**Sistematika Proses Pemasukan (*Submission*) Artikel hingga Terbit (*Published*) pada *International Journal on Advanced Science, Engineering and Information Technology (IJASEIT)***

**JUDUL PAPER**

***Sensory Quality Profile of Ranah Minang Arabica Coffee Specialty***

Editor in Chief
International Journal on Advanced Science, Engineering and Information Technology (IJASEIT)
ISSN: 2088-5334 / e-ISSN: 2460-6952 / DOI: 10.18517

2017 SCImago Journal Rank (SJR): 0.242
2018 SCImago Journal Rank (SJR): 0.230
2019 SCImago Journal Rank (SJR): 0.274


**International Journal on Advanced Science, Engineering and Information Technology**

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## #11179 Summary

SUMMARY REVIEW EDITING

### Submission

| | |
|---|---|
| Authors | Rince Alfia Fadri, Kesuma Sayuti, Novizar Nazir, Irfan Suliansyah |
| Title | Sensory Quality Profile of Ranah Minang Arabica Coffee Specialty |
| Original file | 11179-23206-1-SM.DOC 2020-02-25 |
| Supp. files | None |
| Submitter | Mrs Rince Alfia Fadri |
| Date submitted | February 25, 2020 - 07:57 PM |
| Section | Articles |
| Editor | Rahmat Hidayat |
| Author comments | I am writing to submit our manuscript entitled, "**SENSORY QUALITY PROFILE OF *RANAH MINANG* ARABICA COFFEE SPECIALTY,**" for consideration for publication in IJASEIT.<br><br>Research on the sensory and quality of West Sumatra Arabica coffee has never been done before. So we think it is very important to publish it in your journal.<br><br>Our research study on the quality of sensory or special coffee flavors is crucial, including consistency. The quality of coffee taste was analyzed descriptively with Cup quality.Coffee has a very diverse character and flavor, each coffee variety has a distinct aroma and flavor. This difference in taste depends on the altitude, fertility condition, nutrient availability, as well as the chemical content of the land that becomes coffee planting media. Identification of flavor with wheel note Flavor reference, a circle chart-shaped tool containing flavor and aroma categories, so. they are likely to be of great interest to the vision scientists, researchers, and lecturers who read your journal. |

| | |
|---|---|
| | This manuscript describes original work and is not under consideration by any other journal. All authors approved the manuscript and this submission. Research on the sensory and quality of West Sumatra Arabica coffee has never been done before. So we think it is very important to publish it in your journal.Thank you for receiving our manuscript and considering it for review. We appreciate your time and look forward to your response. |
| Abstract Views | 9 |

## Status

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| Status | Published Vol 11, No 1 (2021) |
| Initiated | 2021-02-21 |
| Last modified | 2021-02-28 |

## Submission Metadata

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| Bio Statement | – |


### Title and Abstract

Title: Sensory Quality Profile of Ranah Minang Arabica Coffee Specialty

Abstract


Research has been conducted to determine the Minang domain arabica coffee sensory quality profile, which can be used as a reference for specialty coffee. Seed processing is carried out at the research location (Solok Regency, South Solok Regency, Pasaman, Agam, and Fifty Cities) until the grain stage is wet (washed). Fianda Coffee Roastery carries out the coffee roasting process. Coffee uses W600i Roaster with a long roast method with two treatments, namely temperature 1800C for 15 minutes, temperature B 2000C for 10 minutes. The taste test was conducted at a two-door cafe and the Indonesian Coffee and Cocoa Research Institute Laboratory, Jember, East Java, following the SCAA. The test results showed that dry coffee beans' moisture content for all treatments was <12%. Testing of brewing quality characteristic shows that five local coffee origins (SC 1, SC 2, SC 3, SC 4, and SC 5) could meet the specialization qualifications under the SCAA Flavor Test Protocol (final score of at least 80) so that they meet the specifications for quality requirements as typical coffee from the Minang realm. The five Arabica coffee samples' taste quality is almost the same, but each has a unique aroma profile. The SC 1 and SC 2 coffee samples had a distinctive lemon (lemon) aroma, while SC 3 and SC 4 each had a honey-like aroma (honeyed), Herb aroma produced by SC 5, and SC1. Only SC 3 brewing produces a chocolaty aroma.


### Indexing


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|---|---|
| Keywords | Ranah Minang; specialty coffee; sensory quality; Arabica. |
| Language | en |


### Supporting Agencies


Agencies: West Sumatra Minang Coffee Association


### References


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1 - 10 of 10 Items

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## #11179 Summary

SUMMARY REVIEW EDITING

### Submission

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|---|---|
| Authors | Rince Alfia Fadri, Kesuma Sayuti, Novizar Nazir, Irfan Suliansyah |
| Title | Sensory Quality Profile of Ranah Minang Arabica Coffee Specialty |
| Original file | 11179-23206-1-SM.DOC 2020-02-25 |
| Supp. files | None |
| Submitter | Mrs Rince Alfia Fadri |
| Date submitted | February 25, 2020 - 07:57 PM |
| Section | Articles |
| Editor | Rahmat Hidayat |
| Author comments | I am writing to submit our manuscript entitled, "**SENSORY QUALITY PROFILE OF *RANAH MINANG* ARABICA COFFEE SPECIALTY,**" for consideration for publication in IJASEIT.<br><br>Research on the sensory and quality of West Sumatra Arabica coffee has never been done before. So we think it is very important to publish it in your journal.<br><br>Our research study on the quality of sensory or special coffee flavors is crucial, including consistency. The quality of coffee taste was analyzed descriptively with Cup quality.Coffee has a very diverse character and flavor, each coffee variety has a distinct aroma and flavor. This difference in taste depends on the altitude, fertility condition, nutrient availability, as well as the chemical content of the land that becomes coffee planting media. Identification of flavor with wheel note Flavor reference, a circle chart-shaped tool containing flavor and aroma categories, so. they are likely to be of great interest to the vision scientists, researchers, and lecturers who read your journal.<br><br>This manuscript describes original work and is not under consideration by any other journal. All authors approved the manuscript and this submission. Research on the sensory and quality of West Sumatra Arabica coffee has never been done before. So we think it is very important to publish it in your journal.Thank you for receiving our manuscript and considering it for review. We appreciate your time and look forward to your response. |
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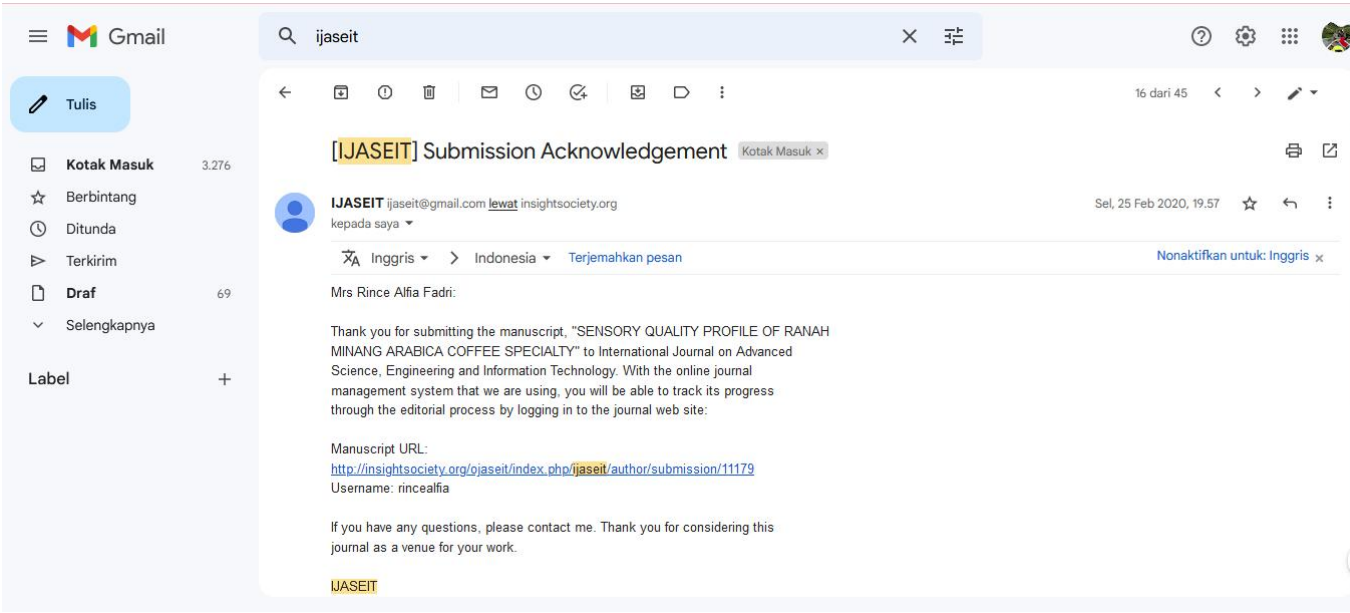
2. Balasan dari editor IJASEIT ijaseit@gmail.com **lewat** insightsociety.org dengan ***subjek*** manuscript diterima 25 Februari 2020 Jam 19.57 WIB

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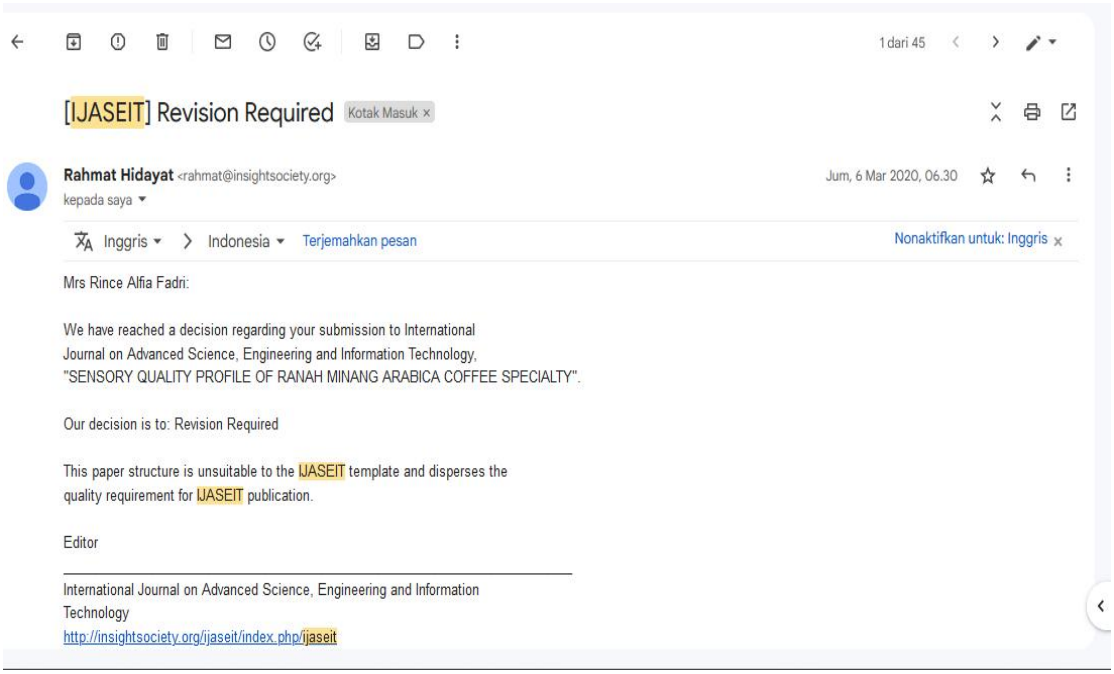


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# REVIEW FORM

6th March 2020
Ref. No. 4/ReV/IJASEIT/III/2020

Dear Rince Alfia Fadri,
Study Program of Food Technology, Payakumbuh State Agricultural Polytechnic, 26271, Indonesia
Corresponding author: alfiarince@gmail.com

| | |
|---|---|
| Title: | Sensory Quality Profile Of *Ranah Minang* Arabica Coffee Specialty |
| Author(s): | Rince Alfia Fadri, Kesuma Sayuti, Novizar Nazir, Irfan Suliansyah |
| Paper-ID | 11179 |

## A. Technical aspects

| | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1. The paper is within the scope of the Journal. | □ | □ | □ | □ | ■ | □ |
| 2. The paper is original. | □ | □ | □ | □ | □ | ■ |
| 3. The paper is free of technical errors. | □ | □ | □ | □ | ■ | □ |

## B. Communications aspects

| | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1. The paper is clearly readable. | □ | □ | □ | □ | ■ | □ |
| 2. The figures are clear & do clearly convey the intended message. | □ | □ | □ | □ | □ | ■ |
| 3. The length of the paper is appropriate. | □ | □ | □ | □ | ■ | □ |

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**C. Comments to the authors** (You may use another sheet of paper.)

Thank you very much for the submission through the online system. The manuscript has been reviewed. Please look into this and resubmission your manuscript after revision. Please find the revision in the attachment!

Thank you for submitting your manuscript to International Journal of International Journal on Advanced Science, Engineering and Information Technology (*IJASEIT*). I have received comments from reviewers on your manuscript. Your paper should become acceptable for publication pending suitable minor revision and modification of the article in light of the appended reviewer comments.

***The novelty:*** Research has been done to know the sensory quality profile of *Ranah Minang* Arabica coffee that can be used as a reference for specialty coffee. Arabica coffee from *Ranah Minang* province of West Sumatra is one of the superior export commodities in Indonesia. Quality improvement of coffee is rated more important today, considering the world coffee market condition is being more competitive. For consumers, the quality of coffee is tightly related to its good flavor.

**The Title:** The **title** summarizes the main idea or ideas of your study. A good **title contains** the fewest possible words that adequately describe the contents and/or purpose of your research paper. The **title** is without doubt the part of a paper that is read the most, and it is usually read first. The title of this paper is good and informative.

**The abstract**: has already explained, "What is the importance of research". [An abstract should be between 150-250 words.]. Please improve the English, use simple sentence and provide the implication of research.

*Abstract*— **ABSTRACK**

**Abstract** –Research has been done to know the sensory quality profile of Ranah Minang Arabica coffee that can be used as a reference for specialty coffee. Arabica coffee from Ranah Minang province of West Sumatra is one of the superior export commodities in Indonesia. Quality improvement of coffee is rated more important today, considering the world coffee market condition is being more competitive. For consumers, the quality of coffee is tightly related to its good flavor. The seed processing is done at the research site (Solok Regency, South Solok, Pasaman, Agam, and Limapuluh Kota Regency) until the rice grain stage. The seed processing method is done by wet processing (full washed); the coffee roasting process is done by Fianda Coffee Roastery.

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Taste-testing known as cupping is done at two coffee doors cafe and Laboratory of Indonesian Coffee and Cocoa Research Center, Jember, East Java, following SCAA. The test result showed the water content of dried coffee beans for all the treatment is < 12%. Testing of the brewing quality characteristic indicates that the five local coffee origins (SC 1, SC 2, SC 3, SC 4, and SC 5) can qualify for the specialty based on the SCAA Flavor Test Protocol (minimum final score 80) so that it meets the specifications of quality requirements as specialty coffee from Ranah Minang. The quality flavor of the five Arabica coffee samples is almost the same, but each has a unique aroma profile. The sample of coffee SC 1 and SC 2 has a special lemon aroma (lemony), while SC 3 and SC 4 each have a honey-like aroma (honeyed), Herb's aroma produced by SC 5 and SC1. Only SC 3 brewing produces chocolate-like aroma (chocolaty).

Keywords— ranah minang, specialty coffee, arabica

**The Introduction** typically occupies 10-15% of the paper. The **introduction should** consists of two parts: It **should** include a few general statements about the subject to provide a background to your paper and to attract the reader's attention. It **should** try to explain why you are writing the paper. The introduction section has included a general introduction, problem definition, problem solution, study motivation, aims and objectives, gaps in the literature.

**The introduction is already mentioned in the Introduction.**

**The Materials and methodology** is good. The methods have described how the research question was answered, explain how the results were analysed. Adequacy & up-to-date data and methodology: Sufficient data and up-to-date, with the method of analysis and discussion that deep

**Materials and methods has been written in more detailed**

**Results and Discussion** have included findings, comparison with prior studies, causal arguments, and deductive arguments. have included findings, comparison with prior studies, causal arguments, and deductive arguments. This section responds to the question "What have you found?" Hence, only representative results from your research should be presented. The results should be essential for discussion. The author should improve his/her analyzing and also present the comparison between performance of his/her approach and other researches. Results given in figures should not be repeated in tables. This section report the most important FINDINGS, including results of analyses as appropriate. It is very important to prove that the manuscript has a significant value and not trivial.

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All results should be described, including unexpected findings. Authors should include both descriptive statistics and tests of significance. The Publication Manual provides information on tests of significance, including null hypothesis testing, effect sizes, confidence intervals, inferential statistics, and supplementary analyses. In the Discussion section, the writer evaluates and interprets the findings. If the hypotheses were not supported, the author considers post hoc explanations. In interpreting the results, authors consider sources of bias and other threats to internal validity, imprecision of measures, overall number of tests or overlap among tests, effect sizes, and other weaknesses of the study

Pay attention to these tips:

1. Avoid statements that go beyond what the results can support.
2. Avoid non-specific expressions such as "higher temperature", "with shorter time", "highly significant". Quantitative description is always preferred
3. Avoid the sudden introduction of new terms or ideas; You have to present everything in the introduction, to be faced with your results here.
4. Speculations on possible interpretations are allowed, but these should be rooted in fact, rather than imagination. To achieve good interpretations think about:
    a. How do these results relate to the original question or objectives outlined in the Introduction sections?
    b. Are your results consistent with what other investigators have reported?
    c. Discuss weaknesses and discrepancies. If your results were unexpected, try to explain why
    d. Is there another way to interpret your results?
    e. What further research would be necessary to answer the questions raised by your results?
    f. Explain what is new without exaggerating.
    g. Please improve the citation for discussion

**Conclusion:**

This section shows how the work advances the field from the present state of knowledge. In some journals, it's a separate section; in others, it's the last paragraph of the Discussion section. Whatever the case, without a clear conclusion section, reviewers and readers will find it difficult to judge your work and whether it merits publication in the journal.

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A common error in this section is repeating the abstract, or just listing experimental results. Trivial statements of your results are unacceptable in this section. The author should provide a clear scientific justification for your work in this section, and indicate uses and extensions if appropriate. Moreover, the author can suggest future experiments and point out those that are underway. Author can propose present global and specific conclusions, in relation to the objectives included in the introduction**.**

**Reference:**
The author has added references to the publication, which has been published for the past three years, according to the reviewer's advice.

**Decision:** As a result of research with an appropriate methodology, **this paper is ACCEPTED for publication**

Additional Comments:

**There are some grammatical mistakes and some mistakes in Punctuation.**

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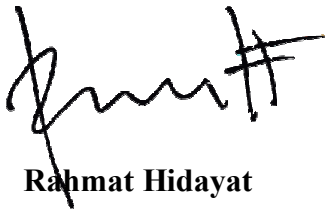

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International Journal on Advanced Science,
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# SENSORY QUALITY PROFILE OF *RANAH MINANG* ARABICA COFFEE SPECIALTY

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***Abstract*—** Research has been done to know the sensory quality profile of *Ranah Minang* Arabica coffee that can be used as a reference for specialty coffee. Arabica coffee from *Ranah Minang* province of West Sumatra is one of the superior export commodities in Indonesia. Quality improvement of coffee is rated more important today, considering the world coffee market condition is being more competitive. For consumers, the quality of coffee is tightly related to its good flavor. The seed processing is done at the research site (Solok Regency, South Solok, Pasaman, Agam, and Limapuluh Kota Regency) until the rice grain stage. The seed processing method is done by wet processing (full washed); the coffee roasting process is done by *Fianda Coffee Roastery. Taste-testing known as cupping is done at two coffee doors cafe and Laboratory of Indonesian Coffee and Cocoa Research Center, Jember, East Java, following SCAA.* The test result showed the water content of dried coffee beans for all the treatment is < 12%. Testing of the brewing quality characteristic indicates that the five local coffee origins (*SC 1, SC 2, SC 3, SC 4, and SC 5*) can qualify for the specialty based on the SCAA Flavor Test Protocol (minimum final score 80) so that it meets the specifications of quality requirements as specialty coffee from Ranah Minang. The quality flavor of the five Arabica coffee samples is almost the same, but each has a unique aroma profile. The sample of coffee SC 1 and SC 2 has a special lemon aroma (lemony), while SC 3 and SC 4 each have a honey-like aroma (honeyed), Herb's aroma produced by SC 5 and SC1. Only SC 3 brewing produces chocolate-like aroma (chocolaty).

***Keywords*— ranah minang, specialty coffee, arabica**

## I. INTRODUCTION

Specialty Coffee is an assessment or classification of coffee that has a special aroma and flavor that with a minimum value of 80 and a maximum of 100 and does not have a major defect in the green bean. Specialty Coffee is the term for coffee with the highest grade because coffee is processed specifically with special provisions, also ranging from upstream to downstream. The quality of the sensory or specialty coffee flavor is very decisive, including consistency. Coffee taste quality-analyzed descriptively with Cup quality [1,2,3]. Cupping (cup quality) is a method of systematic in evaluating the aroma and flavor of coffee samples and assessing the coffee beans to be sold, product quality control, development and evaluation of new or mixed products (blend), to convince the material purchased As desired, and lastly to get to know the flavor of coffee.

Coffee has a very diverse character and flavor, each coffee variety has a distinct aroma and flavor. This difference in taste depends on the altitude, fertility condition, nutrient availability, as well as the chemical content of the land that becomes coffee planting media. Identification of flavor with *wheel note Flavor* reference, a circle chart-shaped tool containing flavor and aroma categories, for industrial use in determining the flavor of coffee to be assessed by the person who works as a sampling and coffee grader giver Called Q grader. The Coffee Quality Institute (CQI) International Institute ensures that distributed coffee is

a specialty coffee that has been through the test stage. This is the advancement of the third Wave era, which is closely related to support the smooth coffee chain industry in terms of specialty coffee distribution. CQI created the Q Grader program to become the coordinator of the coffee era, taking part to ensure that the coffee that is distributed is actually specialty coffee. To determine the characteristics of good coffee can also be seen from the standard *Specialty Coffee Association of America (SCAA),* it is the standard to see the characteristic flavor of coffee beans that will be roasted and brewed by pay attention to the selection process of Coffee beans to be served. Rice coffee beans do not have a characteristic flavor of coffee but contain only precursors compounds (prospective)the forming of flavors.

New Coffee flavor character formed after coffee beans are roasted. During the roasting, there are complex chemical reactions until formed the chemical components forming a characteristic coffee character. Up to now, it has been able to be detected more than 800 aroma forming chemical compounds; in addition, there are still many components that have not been detectable, including non-volatile compounds. The Aroma of coffee produced during the roasting process depends on the type of green coffee used, the way of processing coffee beans, roasting, grinding, storage, and method of brewing. The roasting of coffee beans will change the content chemically in coffee beans, accompanied by weight, increasing the size of coffee beans and color change of seeds. Roasted Coffee beans will undergo a chemical change that is an element of delicious taste [4,5].

Quality improvement of coffee is rated more important to do today considering the condition of the world Coffee Market that is more competitive. For consumers, the quality of coffee cannot be released from its good flavor. A variety of specialty coffee products then emerge as consumers' demand is higher than one of the coffee quality variables. The term of specialty coffee is aimed to the Arabica coffee products in certain regions that have distinctive properties prominent with stable quality, especially processed by the roaster, and traded specifically in the form of roasted coffee, ground coffee, or Brewing Coffee in certain retail markets [6,7]. The determination of specialty coffee in Indonesia is still based on the location of the development (origin). In fact, the availability of broad genetic diversity provides the opportunity to conduct a selection of Single Cultivar Based Specialty Coffee, which grows in specific locations (single origin). Based on the results of previous studies have been proved to be a diversity of physical quality characteristic, biochemistry, and taste among Arabica coffee Cultivar [8,9,10].

Overseas, coffee beans derived from a single cultivar that has been marketed as specialty coffees. Product identification and certification today can even be done with the help of molecular markers [11,12]. With the emergence of a new specialty coffee single cultivar based, farmers are expected to obtain incentives in the form of higher prices for the crops of the cultivars concerned. The assessment of the quality of coffee is not simple but very complex, and many factors will affect it, ranging from the level of on-farm to Off-farm [13,14,15]. Coffee quality is influenced by differences in genetic factors (cultivars), altitude, and also processing into rice seeds (green beans). Therefore, the interaction process of these three factors to the quality attribute of coffee becomes more complex. Interactions research of various factors is still relatively limited. Based on the above, it is necessary to do research to know the sensory quality profile of the *Ranah Minang* Arabica Coffee, which can be used as a reference for specialty coffee.

## II. METHOD

### *A. Time and Place*

Seed processing is done at the research site (*Solok Regency, South Solok, Pasaman, Agam, and Limapuluh Kota* Regency) until the rice grain stage. The seed processing method is done by wet processing (full washed) [16,17]. The wet processing method is done by means of harvested red coffee fruit mechanically peeled using a pulper machine to separate the skin of the fruit from the seeds, then fermented for 24 hours, and then it is washed until clean and directly dried by Sunlight. The quality testing of green coffee is done at Payakumbuh State Agricultural Polytechnic Laboratory. The process of coffee roasting is done by Fianda Coffee Roastery. Taste-testing known as cupping will be done at *Two Doors coffee cafe* and *Laboratory of Indonesian Coffee and Cocoa Research Center*, Jember, East Java, following the standard Specialty Coffee Association of America *(Specialty Coffee Association of America)* [18]. The research had been done for eight months, from May to December 2019

### *B. Tools and Materials*

The tools used in this study are pulper, sieve with size 30 and 75 mesh, stainless cups, thermometer, desiccator, digital scales, basin, plastic, measuring cup/chemical, pipette drops, filter paper, electric heating equipment, and cotton wool, pH meter, tester, Erlenmeyer, Volumetric flask, oven, Roaster machine *Brand Berto* and equipment for organoleptic test/cupping test. The materials used in this task are Single Origin Arabica Coffee from The Regency of Solok, South Solok, Pasaman, Agam, and Limapuluh Kota Regency *Sigagar Utang Varieties* by means of Fully washed processing.

### *C. Roasting Method*

Coffee Roasting by Berto Roaster using A long roast method with two treatments, which is temperature $175^0$C with a time of 15 minutes, B temperature $200^0$C with a time of 10 minutes. The Data obtained is analyzed using two-factors two-levels factorial design. Two-factors factorials are temperature and time, while for two levels that use are high temperature and low temperature. The established factor is used to determine the temperature and the optimization time that can produce accepted coffee flavor by the community.

### *D. Sensory Test Method/Cupping Test*

Coffee brewing quality tests and data analysis of rice coffee beans that are processed into ground coffee as much as 500g for each treatment. The whole process of processing into ground coffee, as well as Coffee brewing quality test (cupping), will be done at *Two Doors Coffee Cafe* and *Laboratory of Indonesian Coffee and Cocoa Research*

*Center*, Jember, East Java, following the standard Specialty Coffee Association of America. The brewing quality assessment was done by several expert panelists and Q grader. The tested quality attributes included aroma, flavor, body, acidity, aftertaste, sweetness, balance, clean cup, uniformity, defect, and overall, as well as the total score value (*Specialty Coffee Association of America*) [19].

Several things that must be considered by Q grader and trained panelists before doing the tastings are room conditions and the date of roasting samples. The ideal room has bright light and does not contaminate any smell because it can interfere with the color assessment of the brew and aroma—meanwhile, roasted samples not more than one week from the evaluation time. The tools in the *cupping* coffee technique are *flavor note wheel* and cupping spoon. The procedure of coffee cupping starts by grinding the roasted coffee beans to smoothness level of medium-coarse or medium. Boil water up to 96 °c. Sniff in the aroma of the coffee powder (first analysis). Note on the *flavor note wheel*. The coffee cupping technique uses a ratio of 150 ml of water for 8.5 grams. Brew with a *tubruk* technique (*Tubruk) Indonesian style coffee where coarse coffee grounds are boiled along with solid sugar)* Let it brew for 4 minutes. Sniff in the scent again after brewed (second analysis). Note on the *flavor note wheel*. With a cupping spoon, remove the powder are on the surface to the edges, then sniff in the aroma (third analysis). Note on the *flavor note wheel*. Move the powder that is still on the surface to another container using a cupping spoon. Take a cupping spoon of the brewing water, sipping until filling the mouth. Note on the *flavor note wheel*.

## III. RESULT AND DISCUSSION

### *A. Coffee Beans Quality Value*

The criteria for determining the quality of coffee beans refer to the physical test standard of *Indonesian National Standard* [18] and the standard of Specialty Coffee Association of America (SCAA) [19]. The stages of physical test of coffee beans that are commonly done are water content test, Trasee test, defect test, color/smell test, seed size test. The *Minang Coffee Association* in the *Ranah Minang* uses the criteria of physical quality value, water content, seed defect value, and land elevation for quality determination of coffee. Physical testing is a system used to assess the quality of coffee beans based on their physique, either using AIDS or using the human senses in accordance with the prevailing standards.

*Figure 1. West Sumatera Arabica coffee beans samples*

1) Water Content Value

Visually observation shows that the color of coffee beans will be darker with the length of time of fermentation. This shows that microbial penetration into coffee beans is getting stronger with the growing length of fermentation time. This is in line with the statement of *Marcone (2004*) as well as *Hadipernata & Nugraha (2012*) in coffee beans, and there is a change in the color of coffee beans become darker. The test results showed the water content of dried coffee beans all the treatment of < 12% so as to meet the specification of the quality requirements SNI 01-2907-2008 (BSN, 2008). Water content testing is carried out using a drying oven with weighing methods. The water content of the *Ranah Minang* Arabica coffee powder is available in Table 1.

TABLE I
West Sumatra *Single Origin* Arabica Coffee Beans Water Content Various of Variety

| Sample Codes | Water Content Average (%) |
|---|---|
| SC 1 | 10.5 |
| SC 2 | 10.7 |
| SC 3 | 10.8 |
| SC 4 | 11.1 |
| SC 5 | 11.6 |

Water content testing shows the average sample has 10.94 % or below 12 % water content. The maximum water content is 11.6 % and the lowest 10.5 %. Water content testing is very closely related to the potential of the growth of fungus that is widely found in coffee such as Aspergillus Ochraeceus and Aspergillus Niger, Two types of fungus that cause ochratoxins (OTA). OTA is a toxin or toxic compound that becomes the standard quality of the coffee. Coffee importing countries have set the maximum content of OTA in coffee beans and its dairy products. Italy sets the maximum content of OTA on coffee beans and processed coffee products, respectively, of 8 and 4 ppb [20]. The existence of mycotoxins in coffee is very detrimental to the trade/economy of the country, especially the coffee-producing country [21,22].

*2) Triage Value*

Triage is a percentage of defect seeds in 100 grams of coffee beans. Testing of Triage is done in a weighted manner where it will be separated between the defect beans with normal beans, and the weighing result of defects beans is referred to as the percentage of triage, Test of Triage done in the origin coffee beans, high or low of triage to present The quality of the coffee beans.

*3) Defect Value*

The defect is the sum of the value of coffee beans defect, Test of Defect done at the time coffee beans ready to export to determine the quality or grade of the coffee. To determine defect can use two systems, namely the *Indonesian National Standard* and standard *Specialty Coffee Association of America (SCAA)*[19].

Figure 2. Coffee Beans Quality Test

Physical quality test is a system that is used to assess the quality of coffee beans based on their physique, either using AIDS or using human senses in accordance with the prevailing standards. The quality standard of coffee beans has been encouraged since 1978 through *DECREE* of the Minister of Trade No. 108/Kp/VII/78 dated 1 July 1978. The quality standard of coffee beans used is the triage system. But from October 1, 1983, until now, to determine the quality of coffee, Indonesia uses the *Defects Value system* in accordance with the decision of the *International Coffee Organization (ICO).* In this defect system, the more the value of the defect, the lower the quality of the coffee, and the smaller the value of defect, the better the quality of the coffee. Coffee beans are a coffee that is ready to be traded, the form of dried coffee beans that have been detached from the fruit flesh, horns skin, and skin.

| | |
|---|---|
|  | Coffee beans caused by insects that cause perforated beans and damaged beans due to post-picking or harvesting |
|  | Seeds are subjected to depreciation. The cause is due to drought and less fertile beans |
|  | Coffee beans in good condition, do not suffer damage and uninfected with coffee bean crop pests |

| | |
|---|---|
|  | Coffee beans in good condition, do not suffer damage and uninfected with coffee bean crop pests |

Figure. 3. Defect of ***Ranah Minang*** Coffee Beans

The rupture bean is the coffee beans are not intact, have the same size or less than 3/4 parts of intact seeds. Young seeds are small coffee beans and wrinkles on all parts of the outside. This is due to the harvesting of the fruit that is too young. One hollowed bean is a coffee bean that is one hollowed due to insect attack. More than one perforated beans are coffee beans that are perforated more than one due to insect attack. Spotted beans are coffee beans that are spotted on the outside. This is due to the of the pulper or washer which is less appropriate (too tightly) so that injuries to the surface of the bean. Rupture Black bean is black coffee beans are not intact, have the same size or less than 3/4 parts of intact beans. The rupture of this black bean is due to the adjustment of pulper, washer, or huller that is too tightly, direct Peeling after drying or a very low water content coffee peeling [23,24,25, 26]. The Black bean is a coffee bean that is half or more outside of it is black. Black coffee beans are caused by fruit disease and fruit decay during the hoarding or too young fruit picking. While the partly black beans are coffee beans are less than half the outside is black. This is due to injuries that occur during pulping or washing. The roll coffee is dried coffee fruit, or dried coffee beans are still wrapped in the skin of the fruit. This is caused by the too high water content of coffee in the time of peeling. The brown beans is a coffee bean that is half or more outside of brown. Red coffee beans are caused by overripe fruit harvesting, absorption of fruit flesh that is destroyed during bean fermentation, and imperfect washing or too dry drying temperatures. Therefore, the fermentation process is an important step in the processing of coffee in a wet manner, considering its positive influence on the improvement of Taste [27,28]. On physical sightings, arabica coffee beans testing does not indicate the presence of mold or live insects, so that still meet the quality requirements according to the Indonesian National Standard; likewise, the aroma, the aroma of arabica coffee beans do not indicate the presence of rotten smell like moss or rotten coffee skin. Before further processing, coffee beans are dried with the method of sunbathing.

Referring to the history of the implementation of quality standards on the commodity of coffee has existed since the Dutch era, then known as OVEIP or organizers Atie Verenigde Eksporteurs Van Indonesiche Producten. This organization is an institution that standardizes the commodity products exported from Indonesia. Subsequently applied TRIAGE system, or better known by a gross value system. The gross value in question is the coffee beans of black, brown, and crushed seeds. The quality standard of coffee beans has been encouraged since 1978 through DECREE of the Minister of Trade No. 108/Kp/VII/78 dated 1 July 1978. The quality standard of coffee beans used is the triage system. With the development of tastes and demand

for coffee commodities, then on 1 October 1983, set the standard of coffee quality with the name of defect value system . Coffee Quality system is known quality coffee 1 to quality 6. Renewal of quality standards with this system is intended to adjust the quality standards of Indonesian coffee with a quality level system or qualities in a country, especially the coffee-producing country. This system is adopted by *the National Standardization Agency* in setting *the Indonesian National Standard* for coffee beans quality.

As time goes by, coffee beans Indonesian National Standard undergoes several changes, and the latest Standard used today is Indonesian National Standard No. 01-2907-2008. In this standard, there is the definition and determination of the defect value for the type of coffee beans defect, and the quality classification based on the value of defects obtained. Defect in coffee is sensation characteristic of unpleasant (negative) coffee flavor that occurs due to several factors, including the processing of green beans are not careful, improper harvesting process, imprecision of water content During storage, or the presence of physical defects in coffee beans that cause taste defect or aroma defect. Renewal of quality standard with a defective value system is also meant to adjust the quality standard of our coffee with a system widely used in various countries of coffee producers, also to be more easily understood by buyers from consumer countries. This defective value system is still used with only a few revisions [18,19].

The provisions on bean quality at this time are generally based on the assessment on the content of coffee beans defect in the coffee bean party that is taken through examples or samples representing a coffee bean party. Determining the type or type of quality is based on the determination of Defect value [18,19]. According to the International Coffee Organization (ICO), the consumption of coffee increased from year to year, so that the increase in coffee production in Indonesia has the opportunity to export coffee to the major coffee consumption countries in the world such as the Europe, America, and Japan. Coffee beans in Indonesia are also supplied to coffee shops such as Starbuck and Quick Chek located in Indonesia and abroad [29].

Based on the general quality requirements shown in table 1 above is known that in all samples of coffee from the origin of Ranah Minang no found living insects and also odorless bean and or mold smelly. Based on the results of coffee impurity fraction analysis found in several samples, but still under the threshold of the coffee quality requirement of 0.5%. Some samples are even completely undiscovered there is the impurity, this indicates that the level of sorting has been done well, it is in line with the identification of post-harvest coffee handling by coffee farmers in West Sumatera. The smell is one of the determining parameters of coffee quality. According to *Sumarlin (2007)*, the taste defects that should be avoided from coffee is the presence of stink, smell of soil (earthy), smell of fungus (moldy), smell of moss (musty), unpleasant acid taste (sour), smell of petroleum (oily), smell of chemicals (chemical) and smell of Smoke (smoky) [30].

*4) Color and Small Value*

The test is done by using the senses in the form of carefulness in the observing and smelling; good coffee beans have a fresh smell and bright colors and not contaminated with foreign materials, either causing discoloration or smell.

Figure 4. ***Ranah Minang*** Coffee Beans Colors

*5) Coffee Beans Size Value*

Coffee beans used in the research of Ranah Minang Arabica coffee is from *Solok Regency, South Solok, Pasaman, Agam, and Limapuluh Kota Regency*. This test is done to determine the size of coffee beans, namely large bean size, medium bean size, small bean Size, as well as very small seeds/do not pass the screen (shells). The test is done using Screen consisting of several minimum levels of 4 levels. According to SNI 01-2907-2008, the quality requirement of coffee based on its size is divided into three size criteria, namely the large (not qualified to pass the diameter of 7.5 mm sieve/sieve No. 19, Medium (qualified to pass the diameter of 7.5 mm sieve, do not pass the sieve 6.5 mm/Sieve No.16), and small (qualified to pass sieve diameter 6.5, not qualified to pass sieve diameter 5,5 mm/ sieve No.14).

Some type of defects on a fairly common coffee found and should be avoided by any coffee farmer is ***a)*** Baked coffee; this defect occurs when the coffee is roasted too long with a low temperature without reaching the first crack. This defect can not be seen with the naked eye. Generally, coffee with defects like this produces a coffee flavor that is flat, a little sweetness or often described as a taste like fresh bread or paper. ***b)*** Underdeveloped Coffee, which is an imperfect coffee bean (underdeveloped), tends to have a grass-like flavor (grassy) or like eating a green plant stem. The most noticeable thing when doing this type of coffee cupping is the taste of muted acidity. ***c)*** Overdeveloped Coffee, this type of defect is the opposite of the underdeveloped. Between Overdeveloped and dark roast, the difference is

very thin. However, when the roaster roasting the coffee is darker than the original goal, of course, this makes the coffee into a broken category (defect). The most obvious thing is the result of coffee that has been roasted to be dark close to black and oily. The characteristic flavor that can be felt is bitter; it feels like eating charcoal/coal and leaving a less comfortable aftertaste. ***d)*** Quakers are a common type of defect found, especially when purchasing packaged coffee (whole beans). Quaker is an immature coffee bean and generally has a wrinkled surface. It is difficult to identify Quakers while still in the form of green beans. Quaker generally occurs because it is caused by bad soil conditions so that the essence of sugar and starch in coffee beans is not developed perfectly. Technically this is not a defect due to the roasting method, but generally, we can only find Quaker after the coffee is roasted. To get the maximum flavor of the coffee, the Quaker should be sorted and discarded. Otherwise, brewed coffee will produce flavors such as paper, cereal, and dry. e) Overfermented, balanced coffee fermentation can produce an exotic and complex fruit flavor character and has an acidity like fresh grapes. However, what happens if the fermentation is left for too long will result in a taste like rotten fruit or vinegar. f) Baggy/Past Corp, this type of defect can be found when coffee beans are stored too long in bad condition. When sipping the coffee, it will produce less savory flavor, such as cardboard or wood.
Overall, the coffee beans from Ranah Minang almost no one hundred percent can be declared zero defect, and always there will be expressed defects or damaged beans in it. It can be minimized by the sorting process. To determine the quality of specialty coffee, coffee farmers in West Sumatera use the Defects Value system according to the decision of ICO (International Coffe Organization). In this defect system, the more value of the defect, the quality of the coffee will be lower, and the lower the value of the defect, the quality of coffee is better. Specialty Coffee is the term for coffee with the highest grade because coffee is processed specifically with special provisions from the initial process of coffee is planted until it is served in a cup.

*6) Fat Content*

***Ranah Minang*** Arabica coffee fat content can be seen in Table 2, indicating that the fat content is different for each variety. The amount of fat content contained in the coffee beans affects the flavor of the coffee.

Table 2. West Sumatra *Single Origin* Arabica Coffee Beans Fat Content Various of Variety

| Sample Codes | Fat Content Average (%) |
|---|---|
| SC 1 | 2.75 |
| SC 2 | 2.93 |
| SC 3 | 3.11 |
| SC 4 | 3.14 |
| SC 5 | 2.26 |

The fat content of Arabica coffee is found in the cuticle, the beans protector, and coffee oil. In the cuticle contained five hydroxytryptophan fat acid from palmitic acid, Arachidate, Behenate, and Lignoserat. Fat on coffee is one of the chemical composition of coffee that makes up the coffee flavor. The total fat content of the Arabica coffee is between 2-6%, which is on the cuticle of beans protector. The increase of free fatty acids during storage will cause rancidity on the coffee powder, so it will affect the flavor as well as lowering the coffee powder quality. Fat content produced is the same as rice coffee beans [31].

## *B. Sensory Profile of Specialty Arabica Coffee in West Sumatera*

1) Quality Diversity of Coffee Brewing

Planted Coffee and grow in the area around the plateau in West Sumatra precisely in the regency of Solok, South Solok, Pasaman, Agam, and Limapuluh Kota Regency. Coffee in Ranah Minang also picked directly by hand by the farmers with the method of handpicking/selective pick. The natural condition of the Ranah Minang Highlands has a great influence on the quality of the aroma and flavor of the coffee produced. Ranah Minang coffee is a strong specific aroma between the combination of fresh fruits and spices. Another characteristic is its full body coffee character and has a sweet flavor like vanilla/caramel/hazelnut. The combination of pleasant taste will be felt in the after taste.

The testing results of the quality of brewing characteristics show that the five local coffee origins (SC 1, SC 2, SC 3, SC 4, and SC 5) can qualify for the specialty based on the flavor test protocol of the SCAA (minimum final score 80). The final score difference between counties is very thin. Similarly, the scores of each flavor attribute are almost identical to all cultivars. The condition does not reflect the diversity of seed size among the five samples. These results also support the conclusion of Kathurima et al. (2009) that the size of the seeds is not real correlates positively with the quality of flavor. The interesting thing is the Clean Cup, uniformity, and sweetness attributes for all the tested coffee origins obtain a maximum score (10) so that the category is extraordinary (exceptional). Many coffee aroma forming components, including the oil in coffee that has been roasted very sensitive to damage mainly due to oxidation and hydrolysis.

Based on the test result, the highest score for the body attribute is given to the SC 3 sample code whose caffeine content is lower than SC 1, SC 2, SC 4, and SC 5. The results tend to agree with *James J. E (1991)*, who reports that caffeine content in coffee beans is negatively correlated with most of its flavor quality character. The caffeine content also proved to be not real positive correlates with flavor components [32,33,34], which directly affects the quality of coffee as a whole. The physical characteristics of the beans are not really correlated with the caffeine content, so that it cannot be used as an indirect identifier in the selection process. On the other, Salva (2011) argues that the attributes of the body are closely correlated with protein and lipid content, while the caffeine content relates to the character of bitterness [35].

Although quantitatively, the quality of the fifth flavor of the Arabica coffee sample is almost identical, each has a unique aroma profile. The sample with the SC 1 coffee, SC 2 each has a distinctive aroma resembling lemon (lemony), while SC 3 and SC 4 each have a honey fragrance (honeyed). Spicy Aroma is produced by SC 5 and SC1. Only SC 3, whose flavor produces a distinctive aroma resembling

chocolate (chocolaty). It is suspected that the distinctive aroma ever attracted the roaster and gave a higher price at the farmer's level to the original coffee beans SC 1. According to Borém et al. (2008), the distinctive fragrance of the brew is proven to provide added value to the produced coffee products. The difference in the content of volatile compounds can be caused by differences in roasting degrees and the difference in the proportion of the compounds found in coffee-related to the distinctive aroma of coffee. Many components are forming coffee aroma, including the oil in roasted coffee. Oil in coffee is very sensitive to damage, mainly due to oxidation and hydrolysis. Therefore, to suppress the damage, the oxygen and water access should be limited, for example, by vacuum packing of the powder or by modifying the air in the package with C02 or N2. Characteristics of the occurrence of aroma (and flavor) damage in the stored coffee are the smell of musty (staling) and rancid [36].

A variety of specialty coffee products then emerge as higher consumers demand to one of the coffee quality variables. The term of specialty coffee is intended for Arabica coffee products in certain regions that have prominent distinctive properties in stable quality, especially processed by the roaster, and traded specifically in the form of roasted coffee, ground coffee, or Coffee as a brew in certain retail markets [37]. The determination of specialty coffee in Indonesia is still based on the location of the development (origin). In fact, the availability of broad genetic diversity provides the opportunity to conduct specialty coffee single cultivar based selection, which grows in specific locations (single origin). Based on the results of the previous study has been proved to be a diversity of physical quality characteristics, Biochemic, and flavors among the Arabica coffee cultivar [38,39]. Overseas, coffee beans derived from single cultivars have been marketed as specialty coffees. Current product identification and certification can even be done with the help of molecular markers. With the advent of a new single cultivar-based specialty coffee, farmers are expected to obtain incentives in the form of higher prices for the crops of the cultivars concerned.

2) Cupping Test Value

Sensory test to know the profile of Ranah Minang Specialty Arabica coffee is done by the Cupping method. Cupping coffee is a method used to assess the taste of the coffee. Because each type of coffee has several different characteristics, so cupping coffee is felt good enough to distinguish the characteristics of the coffee. The cupping method of coffee is done to know the sensitivity of a person through the aroma and despair of the coffee that will be tested by relying on the sense of smell and sense of taste (mouth). Coffee Tasting Test (Cupping) is well known in the mid-19th century in San Francisco. In addition, some are tested to know the characteristic of coffee is the fragrance (dried smell of coffee), aroma, flavor (typical smell of coffee), body (viscosity), acidity (sour taste), aftertaste (sense of taste), sweetness (sweetness), balance (balance of taste and Aroma), clean cup (clean coffee), uniformity (consistency of flavor), overall and defects (delicious or not flavor produced). Some characteristics of the assessment of coffee cupping method are Aroma (fragrance), the aroma of coffee that will be sniffed, that is, the dried smell of coffee beans that have not been brewed but have been finely ground and also smelled wet from coffee beans that have been brewed.

Flavor, this process the tongue is used to translate what has been a smell of the coffee is detected by the tongue or not. The flavor is a combination of perception that is recognized by the tongue and aroma, which is recognized by the overall smell organ. The flavor component of coffee is the main element of the brewing value of a coffee, as it covers two elements at once. In organoleptic Assessment generally, the flavor is usually associated with other effects such as temperature, coarse/fine, etc. In the assessment of coffee flavors usually only include the flavor and aroma in unison and intact. It is true that other elements such as the heat level of the brewing also determine especially the aroma, which is associated with the level of volatility of the aroma-forming compounds. The cooler is usually the weaker the aroma value, as a result of the lower the number of volatile compounds in brewing water vapor. Therefore in the assessment of coffee brewing is usually in the condition that is quite hot or warm (± 65°C). For flavor can be done together with aroma, acidity, and after taste. After taste is detected when the first time to drink coffee, it will feel like there is a taste left in the base of the tongue or when swallowed it just passing, and to judge it, the less taste is left, then the better its Value.

Acidity is the process of sensing the acidic presence of coffee while sipping. In addition to the flavor, the assessment of coffee is known as Body element, which is the level of the flavor concentrations of coffee brew. It can easily be imagined between a light coffee (flat) with a heavy coffee. The body value of a coffee is determined by the compounds that are water-soluble when brewed. Compounds such as carbohydrate groups, aromatic compounds, alkaloids, and oils greatly determine the body of a coffee. The higher the compounds that dissolve or form a colloid in a brew fluid than the higher the body value of the coffee. Thus, the body is usually associated with viscosities (viscosity) of liquids, strength (imaginary), and slippery or rough properties, from the brewing fluid. The body referred to here is the thick or light of coffee when it was sipped. Assessment, if the body is thick, then the value to be given should be greater. The body can be given if it is not very fond of coffee; it can not be too distinguish whether the coffee body is thick or thin. Balance of some assessments such as flavor, after taste, and body. And if it is not a balance or less one of all the flavors that come mixed, then the given value is low. Sweetness, in the coffee, also has a sweet flavor, but the sweetness that is inflicted differs from the sweetness of sucrose. The interaction between the taste and aroma components is usually prominent, but there is a balance. There is a particular coffee more acid (arabica in general) known as the acidity, but there is a more dominant coffee sweetness known as acidy.

Clean Cup, this is done at the start of the cupping method. And this assessment can be done coincide with the after taste: uniformity, uniformity between glass one with the other. Overall, the overall assessment of all the characteristics that have been assessed, and the value will be good when what is

felt and sniffed as expected. Defects here is more to the flavor and aroma caused by the coffee. Cupping method has a distinctive way of implementation to get good results and satisfying so that the flavor and aroma produced not too tasteless or even too thick. The cupping method is carried out by weighing coffee as much as 8 grams, and the water measurement is given to 150 ml of glass with a temperature of 90-95°C. Then the coffee that will be tasted of its flavor and aroma to be left for 4 minutes and not mixed with sugar at all during the cupping process. This is done so as not to damage the taste of the coffee itself.

Specialty Coffee is the term for coffee with the highest grade because the coffee is processed specifically with special provisions start from the coffee is planted until it is served in a cup. Arabica coffee from the Ranah Minang can be said to be a specialty coffee because the condition of a coffee can be categorized as a special coffee grade is fulfilled. Coffee that is picked when harvested must be red-colored only, which is then processed into a green bean. It has a total defect of < 4%. If in 1 kg of green bean Specialty Coffee, then the total defect or the damaged beans should not be more than 40 grams. Green bean Specialty Coffee has a test cupping value of more than 80.

Table 3. The Profile of Ranah Minang Specialty Coffee Fully Washed Method

| Name Of Coffee | altitude (mdpl) | Body | Acidity | Taste Profile |
|---|---|---|---|---|
| Agam | 1250 - 1450 | Medium | Low | *Enough sweetness*, spicy like *cinnamon,* herb, *fruity* |
| Solok Selatan | 1100 - 1500 | Medium | Medium | Spicy, herb, vanilla, tea like, tamarin, Clean after taste, Sweet, *fruity, flowery, sugar browning, dried fruit, vinegar smell, sour, chocolate.* |
| Solok | 1250 - 1500 | Medium | Medium | *sugar browning, dried fruit, vinegar smell,* Sweet, *fruity, flowery,* lemon, Cokelat, herb, cinnamon after taste |
| Pasaman | 1250 - 1450 | Medium | Low | Herb, dark chocolate, lemony, sugar browning, cinnamon after taste, flowery, spicy, Green Apple, Citric acid, lime, sweet, ripe fruit, |
| Lima Puluh Kota | 1000 - 1350 | Medium | Low | *Herb, enough sweetness spicy* like *cinnamon,* herb. |

South Solok is one of the areas in West Sumatera, which is famous for its coffee, which has a very wide area of coffee plantations. Coffee cultivation can now be said to be one of the principal professions for most residents there. No wonder if the interest in planting coffee in the South Solok population is increasing. That's why South Solok coffee is increasingly popular among Indonesian coffee lovers. Sumatera itself has many distinctive coffees. However, the South Solok is better known for its coffee than other regions in West Sumatra. In accordance with the region's name, this coffee is called South Solok Coffee. Although not as popular as Aceh coffee and other famous coffees, coffee is no less good results and can be enjoyed by coffee enthusiasts.

This coffee plantation is located in the South Solok precisely between Twin Lakes and Mount of Talang. As it still includes Minang Land, this coffee is also known by the name of coffee Solok Minang. The South Solok coffee is planted close to the slopes of Talang Mountain. The altitude of this area ranges from 1,200M to 1,600M Above The Sea Levels, which has a character of various flavors such as lemon, chocolate, spices, and spicy. Spices and spicy This is the most vicious taste of this coffee. Whatever its name, the coffee is well received by the wider community, not just in Sumatra but throughout Indonesia. Even when properly processed, the quality will not lose with coffee from other countries. In fact, this coffee is also sold to foreign countries. Solok Coffee is increasingly known for at least the last three years. The unique character makes this type of coffee fast-paced and, no wonder if this Solok specialty immediately turned into a new star in the class of Sumatran coffees.

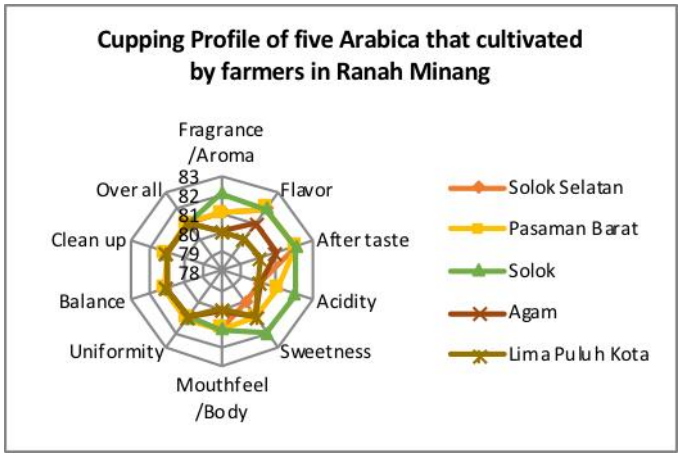


*Figure 5. Cupping profile of five Arabica coffees that cultivated by farmers in Ranah Minang,West Sumatra*

The Body is among the low-medium, sweetness with a lot of notes such as tropical fruits and fruity aroma, flowery, lemon, chocolate, so in general, Solok Coffee tends to be similar to typical African coffee. Limapuluh Kota Regency coffee is almost similar to Minang Solok Coffee; the

production of coffee from Limapuluh Kota, especially from the district of Situjuah also increase significantly since the last three years. Arabica varieties have also gained more special attention from farmers since the year 2015. ***Situjuah*** Subdistrict of Limapuluh Kota regency is located around Mount of Sago; this area has altitude about 1200M-1450M Above The Sea level. Planting areas are scattered in several ***Nagari*** (district). ***Situjuah*** Coffee has a character with a medium body, low acidity, and enough sweetness spices, exactly like cinnamon and herbs. One of the advantages of a wet processing method is the process of fermentation and the cleansing of mucilage.

The aroma aspect includes Fragrance (the smell of coffee when it is still dry) and aroma (smell of coffee when brewed with hot water). One can assess these criteria by three stages in the cupping, which is a) smell of different coffee powder in the bowl before pouring with water. b) Smell the scent while stirring the coffee surface of the brew. c) Smell the coffee aroma when coffee is dissolved. The quality of the special aroma is influenced by the aroma of the dried coffee beans, stirring, and the aroma of the coffee after the coffee is dissolved has a value of 5 vertical scales on the form. The final value must be based on all three aspects: aroma (delicious smell), flavor (typical coffee smell). The flavor shows the special properties between the scent was the first kiss with acidity and ended with an after taste. Flavour is a combination of the tongue and steam aroma of the nose that flows from the mouth to the nose. The value given to flavor should include the influence, quality, and complexity of the combined flavor and aroma when the coffee is sipped into the mouth firmly so that it involves the entire palate in judging.

The Body is based on the flavor when the fluid enters the mouth in particular between the tongue and palate. Most examples with the viscous body have high scores. Some examples with a lightweight body can also have good taste in the mouth. Coffee that has a vicious body such as Sumatran coffee or coffee that has a light body like Mexico coffee becomes a reference though different. Acidity (flavored sour taste), often described as an acidic flavor that is obviously tasty, or sour if not tasty. Good Acidity describing the coffee is delicious, sweet, and like the flavor of fresh fruit that is immediately felt at the time of coffee was sipped. Acidity that is too predominantly categorized is not tasty and inappropriate as an example to assess flavor. Sweetness, it's pleasant because coffee contains carbohydrates. The opponent of the sweetness in this context is sour, astringent, or raw. This Sweetness is not like the flavor of sucrose found in soft drinks.

The Clean Cup indicates the absence of negative values from the beginning of taste until after taste as the end. In judging these criteria should be noted from the beginning of taste until the fluid coffee is swallowed or discarded. Coffee from a bowl that has no flavor and aroma is removed. The value of 2 digits will be given to each cup showing the Clean Cup. Uniformity, There is aroma uniformity from each bowl. Overall is an assessment that reflects the whole aspect above from an example that each assessor has felt. An example with a pleasing aspect but not fulfill the standard criteria will be given a low value. Coffee that has the expected criteria and has a distinctive aroma such as from the Origin state will be given a high value.

## IV. Conclusions

The method of processing, the influence of cultivars, and the elevation of the place of analysis results indicate that there is no real interaction on the entire quality attribute, except for the aftertaste and body attributes as well as the total score. The growing place and the height of coffee is a real effect on the acidity, balance, overalls, and total score attributes. The specialty coffee was introduced the first time in 1978 by Erna Knutsen at an international coffee conference in France. The concept is very simple, namely: a special geographic micro-climate that produces coffee beans with a unique flavor profile. Specialty coffee refers to coffee that is different from ordinary coffee because of its high quality or because the production process obtained certification such as *Organic, Fairtrade, Utz Certified, Rainforest Alliance, c.a.f.é. Practices, Common Code for the Coffee Community (4C), Bird Friendly, and geographical indications.*

The main purpose of cupping is to ensure the best quality of the coffee that has been roasted. Cupping serves as an important method to identify defects caused by nature or that occur through the processing of coffee beans. Not only roasting but can identify any coffee that goes into the category of defect. Other indicators in judging the flavor are the balance of taste, hygiene taste, and the uniformity of the main sense of coffee that can be displayed starting from the fragrance (dried ground coffee smell). The main taste defects should not be the smell of coffee beans such as soil odor, moldy (mildew odor), stuffy (moss odor), sour (sour taste), oily (oil odor), chemicals (chemical odor), smoky (smoke smell), etc.

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# REVIEW FORM

11th July 2020
Ref. No. 14/ReV/IJASEIT/VII/2020

Dear Rince Alfia Fadri,
Study Program of Food Technology, Payakumbuh State Agricultural Polytechnic,26271, Indonesia
Corresponding author: alfiarince@gmail.com

| | |
|---|---|
| Title: | Sensory Quality Profile Of *Ranah Minang* Arabica Coffee Specialty |
| Author(s): | Rince Alfia Fadri, Kesuma Sayuti, Novizar Nazir, Irfan Suliansyah |
| Paper-ID | 11179 |

## A. Technical aspects

| | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1. The paper is within the scope of the Journal. | □ | □ | □ | □ | ■ | □ |
| 2. The paper is original. | □ | □ | □ | □ | □ | ■ |
| 3. The paper is free of technical errors. | □ | □ | □ | □ | ■ | □ |

## B. Communications aspects

| | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1. The paper is clearly readable. | □ | □ | □ | □ | ■ | □ |
| 2. The figures are clear & do clearly convey the intended message. | □ | □ | □ | □ | □ | ■ |
| 3. The length of the paper is appropriate. | □ | □ | □ | □ | ■ | □ |

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**C. Comments to the authors** (You may use another sheet of paper.)

Thank you very much for the submission through the online system. The manuscript has been reviewed. Please look into this and resubmission your manuscript after revision. Please find the revision in the attachment!

***The novelty:*** Research has been done to know the sensory quality profile of *Ranah Minang* Arabica coffee that can be used as a reference for specialty coffee. Arabica coffee from *Ranah Minang* province of West Sumatra is one of the superior export commodities in Indonesia. Quality improvement of coffee is rated more important today, considering the world coffee market condition is being more competitive. For consumers, the quality of coffee is tightly related to its good flavor.

**The Title:** The **title** summarizes the main idea or ideas of your study. A good **title contains** the fewest possible words that adequately describe the contents and/or purpose of your research paper. The **title** is without doubt the part of a paper that is read the most, and it is usually read first. The title of this paper is good and informative.

**The abstract**: has already explained, "What is the importance of research". [An abstract should be between 150-250 words.]. Please improve the English, use simple sentence and provide the implication of research.

*Abstract*— **ABSTRACK**

**Abstract** –Research has been done to know the sensory quality profile of Ranah Minang Arabica coffee that can be used as a reference for specialty coffee. Arabica coffee from Ranah Minang province of West Sumatra is one of the superior export commodities in Indonesia. Quality improvement of coffee is rated more important today, considering the world coffee market condition is being more competitive. For consumers, the quality of coffee is tightly related to its good flavor. The seed processing is done at the research site (Solok Regency, South Solok, Pasaman, Agam, and Limapuluh Kota Regency) until the rice grain stage. The seed processing method is done by wet processing (full washed); the coffee roasting process is done by Fianda Coffee Roastery. Taste-testing known as cupping is done at two coffee doors cafe and Laboratory of Indonesian Coffee and Cocoa Research Center, Jember, East Java, following SCAA. The test result showed the water content of dried coffee beans for all the treatment is < 12%. Testing of the brewing quality characteristic indicates that the five local coffee origins (SC 1, SC 2, SC 3, SC 4, and SC 5) can qualify for the specialty based on the SCAA Flavor Test Protocol (minimum final score 80) so that it meets the specifications of quality requirements as specialty coffee from Ranah Minang.

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The quality flavor of the five Arabica coffee samples is almost the same, but each has a unique aroma profile. The sample of coffee SC 1 and SC 2 has a special lemon aroma (lemony), while SC 3 and SC 4 each have a honey-like aroma (honeyed), Herb's aroma produced by SC 5 and SC1. Only SC 3 brewing produces chocolate-like aroma (chocolaty).

Keywords— ranah minang, specialty coffee, arabica

**The Introduction** typically occupies 10-15% of the paper. The **introduction should** consists of two parts: It **should** include a few general statements about the subject to provide a background to your paper and to attract the reader's attention. It **should** try to explain why you are writing the paper. The introduction section has included a general introduction, problem definition, problem solution, study motivation, aims and objectives, gaps in the literature.

**The Materials and methodology** is good. Materials and methods has been written in more detailed. The methods have described how the research question was answered, explain how the results were analysed. Adequacy & up-to-date data and methodology: Sufficient data and up-to-date, with the method of analysis and discussion that deep

Materials and methods has been written in more detailed

**Results and Discussion** have included findings, comparison with prior studies, causal arguments, and deductive arguments. have included findings, comparison with prior studies, causal arguments, and deductive arguments.

Result and discussion has been written in accordance with scientific principles

**Conclusion:**

The Conclusion has been written in relation to the objectives included in the introduction. The author should provide a clear scientific justification for your work in this section, and indicate uses and extensions if appropriate. Moreover, the author can suggest future experiments and point out those that are underway.

**Reference:**
The author has added references to the publication, which has been published for the past three years, according to the reviewer's advice.

**Decision**: As a result of research with an appropriate methodology, this paper is ACCEPTED for publication.

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Additional Comments:

There are some grammatical  mistakes and some mistakes in Punctuation.

**D. Recommendation** (Tick one)

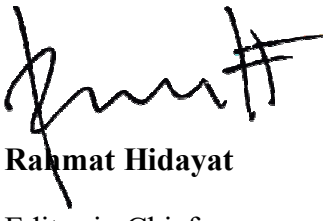
1. Accepted without modifications. ☐
2. Accepted with minor corrections. ■
3. Accepted with major modification. ☐
4. Rejected. ☐

**E. Comments to the editors** (These comments will not be sent to the authors)

Grammar must be extensively improved. Some sentences have poor sentence structure. They are hardly understandable. The more serious issue is, there are spelling mistakes in the article. To show professionalism, the authors should cross-check these before submission

Sincerely,

Regards,



**Rahmat Hidayat**

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7. Hasil Revisi Kedua

# SENSORY QUALITY PROFILE OF ***RANAH MINANG*** ARABICA COFFEE SPECIALTY

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*Abstract*— Research has been done to know the sensory quality profile of *Ranah Minang* Arabica coffee that can be used as a reference for specialty coffee. Arabica coffee from *Ranah Minang* province of West Sumatra is one of the superior export commodities in Indonesia. Quality improvement of coffee is rated more important today, considering the world coffee market condition is being more competitive. For consumers, the quality of coffee is tightly related to its good flavor. The seed processing is done at the research site (Solok Regency, South Solok, Pasaman, Agam, and Limapuluh Kota Regency) until the rice grain stage. The seed processing method is done by wet processing (full washed); the coffee roasting process is done by *Fianda Coffee Roastery. Taste-testing known as cupping is done at two coffee doors cafe and Laboratory of Indonesian Coffee and Cocoa Research Center, Jember, East Java, following SCAA.* The test result showed the water content of dried coffee beans for all the treatment is < 12%. Testing of the brewing quality characteristic indicates that the five local coffee origins (*SC 1, SC 2, SC 3, SC 4, and SC 5*) can qualify for the specialty based on the SCAA Flavor Test Protocol (minimum final score 80) so that it meets the specifications of quality requirements as specialty coffee from Ranah Minang. The quality flavor of the five Arabica coffee samples is almost the same, but each has a unique aroma profile. The sample of coffee SC 1 and SC 2 has a special lemon aroma (lemony), while SC 3 and SC 4 each have a honey-like aroma (honeyed), Herb's aroma produced by SC 5 and SC1. Only SC 3 brewing produces chocolate-like aroma (chocolaty).

***Keywords*— ranah minang, specialty coffee, arabica**

## I. INTRODUCTION

Indonesia, as the second-largest coffee exporting country in Asia, has a rich type of coffee from each region known as specialty coffee. High production and consumption levels also increase counterfeiting rates and mixing seeds between high-quality coffee with low-quality coffee or ingredients other than coffee. A coffee market that has a distinctive flavor (specialty taste) is growing rapidly nowadays, especially in the main consumer countries. Nowadays, the coffee commodity that grows in West Sumatera is increasingly sought after by many coffee enthusiasts in the national and international markets, so the price is increasing. Arabica coffee from *Ranah Minang*, the region of West Sumatera Province, is one of the flagship export commodities in Indonesia that has been known in the domestic and international markets. According to the chairman of the Indonesian Plantation Farmers Association Group **(Gapperindo)*, West Sumatera predicted that the price of coffee from the domain of *Ranah Minang* would increase by 10-15% in 2019. The price of West Sumatra Arabica Coffee in 2018 reaches Rp. 130,000 per kilogram, increasing from the previous year, which ranged from Rp. 90,000 to 120,000 per kilogram.

Specialty Coffee is an assessment or classification of coffee that has a special aroma and flavor that with a minimum value of 80 and a maximum of 100 and does not have a major defect in the green bean. Specialty Coffee is the term for coffee with the highest grade because coffee is processed specifically with special provisions, also ranging from upstream to downstream. The quality of the sensory or specialty coffee flavor is very decisive, including consistency. Coffee taste quality-analyzed descriptively with Cup quality [1,2,3]. Cupping (cup quality) is a method of systematic in evaluating the aroma and flavor of coffee samples and assessing the coffee beans to be sold, product quality control, development and evaluation of new or mixed products (blend), to convince the material purchased As desired, and lastly to get to know the flavor of coffee.

Coffee has a very diverse character and flavor, each coffee variety has a distinct aroma and flavor. This difference in taste depends on the altitude, fertility condition, nutrient availability, as well as the chemical content of the land that becomes coffee planting media. Identification of flavor with *wheel note Flavor* reference, a circle chart-shaped tool containing flavor and aroma categories, for industrial use in determining the flavor of coffee to be assessed by the person who works as a sampling and coffee grader giver Called Q grader. The Coffee Quality Institute (CQI) International Institute ensures that distributed coffee is a specialty coffee that has been through the test stage. This is the advancement of the third Wave era, which is closely related to support the smooth coffee chain industry in terms of specialty coffee distribution. CQI created the Q Grader program to become the coordinator of the coffee era, taking part to ensure that the coffee that is distributed is actually

specialty coffee. To determine the characteristics of good coffee can also be seen from the standard *Specialty Coffee Association of America (SCAA),* it is the standard to see the characteristic flavor of coffee beans that will be roasted and brewed by pay attention to the selection process of Coffee beans to be served. Rice coffee beans do not have a characteristic flavor of coffee but contain only precursors compounds (prospective)the forming of flavors.

New Coffee flavor character formed after coffee beans are roasted. During the roasting, there are complex chemical reactions until formed the chemical components forming a characteristic coffee character. Up to now, it has been able to be detected more than 800 aroma forming chemical compounds; in addition, there are still many components that have not been detectable, including non-volatile compounds. The Aroma of coffee produced during the roasting process depends on the type of green coffee used, the way of processing coffee beans, roasting, grinding, storage, and method of brewing. The roasting of coffee beans will change the content chemically in coffee beans, accompanied by weight, increasing the size of coffee beans and color change of seeds. Roasted Coffee beans will undergo a chemical change that is an element of delicious taste [4,5].

Quality improvement of coffee is rated more important to do today considering the condition of the world Coffee Market that is more competitive. For consumers, the quality of coffee cannot be released from its good flavor. A variety of specialty coffee products then emerge as consumers' demand is higher than one of the coffee quality variables. The term of specialty coffee is aimed to the Arabica coffee products in certain regions that have distinctive properties prominent with stable quality, especially processed by the roaster, and traded specifically in the form of roasted coffee, ground coffee, or Brewing Coffee in certain retail markets [6,7]. The determination of specialty coffee in Indonesia is still based on the location of the development (origin). In fact, the availability of broad genetic diversity provides the opportunity to conduct a selection of Single Cultivar Based Specialty Coffee, which grows in specific locations (single origin). Based on the results of previous studies have been proved to be a diversity of physical quality characteristic, biochemistry, and taste among Arabica coffee Cultivar [8,9,10].

Overseas, coffee beans derived from a single cultivar that has been marketed as specialty coffees. Product identification and certification today can even be done with the help of molecular markers [11,12]. With the emergence of a new specialty coffee single cultivar based, farmers are expected to obtain incentives in the form of higher prices for the crops of the cultivars concerned. The assessment of the quality of coffee is not simple but very complex, and many factors will affect it, ranging from the level of on-farm to Off-farm [13,14,15]. Coffee quality is influenced by differences in genetic factors (cultivars), altitude, and also processing into rice seeds (green beans). Therefore, the interaction process of these three factors to the quality attribute of coffee becomes more complex. Interactions research of various factors is still relatively limited. Based on the above, it is necessary to do research to know the sensory quality profile of the *Ranah Minang* Arabica Coffee, which can be used as a reference for specialty coffee.

## II. METHOD

### 1. *Time and Place*

Seed processing is done at the research site (*Solok Regency, South Solok, Pasaman, Agam, and Limapuluh Kota* Regency) until the rice grain stage. The seed processing method is done by wet processing (full washed) [16,17]. The wet processing method is done by means of harvested red coffee fruit mechanically peeled using a pulper machine to separate the skin of the fruit from the seeds, then fermented for 24 hours, and then it is washed until clean and directly dried by Sunlight. The quality testing of green coffee is done at Payakumbuh State Agricultural Polytechnic Laboratory. The process of coffee roasting is done by Fianda Coffee Roastery. Taste-testing known as cupping will be done at *Two Doors coffee cafe* and *Laboratory of Indonesian Coffee and Cocoa Research Center*, Jember, East Java, following the standard Specialty Coffee Association of America *(Specialty Coffee Association of America)* [18]. The research had been done for eight months, from May to December 2019

### *B. Tools and Materials*

The tools used in this study are pulper, sieve with size 30 and 75 mesh, stainless cups, thermometer, desiccator, digital scales, basin, plastic, measuring cup/chemical, pipette drops, filter paper, electric heating equipment, and cotton wool, pH meter, tester, Erlenmeyer, Volumetric flask, oven, Roaster machine *Brand Berto* and equipment for organoleptic test/cupping test. The materials used in this task are Single Origin Arabica Coffee from The Regency of Solok, South Solok, Pasaman, Agam, and Limapuluh Kota Regency *Sigagar Utang Varieties* by means of Fully washed processing.

### *C. Roasting Method*

Coffee Roasting by Berto Roaster using A long roast method with two treatments, which is temperature $175^0$C with a time of 15 minutes, B temperature $200^0$C with a time of 10 minutes. The Data obtained is analyzed using two-factors two-levels factorial design. Two-factors factorials are temperature and time, while for two levels that use are high temperature and low temperature. The established factor is used to determine the temperature and the optimization time that can produce accepted coffee flavor by the community.

### *D. Sensory Test Method/Cupping Test*

Coffee brewing quality tests and data analysis of rice coffee beans that are processed into ground coffee as much as 500g for each treatment. The whole process of processing into ground coffee, as well as Coffee brewing quality test (cupping), will be done at *Two Doors Coffee Cafe* and *Laboratory of Indonesian Coffee and Cocoa Research Center*, Jember, East Java, following the standard Specialty Coffee Association of America. The brewing quality assessment was done by several expert panelists and Q grader. The tested quality attributes included aroma, flavor, body, acidity, aftertaste, sweetness, balance, clean cup, uniformity, defect, and overall, as well as the total score value (*Specialty Coffee Association of America*) [19].

Several things that must be considered by Q grader and trained panelists before doing the tastings are room conditions and the date of roasting samples. The ideal room has bright light and does not contaminate any smell because it can interfere with the color assessment of the brew and aroma—meanwhile, roasted samples not more than one week from the evaluation time. The tools in the *cupping* coffee technique are *flavor note wheel* and cupping spoon. The procedure of coffee cupping starts by grinding the roasted coffee beans to smoothness level of medium-coarse or medium. Boil water up to 96 °c. Sniff in the aroma of the coffee powder (first analysis). Note on the *flavor note wheel*. The coffee cupping technique uses a ratio of 150 ml of water for 8.5 grams. Brew with a *tubruk* technique (*Tubruk) Indonesian style coffee where coarse coffee grounds are boiled along with solid sugar)* Let it brew for 4 minutes. Sniff in the scent again after brewed (second analysis). Note on the *flavor note wheel*. With a cupping spoon, remove the powder are on the surface to the edges, then sniff in the aroma (third analysis). Note on the *flavor note wheel*. Move the powder that is still on the surface to another container using a cupping spoon. Take a cupping spoon of the brewing water, sipping until filling the mouth. Note on the *flavor note wheel*.

## III. RESULT AND DISCUSSION

### A. *Coffee Beans Quality Value*

The criteria for determining the quality of coffee beans refer to the physical test standard of *Indonesian National Standard* [18] and the standard of Specialty Coffee Association of America (SCAA) [19]. The stages of physical test of coffee beans that are commonly done are water content test, Trasee test, defect test, color/smell test, seed size test. The *Minang Coffee Association* in the *Ranah Minang* uses the criteria of physical quality value, water content, seed defect value, and land elevation for quality determination of coffee. Physical testing is a system used to assess the quality of coffee beans based on their physique, either using AIDS or using the human senses in accordance with the prevailing standards.

*Figure 1. West Sumatera Arabica coffee beans samples*

1) Water Content Value

Visually observation shows that the color of coffee beans will be darker with the length of time of fermentation. This shows that microbial penetration into coffee beans is getting stronger with the growing length of fermentation time. This is in line with the statement of *Marcone (2004*) as well as *Hadipernata & Nugraha (2012*) in coffee beans, and there is a change in the color of coffee beans become darker. The test results showed the water content of dried coffee beans all the treatment of < 12% so as to meet the specification of the quality requirements SNI 01-2907-2008 (BSN, 2008). Water content testing is carried out using a drying oven with weighing methods. The water content of the *Ranah Minang* Arabica coffee powder is available in Table 1.

TABLE I
West Sumatra *Single Origin* Arabica Coffee Beans Water Content Various of Variety

| Sample Codes | Water Content Average (%) |
|---|---|
| SC 1 | 10.5 |
| SC 2 | 10.7 |
| SC 3 | 10.8 |
| SC 4 | 11.1 |
| SC 5 | 11.6 |

Water content testing shows the average sample has 10.94 % or below 12 % water content. The maximum water content is 11.6 % and the lowest 10.5 %. Water content testing is very closely related to the potential of the growth of fungus that is widely found in coffee such as Aspergillus Ochraeceus and Aspergillus Niger, Two types of fungus that cause ochratoxins (OTA). OTA is a toxin or toxic compound that becomes the standard quality of the coffee. Coffee importing countries have set the maximum content of OTA in coffee beans and its dairy products. Italy sets the maximum content of OTA on coffee beans and processed coffee products, respectively, of 8 and 4 ppb [20]. The existence of mycotoxins in coffee is very detrimental to the trade/economy of the country, especially the coffee-producing country [21,22].

*2) Triage Value*

Triage is a percentage of defect seeds in 100 grams of coffee beans. Testing of Triage is done in a weighted manner where it will be separated between the defect beans with normal beans, and the weighing result of defects beans is referred to as the percentage of triage, Test of Triage done in the origin coffee beans, high or low of triage to present The quality of the coffee beans.

*3) Defect Value*

The defect is the sum of the value of coffee beans defect, Test of Defect done at the time coffee beans ready to export to determine the quality or grade of the coffee. To determine defect can use two systems, namely the *Indonesian National Standard* and standard *Specialty Coffee Association of America (SCAA)* [19].

Figure 2. Coffee Beans Quality Test

Physical quality test is a system that is used to assess the quality of coffee beans based on their physique, either using AIDS or using human senses in accordance with the prevailing standards. The quality standard of coffee beans has been encouraged since 1978 through *DECREE* of the Minister of Trade No. 108/Kp/VII/78 dated 1 July 1978. The quality standard of coffee beans used is the triage system. But from October 1, 1983, until now, to determine the quality of coffee, Indonesia uses the *Defects Value system* in accordance with the decision of the *International Coffee Organization (ICO).* In this defect system, the more the value of the defect, the lower the quality of the coffee, and the smaller the value of defect, the better the quality of the coffee. Coffee beans are a coffee that is ready to be traded, the form of dried coffee beans that have been detached from the fruit flesh, horns skin, and skin.

| | |
|---|---|
|  | Coffee beans caused by insects that cause perforated beans and damaged beans due to post-picking or harvesting |
|  | Seeds are subjected to depreciation. The cause is due to drought and less fertile beans |
|  | Coffee beans in good condition, do not suffer damage and uninfected with coffee bean crop pests |
|  | Coffee beans in good condition, do not suffer damage and uninfected with coffee bean crop pests |

Figure. 3. Defect of ***Ranah Minang*** Coffee Beans

The rupture bean is the coffee beans are not intact, have the same size or less than 3/4 parts of intact seeds. Young seeds are small coffee beans and wrinkles on all parts of the outside. This is due to the harvesting of the fruit that is too young. One hollowed bean is a coffee bean that is one hollowed due to insect attack. More than one perforated beans are coffee beans that are perforated more than one due to insect attack. Spotted beans are coffee beans that are spotted on the outside. This is due to the of the pulper or washer which is less appropriate (too tightly) so that injuries to the surface of the bean. Rupture Black bean is black coffee beans are not intact, have the same size or less than 3/4 parts of intact beans. The rupture of this black bean is due to the adjustment of pulper, washer, or huller that is too tightly, direct Peeling after drying or a very low water content coffee peeling [23,24,25, 26]. The Black bean is a coffee bean that is half or more outside of it is black. Black coffee beans are caused by fruit disease and fruit decay during the hoarding or too young fruit picking. While the partly black beans are coffee beans are less than half the outside is black. This is due to injuries that occur during pulping or washing. The roll coffee is dried coffee fruit, or dried coffee beans are still wrapped in the skin of the fruit. This is caused by the too high water content of coffee in the time of peeling. The brown beans is a coffee bean that is half or more outside of brown. Red coffee beans are caused by overripe fruit harvesting, absorption of fruit flesh that is destroyed during bean fermentation, and imperfect washing or too dry drying temperatures. Therefore, the fermentation process is an important step in the processing of coffee in a wet manner, considering its positive influence on the improvement of Taste [27,28]. On physical sightings, arabica coffee beans testing does not indicate the presence of mold or live insects, so that still meet the quality requirements according to the Indonesian National Standard; likewise, the aroma, the aroma of arabica coffee beans do not indicate the presence of rotten smell like moss or rotten coffee skin. Before further processing, coffee beans are dried with the method of sunbathing.

Referring to the history of the implementation of quality standards on the commodity of coffee has existed since the Dutch era, then known as OVEIP or organizers Atie Verenigde Eksporteurs Van Indonesiche Producten. This organization is an institution that standardizes the commodity products exported from Indonesia. Subsequently applied TRIAGE system, or better known by a gross value system. The gross value in question is the coffee beans of black, brown, and crushed seeds. The quality standard of coffee beans has been encouraged since 1978 through DECREE of the Minister of Trade No. 108/Kp/VII/78 dated 1 July 1978. The quality standard of coffee beans used is the triage system. With the development of tastes and demand for coffee commodities, then on 1 October 1983, set the standard of coffee quality with the name of defect value system . Coffee Quality system is known quality coffee 1 to quality 6. Renewal of quality standards with this system is intended to adjust the quality standards of Indonesian coffee with a quality level system or qualities in a country, especially the coffee-producing country. This system is adopted by *the National Standardization Agency* in setting *the Indonesian National Standard* for coffee beans quality.

As time goes by, coffee beans Indonesian National Standard undergoes several changes, and the latest Standard used today is Indonesian National Standard No. 01-2907-2008. In this standard, there is the definition and

determination of the defect value for the type of coffee beans defect, and the quality classification based on the value of defects obtained. Defect in coffee is sensation characteristic of unpleasant (negative) coffee flavor that occurs due to several factors, including the processing of green beans are not careful, improper harvesting process, imprecision of water content During storage, or the presence of physical defects in coffee beans that cause taste defect or aroma defect. Renewal of quality standard with a defective value system is also meant to adjust the quality standard of our coffee with a system widely used in various countries of coffee producers, also to be more easily understood by buyers from consumer countries. This defective value system is still used with only a few revisions [18,19].

The provisions on bean quality at this time are generally based on the assessment on the content of coffee beans defect in the coffee bean party that is taken through examples or samples representing a coffee bean party. Determining the type or type of quality is based on the determination of Defect value [18,19]. According to the International Coffee Organization (ICO), the consumption of coffee increased from year to year, so that the increase in coffee production in Indonesia has the opportunity to export coffee to the major coffee consumption countries in the world such as the Europe, America, and Japan. Coffee beans in Indonesia are also supplied to coffee shops such as Starbuck and Quick Chek located in Indonesia and abroad [29].

Based on the general quality requirements shown in table 1 above is known that in all samples of coffee from the origin of Ranah Minang no found living insects and also odorless bean and or mold smelly. Based on the results of coffee impurity fraction analysis found in several samples, but still under the threshold of the coffee quality requirement of 0.5%. Some samples are even completely undiscovered there is the impurity, this indicates that the level of sorting has been done well, it is in line with the identification of post-harvest coffee handling by coffee farmers in West Sumatera. The smell is one of the determining parameters of coffee quality. According to *Sumarlin (2007)*, the taste defects that should be avoided from coffee is the presence of stink, smell of soil (earthy), smell of fungus (moldy), smell of moss (musty), unpleasant acid taste (sour), smell of petroleum (oily), smell of chemicals (chemical) and smell of Smoke (smoky) [30].

*4) Color and Small Value*

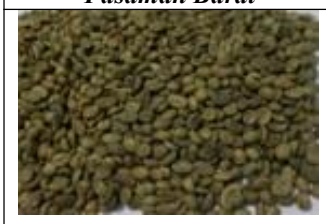
The test is done by using the senses in the form of carefulness in the observing and smelling; good coffee beans have a fresh smell and bright colors and not contaminated with foreign materials, either causing discoloration or smell.

***Solok***

***Solok Selatan***

***Pasaman Barat***

***Agam***



***Limapuluh Kota***

Figure 4. ***Ranah Minang*** Coffee Beans Colors

*5) Coffee Beans Size Value*

Coffee beans used in the research of Ranah Minang Arabica coffee is from *Solok Regency, South Solok, Pasaman, Agam, and Limapuluh Kota Regency*. This test is done to determine the size of coffee beans, namely large bean size, medium bean size, small bean Size, as well as very small seeds/do not pass the screen (shells). The test is done using Screen consisting of several minimum levels of 4 levels. According to SNI 01-2907-2008, the quality requirement of coffee based on its size is divided into three size criteria, namely the large (not qualified to pass the diameter of 7.5 mm sieve/sieve No. 19, Medium (qualified to pass the diameter of 7.5 mm sieve, do not pass the sieve 6.5 mm/Sieve No.16), and small (qualified to pass sieve diameter 6.5, not qualified to pass sieve diameter 5,5 mm/ sieve No.14).

Some type of defects on a fairly common coffee found and should be avoided by any coffee farmer is ***a)*** Baked coffee; this defect occurs when the coffee is roasted too long with a low temperature without reaching the first crack. This defect can not be seen with the naked eye. Generally, coffee with defects like this produces a coffee flavor that is flat, a little sweetness or often described as a taste like fresh bread or paper. ***b)*** Underdeveloped Coffee, which is an imperfect coffee bean (underdeveloped), tends to have a grass-like flavor (grassy) or like eating a green plant stem. The most noticeable thing when doing this type of coffee cupping is the taste of muted acidity. ***c)*** Overdeveloped Coffee, this type of defect is the opposite of the underdeveloped. Between Overdeveloped and dark roast, the difference is very thin. However, when the roaster roasting the coffee is darker than the original goal, of course, this makes the coffee into a broken category (defect). The most obvious thing is the result of coffee that has been roasted to be dark close to black and oily. The characteristic flavor that can be felt is bitter; it feels like eating charcoal/coal and leaving a less comfortable aftertaste. ***d)*** Quakers are a common type of defect found, especially when purchasing packaged coffee (whole beans). Quaker is an immature coffee bean and generally has a wrinkled surface. It is difficult to identify Quakers while still in the form of green beans. Quaker generally occurs because it is caused by bad soil conditions so that the essence of sugar and starch in coffee beans is not developed perfectly. Technically this is not a defect due to

the roasting method, but generally, we can only find Quaker after the coffee is roasted. To get the maximum flavor of the coffee, the Quaker should be sorted and discarded. Otherwise, brewed coffee will produce flavors such as paper, cereal, and dry. e) Overfermented, balanced coffee fermentation can produce an exotic and complex fruit flavor character and has an acidity like fresh grapes. However, what happens if the fermentation is left for too long will result in a taste like rotten fruit or vinegar. f) Baggy/Past Corp, this type of defect can be found when coffee beans are stored too long in bad condition. When sipping the coffee, it will produce less savory flavor, such as cardboard or wood.

Overall, the coffee beans from Ranah Minang almost no one hundred percent can be declared zero defect, and always there will be expressed defects or damaged beans in it. It can be minimized by the sorting process. To determine the quality of specialty coffee, coffee farmers in West Sumatera use the Defects Value system according to the decision of ICO (International Coffe Organization). In this defect system, the more value of the defect, the quality of the coffee will be lower, and the lower the value of the defect, the quality of coffee is better. Specialty Coffee is the term for coffee with the highest grade because coffee is processed specifically with special provisions from the initial process of coffee is planted until it is served in a cup.

*6) Fat Content*

***Ranah Minang*** Arabica coffee fat content can be seen in Table 2, indicating that the fat content is different for each variety. The amount of fat content contained in the coffee beans affects the flavor of the coffee.

Table 2. West Sumatra *Single Origin* Arabica Coffee Beans Fat Content Various of Variety

| Sample Codes | Fat Content Average (%) |
|---|---|
| SC 1 | 2.75 |
| SC 2 | 2.93 |
| SC 3 | 3.11 |
| SC 4 | 3.14 |
| SC 5 | 2.26 |

The fat content of Arabica coffee is found in the cuticle, the beans protector, and coffee oil. In the cuticle contained five hydroxytryptophan fat acid from palmitic acid, Arachidate, Behenate, and Lignoserat. Fat on coffee is one of the chemical composition of coffee that makes up the coffee flavor. The total fat content of the Arabica coffee is between 2-6%, which is on the cuticle of beans protector. The increase of free fatty acids during storage will cause rancidity on the coffee powder, so it will affect the flavor as well as lowering the coffee powder quality. Fat content produced is the same as rice coffee beans [31].

*B. Sensory Profile of Specialty Arabica Coffee in West Sumatera*

1) Quality Diversity of Coffee Brewing

Planted Coffee and grow in the area around the plateau in West Sumatra precisely in the regency of Solok, South Solok, Pasaman, Agam, and Limapuluh Kota Regency. Coffee in Ranah Minang also picked directly by hand by the farmers with the method of handpicking/selective pick. The natural condition of the Ranah Minang Highlands has a great influence on the quality of the aroma and flavor of the coffee produced. Ranah Minang coffee is a strong specific aroma between the combination of fresh fruits and spices. Another characteristic is its full body coffee character and has a sweet flavor like vanilla/caramel/hazelnut. The combination of pleasant taste will be felt in the after taste.

The testing results of the quality of brewing characteristics show that the five local coffee origins (SC 1, SC 2, SC 3, SC 4, and SC 5) can qualify for the specialty based on the flavor test protocol of the SCAA (minimum final score 80). The final score difference between counties is very thin. Similarly, the scores of each flavor attribute are almost identical to all cultivars. The condition does not reflect the diversity of seed size among the five samples. These results also support the conclusion of Kathurima et al. (2009) that the size of the seeds is not real correlates positively with the quality of flavor. The interesting thing is the Clean Cup, uniformity, and sweetness attributes for all the tested coffee origins obtain a maximum score (10) so that the category is extraordinary (exceptional). Many coffee aroma forming components, including the oil in coffee that has been roasted very sensitive to damage mainly due to oxidation and hydrolysis.

Therefore, to suppress the damage, the oxygen and water access should be limited, for example, by vacuum packing of the powder or by modifying the air in the package with C02 or N2. Characteristics of the occurrence of aroma (and flavor) damage in the stored coffee are the smell of musty (staling) and rancid. In the process of brewing, most of the smell (fragrance) components of the coffee powder dissolve in water brewing. The volatilization of the smell component with moisture depends on the partition coefficient of each component. The volatile components carried by the water vapor will then be recognizable by the olfactory nerve in the nasal cavity when we were sipping (slurping) the coffee.

Based on the test result, the highest score for the body attribute is given to the SC 3 sample code whose caffeine content is lower than SC 1, SC 2, SC 4, and SC 5. The results tend to agree with *James J. E (1991)*, who reports that caffeine content in coffee beans is negatively correlated with most of its flavor quality character. The caffeine content also proved to be not real positive correlates with flavor components [32,33,34], which directly affects the quality of coffee as a whole. The physical characteristics of the beans are not really correlated with the caffeine content, so that it cannot be used as an indirect identifier in the selection process. On the other, Salva (2011) argues that the attributes of the body are closely correlated with protein and lipid content, while the caffeine content relates to the character of bitterness [35].

Although quantitatively, the quality of the fifth flavor of the Arabica coffee sample is almost identical, each has a unique aroma profile. The sample with the SC 1 coffee, SC 2 each has a distinctive aroma resembling lemon (lemony), while SC 3 and SC 4 each have a honey fragrance (honeyed). Spicy Aroma is produced by SC 5 and SC1. Only SC 3, whose flavor produces a distinctive aroma resembling chocolate (chocolaty). It is suspected that the distinctive aroma ever attracted the roaster and gave a higher price at the farmer's level to the original coffee beans SC 1. According to Borém et al. (2008), the distinctive fragrance of the brew is

proven to provide added value to the produced coffee products. The difference in the content of volatile compounds can be caused by differences in roasting degrees and the difference in the proportion of the compounds found in coffee-related to the distinctive aroma of coffee. Many components are forming coffee aroma, including the oil in roasted coffee. Oil in coffee is very sensitive to damage, mainly due to oxidation and hydrolysis. Therefore, to suppress the damage, the oxygen and water access should be limited, for example, by vacuum packing of the powder or by modifying the air in the package with C02 or N2. Characteristics of the occurrence of aroma (and flavor) damage in the stored coffee are the smell of musty (staling) and rancid [36].

A variety of specialty coffee products then emerge as higher consumers demand to one of the coffee quality variables. The term of specialty coffee is intended for Arabica coffee products in certain regions that have prominent distinctive properties in stable quality, especially processed by the roaster, and traded specifically in the form of roasted coffee, ground coffee, or Coffee as a brew in certain retail markets [37]. The determination of specialty coffee in Indonesia is still based on the location of the development (origin). In fact, the availability of broad genetic diversity provides the opportunity to conduct specialty coffee single cultivar based selection, which grows in specific locations (single origin). Based on the results of the previous study has been proved to be a diversity of physical quality characteristics, Biochemic, and flavors among the Arabica coffee cultivar [38,39]. Overseas, coffee beans derived from single cultivars have been marketed as specialty coffees. Current product identification and certification can even be done with the help of molecular markers. With the advent of a new single cultivar-based specialty coffee, farmers are expected to obtain incentives in the form of higher prices for the crops of the cultivars concerned.

2) Cupping Test Value

Sensory test to know the profile of Ranah Minang Specialty Arabica coffee is done by the Cupping method. Cupping coffee is a method used to assess the taste of the coffee. Because each type of coffee has several different characteristics, so cupping coffee is felt good enough to distinguish the characteristics of the coffee. The cupping method of coffee is done to know the sensitivity of a person through the aroma and despair of the coffee that will be tested by relying on the sense of smell and sense of taste (mouth). Coffee Tasting Test (Cupping) is well known in the mid-19th century in San Francisco. In addition, some are tested to know the characteristic of coffee is the fragrance (dried smell of coffee), aroma, flavor (typical smell of coffee), body (viscosity), acidity (sour taste), aftertaste (sense of taste), sweetness (sweetness), balance (balance of taste and Aroma), clean cup (clean coffee), uniformity (consistency of flavor), overall and defects (delicious or not flavor produced). Some characteristics of the assessment of coffee cupping method are Aroma (fragrance), the aroma of coffee that will be sniffed, that is, the dried smell of coffee beans that have not been brewed but have been finely ground and also smelled wet from coffee beans that have been brewed.

Flavor, this process the tongue is used to translate what has been a smell of the coffee is detected by the tongue or not. The flavor is a combination of perception that is recognized by the tongue and aroma, which is recognized by the overall smell organ. The flavor component of coffee is the main element of the brewing value of a coffee, as it covers two elements at once. In organoleptic Assessment generally, the flavor is usually associated with other effects such as temperature, coarse/fine, etc. In the assessment of coffee flavors usually only include the flavor and aroma in unison and intact. It is true that other elements such as the heat level of the brewing also determine especially the aroma, which is associated with the level of volatility of the aroma-forming compounds. The cooler is usually the weaker the aroma value, as a result of the lower the number of volatile compounds in brewing water vapor. Therefore in the assessment of coffee brewing is usually in the condition that is quite hot or warm (± 65°C). For flavor can be done together with aroma, acidity, and after taste. After taste is detected when the first time to drink coffee, it will feel like there is a taste left in the base of the tongue or when swallowed it just passing, and to judge it, the less taste is left, then the better its Value.

Acidity is the process of sensing the acidic presence of coffee while sipping. In addition to the flavor, the assessment of coffee is known as Body element, which is the level of the flavor concentrations of coffee brew. It can easily be imagined between a light coffee (flat) with a heavy coffee. The body value of a coffee is determined by the compounds that are water-soluble when brewed. Compounds such as carbohydrate groups, aromatic compounds, alkaloids, and oils greatly determine the body of a coffee. The higher the compounds that dissolve or form a colloid in a brew fluid than the higher the body value of the coffee. Thus, the body is usually associated with viscosities (viscosity) of liquids, strength (imaginary), and slippery or rough properties, from the brewing fluid. The body referred to here is the thick or light of coffee when it was sipped. Assessment, if the body is thick, then the value to be given should be greater. The body can be given if it is not very fond of coffee; it can not be too distinguish whether the coffee body is thick or thin. Balance of some assessments such as flavor, after taste, and body. And if it is not a balance or less one of all the flavors that come mixed, then the given value is low. Sweetness, in the coffee, also has a sweet flavor, but the sweetness that is inflicted differs from the sweetness of sucrose. The interaction between the taste and aroma components is usually prominent, but there is a balance. There is a particular coffee more acid (arabica in general) known as the acidity, but there is a more dominant coffee sweetness known as acidy.

Clean Cup, this is done at the start of the cupping method. And this assessment can be done coincide with the after taste: uniformity, uniformity between glass one with the other. Overall, the overall assessment of all the characteristics that have been assessed, and the value will be good when what is felt and sniffed as expected. Defects here is more to the flavor and aroma caused by the coffee. Cupping method has a distinctive way of implementation to get good results and

satisfying so that the flavor and aroma produced not too tasteless or even too thick. The cupping method is carried out by weighing coffee as much as 8 grams, and the water measurement is given to 150 ml of glass with a temperature of 90-95°C. Then the coffee that will be tasted of its flavor and aroma to be left for 4 minutes and not mixed with sugar at all during the cupping process. This is done so as not to damage the taste of the coffee itself.

Specialty Coffee is the term for coffee with the highest grade because the coffee is processed specifically with special provisions start from the coffee is planted until it is served in a cup. Arabica coffee from the Ranah Minang can be said to be a specialty coffee because the condition of a coffee can be categorized as a special coffee grade is fulfilled. Coffee that is picked when harvested must be red-colored only, which is then processed into a green bean. It has a total defect of < 4%. If in 1 kg of green bean Specialty Coffee, then the total defect or the damaged beans should not be more than 40 grams. Green bean Specialty Coffee has a test cupping value of more than 80.

Table 3. The Profile of Ranah Minang Specialty Coffee Fully Washed Method

| Name Of Coffee | altitude (mdpl) | Body | Acidity | Taste Profile |
|---|---|---|---|---|
| Agam | 1250 - 1450 | Medium | Low | *Enough sweetness*, spicy like *cinnamon,* herb, *fruity* |
| Solok Selatan | 1100 - 1500 | Medium | Medium | Spicy, herb, vanilla, tea like, tamarin, Clean after taste, Sweet, *fruity, flowery, sugar browning, dried fruit, vinegar smell, sour, chocolate.* |
| Solok | 1250 - 1500 | Medium | Medium | *sugar browning, dried fruit, vinegar smell,* Sweet, *fruity, flowery,* lemon, Cokelat, herb, cinnamon after taste |
| Pasaman | 1250 - 1450 | Medium | Low | Herb, dark chocolate, lemony, sugar browning, cinnamon after taste, flowery, spicy, Green Apple, Citric acid, lime, sweet, ripe fruit, |
| Lima Puluh Kota | 1000 - 1350 | Medium | Low | *Herb, enough sweetness spicy* like *cinnamon,* herb. |

South Solok is one of the areas in West Sumatera, which is famous for its coffee, which has a very wide area of coffee plantations. Coffee cultivation can now be said to be one of the principal professions for most residents there. No wonder if the interest in planting coffee in the South Solok population is increasing. That's why South Solok coffee is increasingly popular among Indonesian coffee lovers. Sumatera itself has many distinctive coffees. However, the South Solok is better known for its coffee than other regions in West Sumatra. In accordance with the region's name, this coffee is called South Solok Coffee. Although not as popular as Aceh coffee and other famous coffees, coffee is no less good results and can be enjoyed by coffee enthusiasts.

This coffee plantation is located in the South Solok precisely between Twin Lakes and Mount of Talang. As it still includes Minang Land, this coffee is also known by the name of coffee Solok Minang. The South Solok coffee is planted close to the slopes of Talang Mountain. The altitude of this area ranges from 1,200M to 1,600M Above The Sea Levels, which has a character of various flavors such as lemon, chocolate, spices, and spicy. Spices and spicy This is the most vicious taste of this coffee. Whatever its name, the coffee is well received by the wider community, not just in Sumatra but throughout Indonesia. Even when properly processed, the quality will not lose with coffee from other countries. In fact, this coffee is also sold to foreign countries. Solok Coffee is increasingly known for at least the last three years. The unique character makes this type of coffee fast-paced and, no wonder if this Solok specialty immediately turned into a new star in the class of Sumatran coffees.

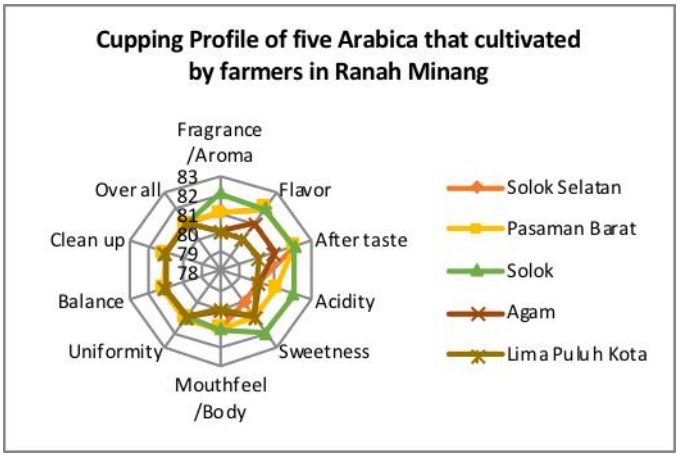



*Figure 5. Cupping profile of five Arabica coffees that cultivated by farmers in Ranah Minang, West Sumatra*

The Body is among the low-medium, sweetness with a lot of notes such as tropical fruits and fruity aroma, flowery, lemon, chocolate, so in general, Solok Coffee tends to be similar to typical African coffee. Limapuluh Kota Regency coffee is almost similar to Minang Solok Coffee; the production of coffee from Limapuluh Kota, especially from the district of Situjuah also increase significantly since the last three years. Arabica varieties have also gained more special attention from farmers since the year 2015. ***Situjuah*** Subdistrict of Limapuluh Kota regency is located around Mount of Sago; this area has altitude about 1200M-1450M Above The Sea level. Planting areas are scattered in several ***Nagari*** (district). ***Situjuah*** Coffee has a character with a medium body, low acidity, and enough sweetness spices, exactly like cinnamon and herbs. One of the advantages of a wet processing method is the process of fermentation and the cleansing of mucilage.

The specialty coffee was introduced the first time in 1978 by Erna Knutsen at an international coffee conference in France. The concept is very simple, namely: a special geographic micro-climate that produces coffee beans with a unique flavor profile. Specialty coffee refers to coffee that is different from ordinary coffee because of its high quality or because the production process obtained certification such as *Organic, Fairtrade, Utz Certified, Rainforest Alliance, c.a.f.é. Practices, Common Code for the Coffee Community (4C), Bird Friendly, and geographical indications.*

The main purpose of cupping is to ensure the best quality of the coffee that has been roasted. Cupping serves as an

important method to identify defects caused by nature or that occur through the processing of coffee beans. Not only roasting but can identify any coffee that goes into the category of defect. Other indicators in judging the flavor are the balance of taste, hygiene taste, and the uniformity of the main sense of coffee that can be displayed starting from the fragrance (dried ground coffee smell). The main taste defects should not be the smell of coffee beans such as soil odor, moldy (mildew odor), stuffy (moss odor), sour (sour taste), oily (oil odor), chemicals (chemical odor), smoky (smoke smell), etc.

The aroma aspect includes Fragrance (the smell of coffee when it is still dry) and aroma (smell of coffee when brewed with hot water). One can assess these criteria by three stages in the cupping, which is a) smell of different coffee powder in the bowl before pouring with water. b) Smell the scent while stirring the coffee surface of the brew. c) Smell the coffee aroma when coffee is dissolved. The quality of the special aroma is influenced by the aroma of the dried coffee beans, stirring, and the aroma of the coffee after the coffee is dissolved has a value of 5 vertical scales on the form. The final value must be based on all three aspects: aroma (delicious smell), flavor (typical coffee smell). The flavor shows the special properties between the scent was the first kiss with acidity and ended with an after taste. Flavour is a combination of the tongue and steam aroma of the nose that flows from the mouth to the nose. The value given to flavor should include the influence, quality, and complexity of the combined flavor and aroma when the coffee is sipped into the mouth firmly so that it involves the entire palate in judging.

The Body is based on the flavor when the fluid enters the mouth in particular between the tongue and palate. Most examples with the viscous body have high scores. Some examples with a lightweight body can also have good taste in the mouth. Coffee that has a vicious body such as Sumatran coffee or coffee that has a light body like Mexico coffee becomes a reference though different. Acidity (flavored sour taste), often described as an acidic flavor that is obviously tasty, or sour if not tasty. Good Acidity describing the coffee is delicious, sweet, and like the flavor of fresh fruit that is immediately felt at the time of coffee was sipped. Acidity that is too predominantly categorized is not tasty and inappropriate as an example to assess flavor. Sweetness, it's pleasant because coffee contains carbohydrates. The opponent of the sweetness in this context is sour, astringent, or raw. This Sweetness is not like the flavor of sucrose found in soft drinks.

After taste is the endurance of positive flavor (flavor and aroma) that comes from the palate of the mouth and survives after the coffee is discarded or swallowed. If the after taste is directly lost and not tasty, then given a low value, the final value is marked by a checklist on the horizontal scale should match the benchmark of the assessment based on the origin and other factors (temperature roasting and destination roasting, etc.).

High Acidity, as in Kenyan coffee and low Acidity such as Sumatran Coffee, becomes a reference though different. Balance is all aspects of flavor, after taste, acidity, body that is balanced in the example is called balance. If one aspect is missing or exceeds on the samples causing the balance value will be reduced.

The Clean Cup indicates the absence of negative values from the beginning of taste until after taste as the end. In judging these criteria should be noted from the beginning of taste until the fluid coffee is swallowed or discarded. Coffee from a bowl that has no flavor and aroma is removed. The value of 2 digits will be given to each cup showing the Clean Cup. Uniformity, There is aroma uniformity from each bowl. Overall is an assessment that reflects the whole aspect above from an example that each assessor has felt. An example with a pleasing aspect but not fulfill the standard criteria will be given a low value. Coffee that has the expected criteria and has a distinctive aroma such as from the Origin state will be given a high value.

## IV. Conclusions

The method of processing, the influence of cultivars, and the elevation of the place of analysis results indicate that there is no real interaction on the entire quality attribute, except for the aftertaste and body attributes as well as the total score. The growing place and the height of coffee is a real effect on the acidity, balance, overalls, and total score attributes.

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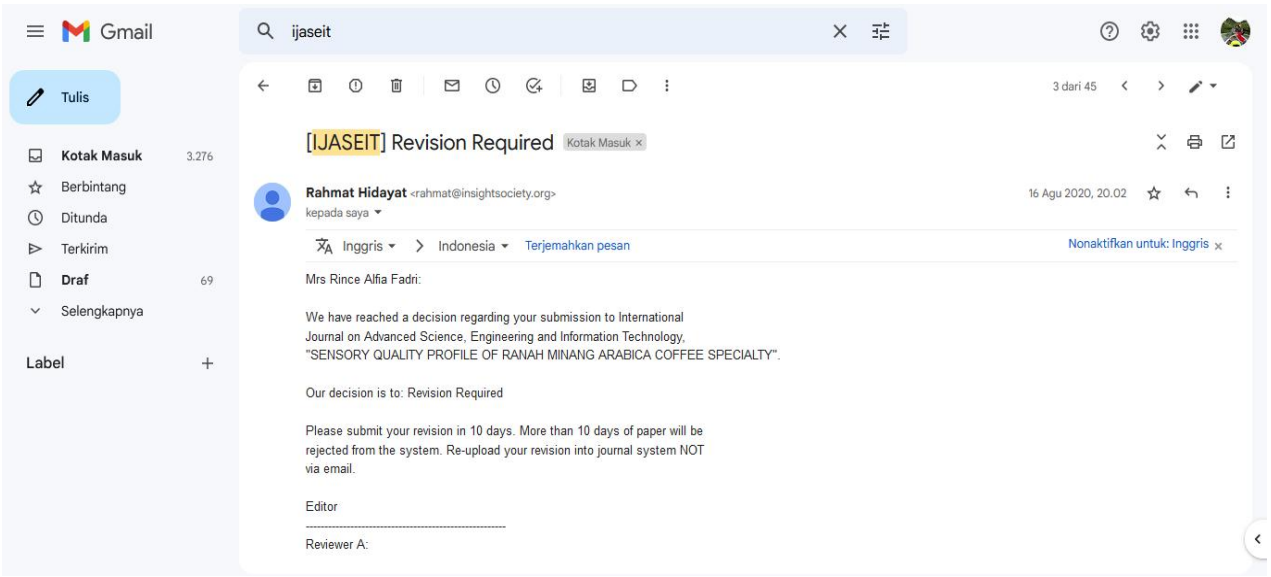


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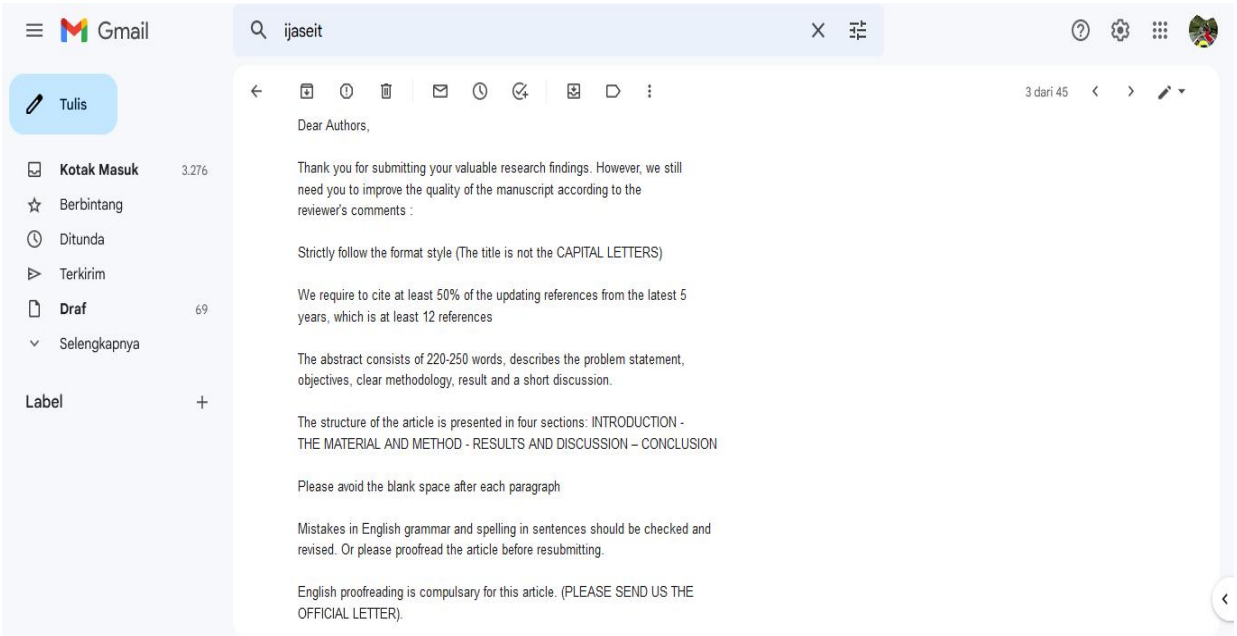


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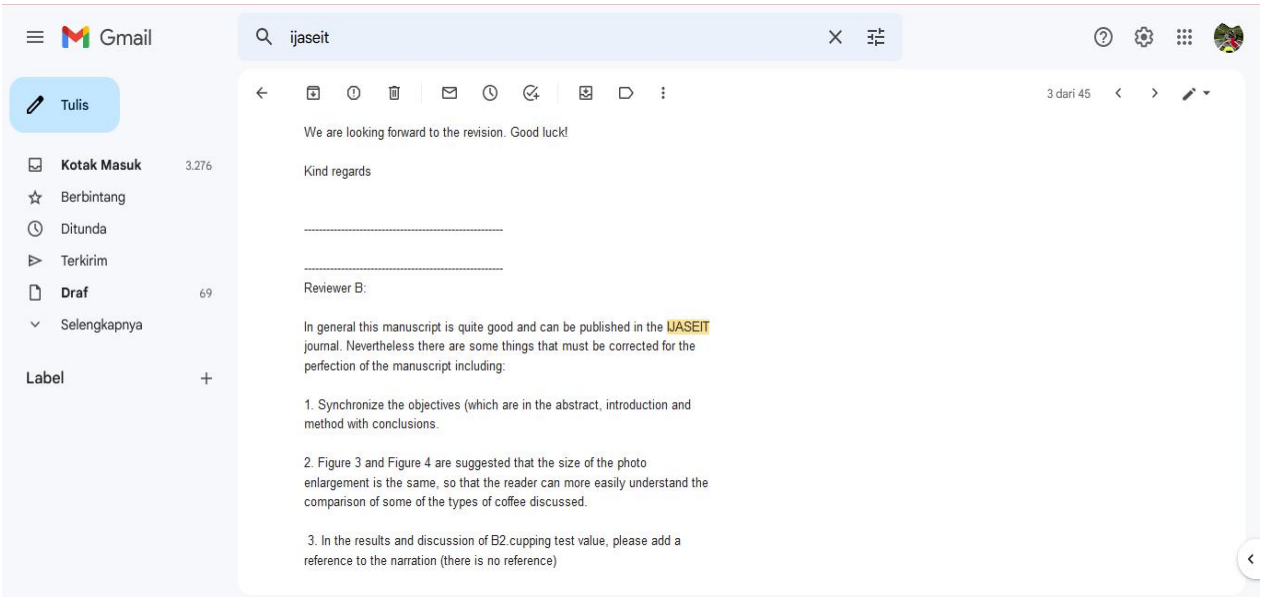


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# REVIEW FORM

16th August 2020
Ref. No. 21/ReV/IJASEIT/VIII/2020

Dear Rince Alfia Fadri,
Study Program of Food Technology, Payakumbuh State Agricultural Polytechnic, 26271, Indonesia
Corresponding author: alfiarince@gmail.com

| | |
|---|---|
| Title: | Sensory Quality Profile Of *Ranah Minang* Arabica Coffee Specialty |
| Author(s): | Rince Alfia Fadri, Kesuma Sayuti, Novizar Nazir, Irfan Suliansyah |
| Paper-ID | 11179 |

## A. Technical aspects

| | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1. The paper is within the scope of the Journal. | □ | □ | □ | □ | ■ | □ |
| 2. The paper is original. | □ | □ | □ | □ | □ | ■ |
| 3. The paper is free of technical errors. | □ | □ | □ | □ | ■ | □ |

## B. Communications aspects

| | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1. The paper is clearly readable. | □ | □ | □ | □ | ■ | □ |
| 2. The figures are clear & do clearly convey the intended message. | □ | □ | □ | □ | □ | ■ |
| 3. The length of the paper is appropriate. | □ | □ | □ | □ | ■ | □ |

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**C. Comments to the authors** (You may use another sheet of paper.)

Thank you very much for the submission through the online system. The manuscript has been reviewed. Please look into this and resubmission your manuscript after revision. Please find the revision in the attachment!

***The novelty:*** Research has been done to know the sensory quality profile of *Ranah Minang* Arabica coffee that can be used as a reference for specialty coffee. Arabica coffee from *Ranah Minang* province of West Sumatra is one of the superior export commodities in Indonesia. Quality improvement of coffee is rated more important today, considering the world coffee market condition is being more competitive. For consumers, the quality of coffee is tightly related to its good flavor.

**The Title:** The **title** summarizes the main idea or ideas of your study. A good **title contains** the fewest possible words that adequately describe the contents and/or purpose of your research paper. The **title** is without doubt the part of a paper that is read the most, and it is usually read first. The title of this paper is good and informative.

**The abstract**: has already explained, "What is the importance of research". [An abstract should be between 150-250 words.]. Please improve the English, use simple sentence and provide the implication of research.

*Abstract*— **ABSTRACK**

Abstract –Research has been done to know the sensory quality profile of Ranah Minang Arabica coffee that can be used as a reference for specialty coffee. Arabica coffee from Ranah Minang province of West Sumatra is one of the superior export commodities in Indonesia. Quality improvement of coffee is rated more important today, considering the world coffee market condition is being more competitive. For consumers, the quality of coffee is tightly related to its good flavor. The seed processing is done at the research site (Solok Regency, South Solok, Pasaman, Agam, and Limapuluh Kota Regency) until the rice grain stage. The seed processing method is done by wet processing (full washed); the coffee roasting process is done by Fianda Coffee Roastery. Taste-testing known as cupping is done at two coffee doors cafe and Laboratory of Indonesian Coffee and Cocoa Research Center, Jember, East Java, following SCAA. The test result showed the water content of dried coffee beans for all the treatment is < 12%. Testing of the brewing quality characteristic indicates that the five local coffee origins (SC 1, SC 2, SC 3, SC 4, and SC 5) can qualify for the specialty based on the SCAA Flavor Test Protocol (minimum final score 80) so that it meets the specifications of quality requirements as specialty coffee from Ranah Minang. The quality flavor of the five Arabica coffee samples is almost the same, but each has a unique aroma profile.

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The sample of coffee SC 1 and SC 2 has a special lemon aroma (lemony), while SC 3 and SC 4 each have a honey-like aroma (honeyed), Herb's aroma produced by SC 5 and SC1. Only SC 3 brewing produces chocolate-like aroma (chocolaty).

Keywords— ranah minang, specialty coffee, arabica

**The Introduction** typically occupies 10-15% of the paper. The **introduction should** consists of two parts: It **should** include a few general statements about the subject to provide a background to your paper and to attract the reader's attention. It **should** try to explain why you are writing the paper. The introduction section has included a general introduction, problem definition, problem solution, study motivation, aims and objectives, gaps in the literature.

**Noted: I Please clearly mention the objective of study in Introduction. Add some recent literature to strengthen the need for this research to be carried out**

**The Materials and methodology** is good. The methods have described how the research question was answered, explain how the results were analysed. Adequacy & up-to-date data and methodology: Sufficient data and up-to-date, with the method of analysis and discussion that deep.

**Materials and methods has been written in more detailed**

**Results and Discussion** have included findings, comparison with prior studies, causal arguments, and deductive arguments. have included findings, comparison with prior studies, causal arguments, and deductive arguments. **Noted: Make the materials and methods more detailed, so others can also do the same. How to determine added value also needs to be explained. Result and discussion has been written in accordance with scientific principles**

**Conclusion:**

**The Conclusion has been written in relation to the objectives included in the introduction.**

**Reference:**
The author has added references to the publication, which has been published for the past three years, according to the reviewer's advice. **Please make sure that the format of "Index Terms" is correct.**

**Decision:** As a result of research with an appropriate methodology, **this paper is ACCEPTED for publication with minor revision.**

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**Additional Comments:**

**There are some grammatical mistakes and some mistakes in Punctuation. Please revise the Table number**

**D. Recommendation** (Tick one)

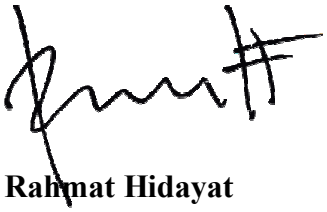
1. Accepted without modifications. ☐
2. Accepted with minor corrections. ■
3. Accepted with major modification. ☐
4. Rejected. ☐

**E. Comments to the editors** (These comments will not be sent to the authors)

Please makes sure that all reviewers comment already answered by the author and fixed it in the manuscript.

Sincerely,

Regards,



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# SENSORY QUALITY PROFILE OF ***RANAH MINANG*** ARABICA COFFEE SPECIALTY

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*Abstract*— Research has been done to know the sensory quality profile of *Ranah Minang* Arabica coffee that can be used as a reference for specialty coffee. Arabica coffee from *Ranah Minang* province of West Sumatra is one of the superior export commodities in Indonesia. Quality improvement of coffee is rated more important today, considering the world coffee market condition is being more competitive. For consumers, the quality of coffee is tightly related to its good flavor. The seed processing is done at the research site (Solok Regency, South Solok, Pasaman, Agam, and Limapuluh Kota Regency) until the rice grain stage. The seed processing method is done by wet processing (full washed); the coffee roasting process is done by *Fianda Coffee Roastery. Taste-testing known as cupping is done at two coffee doors cafe and Laboratory of Indonesian Coffee and Cocoa Research Center, Jember, East Java, following SCAA.* The test result showed the water content of dried coffee beans for all the treatment is < 12%. Testing of the brewing quality characteristic indicates that the five local coffee origins (*SC 1, SC 2, SC 3, SC 4, and SC 5*) can qualify for the specialty based on the SCAA Flavor Test Protocol (minimum final score 80) so that it meets the specifications of quality requirements as specialty coffee from Ranah Minang. The quality flavor of the five Arabica coffee samples is almost the same, but each has a unique aroma profile. The sample of coffee SC 1 and SC 2 has a special lemon aroma (lemony), while SC 3 and SC 4 each have a honey-like aroma (honeyed), Herb's aroma produced by SC 5 and SC1. Only SC 3 brewing produces chocolate-like aroma (chocolaty).

***Keywords*— ranah minang, specialty coffee, arabica**

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## INTRODUCTION

Indonesia, as the second-largest coffee exporting country in Asia, has a rich type of coffee from each region known as specialty coffee. High production and consumption levels also increase counterfeiting rates and mixing seeds between high-quality coffee with low-quality coffee or ingredients other than coffee. A coffee market that has a distinctive flavor (specialty taste) is growing rapidly nowadays, especially in the main consumer countries. Nowadays, the coffee commodity that grows in West Sumatera is increasingly sought after by many coffee enthusiasts in the national and international markets, so the price is increasing. Arabica coffee from *Ranah Minang*, the region of West Sumatera Province, is one of the flagship export commodities in Indonesia that has been known in the domestic and international markets. According to the chairman of the Indonesian Plantation Farmers Association Group **(Gapperindo)*, West Sumatera predicted that the price of coffee from the domain of *Ranah Minang* would increase by 10-15% in 2019. The price of West Sumatra Arabica Coffee in 2018 reaches Rp. 130,000 per kilogram, increasing from the previous year, which ranged from Rp. 90,000 to 120,000 per kilogram.

Specialty Coffee is an assessment or classification of coffee that has a special aroma and flavor that with a minimum value of 80 and a maximum of 100 and does not have a major defect in the green bean. Specialty Coffee is the term for coffee with the highest grade because coffee is processed specifically with special provisions, also ranging from upstream to downstream. The quality of the sensory or specialty coffee flavor is very decisive, including consistency. Coffee taste quality-analyzed descriptively with Cup quality [1,2,3]. Cupping (cup quality) is a method of systematic in evaluating the aroma and flavor of coffee samples and assessing the coffee beans to be sold, product quality control, development and evaluation of new or mixed products (blend), to convince the material purchased As desired, and lastly to get to know the flavor of coffee.

Coffee has a very diverse character and flavor, each coffee variety has a distinct aroma and flavor. This difference in taste depends on the altitude, fertility condition, nutrient availability, as well as the chemical content of the land that becomes coffee planting media. Identification of flavor with *wheel note Flavor* reference, a circle chart-shaped tool containing flavor and aroma categories, for industrial use in determining the flavor of coffee to be assessed by the person who works as a sampling and coffee grader giver Called Q grader. The Coffee Quality Institute (CQI) International Institute ensures that distributed coffee is a specialty coffee that has been through the test stage. This is the advancement of the third Wave era, which is closely related to support the smooth coffee chain industry in terms of specialty coffee distribution. CQI created the Q Grader program to become the coordinator of the coffee era, taking part to ensure that the coffee that is distributed is actually specialty coffee. To determine the characteristics of good coffee can also be seen from the standard *Specialty Coffee Association of America (SCAA),* it is the standard to see the characteristic flavor of coffee beans that will be roasted and brewed by pay attention to the selection process of Coffee beans to be served. Rice coffee beans do not have a characteristic flavor of coffee but contain only precursors compounds (prospective)the forming of flavors.

New Coffee flavor character formed after coffee beans are roasted. During the roasting, there are complex chemical reactions until formed the chemical components forming a characteristic coffee character. Up to now, it has been able to be detected more than 800 aroma forming chemical compounds; in addition, there are still many components that have not been detectable, including non-volatile compounds. The Aroma of coffee produced during the roasting process depends on the type of green coffee used, the way of processing coffee beans, roasting, grinding, storage, and method of brewing. The roasting of coffee beans will change the content chemically in coffee beans, accompanied by weight, increasing the size of coffee beans and color change of seeds. Roasted Coffee beans will undergo a chemical change that is an element of delicious taste [4,5].

Quality improvement of coffee is rated more important to do today considering the condition of the world Coffee Market that is more competitive. For consumers, the quality of coffee cannot be released from its good flavor. A variety of specialty coffee products then emerge as consumers' demand is higher than one of the coffee quality variables. The term of specialty coffee is aimed to the Arabica coffee products in certain regions that have distinctive properties prominent with stable quality, especially processed by the roaster, and traded specifically in the form of roasted coffee, ground coffee, or Brewing Coffee in certain retail markets [6,7]. The determination of specialty coffee in Indonesia is still based on the location of the development (origin). In fact, the availability of broad genetic diversity provides the opportunity to conduct a selection of Single Cultivar Based Specialty Coffee, which grows in specific

locations (single origin). Based on the results of previous studies have been proved to be a diversity of physical quality characteristic, biochemistry, and taste among Arabica coffee Cultivar [8,9,10].

Overseas, coffee beans derived from a single cultivar that has been marketed as specialty coffees. Product identification and certification today can even be done with the help of molecular markers [11,12]. With the emergence of a new specialty coffee single cultivar based, farmers are expected to obtain incentives in the form of higher prices for the crops of the cultivars concerned. The assessment of the quality of coffee is not simple but very complex, and many factors will affect it, ranging from the level of on-farm to Off-farm [13,14,15]. Coffee quality is influenced by differences in genetic factors (cultivars), altitude, and also processing into rice seeds (green beans). Therefore, the interaction process of these three factors to the quality attribute of coffee becomes more complex. Interactions research of various factors is still relatively limited. Based on the above, it is necessary to do research to know the sensory quality profile of the *Ranah Minang* Arabica Coffee, which can be used as a reference for specialty coffee.

## I. METHOD

### *A. Time and Place*

Seed processing is done at the research site (*Solok Regency, South Solok, Pasaman, Agam, and Limapuluh Kota* Regency) until the rice grain stage. The seed processing method is done by wet processing (full washed) [16,17]. The wet processing method is done by means of harvested red coffee fruit mechanically peeled using a pulper machine to separate the skin of the fruit from the seeds, then fermented for 24 hours, and then it is washed until clean and directly dried by Sunlight. The quality testing of green coffee is done at Payakumbuh State Agricultural Polytechnic Laboratory. The process of coffee roasting is done by Fianda Coffee Roastery. Taste-testing known as cupping will be done at *Two Doors coffee cafe* and *Laboratory of Indonesian Coffee and Cocoa Research Center*, Jember, East Java, following the standard Specialty Coffee Association of America *(Specialty Coffee Association of America)* [18]. The research had been done for eight months, from May to December 2019

### *B. Tools and Materials*

The tools used in this study are pulper, sieve with size 30 and 75 mesh, stainless cups, thermometer, desiccator, digital scales, basin, plastic, measuring cup/chemical, pipette drops, filter paper, electric heating equipment, and cotton wool, pH meter, tester, Erlenmeyer, Volumetric flask, oven, Roaster machine *Brand Berto* and equipment for organoleptic test/cupping test. The materials used in this task are Single Origin Arabica Coffee from The Regency of Solok, South Solok, Pasaman, Agam, and Limapuluh Kota Regency *Sigagar Utang Varieties* by means of Fully washed processing.

### *C. Roasting Method*

Coffee Roasting by Berto Roaster using A long roast method with two treatments, which is temperature $175^0$C with a time of 15 minutes, B temperature $200^0$C with a time of 10 minutes. The Data obtained is analyzed using two-factors two-levels factorial design. Two-factors factorials are temperature and time, while for two levels that use are high temperature and low temperature. The established factor is used to determine the temperature and the optimization time that can produce accepted coffee flavor by the community.

### *D. Sensory Test Method/Cupping Test*

Coffee brewing quality tests and data analysis of rice coffee beans that are processed into ground coffee as much as 500g for each treatment. The whole process of processing into ground coffee, as well as Coffee brewing quality test (cupping), will be done at *Two Doors Coffee Cafe* and *Laboratory of Indonesian Coffee and Cocoa Research Center*, Jember, East Java, following the standard Specialty Coffee Association of America. The brewing quality assessment was done by several expert panelists and Q grader. The tested quality attributes included aroma, flavor, body, acidity, aftertaste, sweetness, balance, clean cup, uniformity, defect, and overall, as well as the total score value (*Specialty Coffee Association of America*) [19].

Several things that must be considered by Q grader and trained panelists before doing the tastings are room conditions and the date of roasting samples. The ideal room has bright light and does not contaminate any smell because it can interfere with the color assessment of the brew and aroma—meanwhile, roasted samples not more than one week from the evaluation time. The tools in the *cupping* coffee technique are *flavor note wheel* and cupping spoon. The procedure of coffee cupping starts by grinding the roasted coffee beans to smoothness level of medium-coarse or medium. Boil water up to 96 °c. Sniff in the aroma of the coffee powder (first analysis). Note on the *flavor note wheel*. The coffee cupping technique uses a ratio of 150 ml of water for 8.5 grams. Brew with a *tubruk* technique (*Tubruk) Indonesian style coffee*

*where coarse coffee grounds are boiled along with solid sugar)* Let it brew for 4 minutes. Sniff in the scent again after brewed (second analysis). Note on the *flavor note wheel*. With a cupping spoon, remove the powder are on the surface to the edges, then sniff in the aroma (third analysis). Note on the *flavor note wheel*. Move the powder that is still on the surface to another container using a cupping spoon. Take a cupping spoon of the brewing water, sipping until filling the mouth. Note on the *flavor note wheel*.

## II. RESULT AND DISCUSSION

### *A. Coffee Beans Quality Value*

The criteria for determining the quality of coffee beans refer to the physical test standard of *Indonesian National Standard* [18] and the standard of Specialty Coffee Association of America (SCAA) [19]. The stages of physical test of coffee beans that are commonly done are water content test, Trasee test, defect test, color/smell test, seed size test. The *Minang Coffee Association* in the *Ranah Minang* uses the criteria of physical quality value, water content, seed defect value, and land elevation for quality determination of coffee. Physical testing is a system used to assess the quality of coffee beans based on their physique, either using AIDS or using the human senses in accordance with the prevailing standards.

*Figure 1. West Sumatera Arabica coffee beans samples*

1) Water Content Value

Visually observation shows that the color of coffee beans will be darker with the length of time of fermentation. This shows that microbial penetration into coffee beans is getting stronger with the growing length of fermentation time. This is in line with the statement of *Marcone (2004*) as well as *Hadipernata & Nugraha (2012*) in coffee beans, and there is a change in the color of coffee beans become darker. The test results showed the water content of dried coffee beans all the treatment of < 12% so as to meet the specification of the quality requirements SNI 01-2907-2008 (BSN, 2008). Water content testing is carried out using a drying oven with weighing methods. The water content of the *Ranah Minang* Arabica coffee powder is available in Table 1.

TABLE I
West Sumatra *Single Origin* Arabica Coffee Beans Water Content Various of Variety

| Sample Codes | Water Content Average (%) |
|---|---|
| SC 1 | 10.5 |
| SC 2 | 10.7 |
| SC 3 | 10.8 |
| SC 4 | 11.1 |
| SC 5 | 11.6 |

Water content testing shows the average sample has 10.94 % or below 12 % water content. The maximum water content is 11.6 % and the lowest 10.5 %. Water content testing is very closely related to the potential of the growth of fungus that is widely found in coffee such as Aspergillus Ochraeceus and Aspergillus Niger, Two types of fungus that cause ochratoxins (OTA). OTA is a toxin or toxic compound that becomes the standard quality of the coffee. Coffee importing countries have set the maximum content of OTA in coffee beans and its dairy products. Italy sets the maximum content of OTA on coffee beans and processed coffee products, respectively, of 8 and 4 ppb [20]. The existence of mycotoxins in coffee is very detrimental to the trade/economy of the country, especially the coffee-producing country [21,22].

*2) Triage Value*

Triage is a percentage of defect seeds in 100 grams of coffee beans. Testing of Triage is done in a weighted manner where it will be separated between the defect beans with normal beans, and the weighing result of defects beans is referred to as the percentage of triage, Test of Triage done in the origin coffee beans, high or low of triage to present The quality of the coffee beans.

*3) Defect Value*

The defect is the sum of the value of coffee beans defect, Test of Defect done at the time coffee beans ready to export to determine the quality or grade of the coffee. To determine defect can use two systems, namely the *Indonesian National Standard* and standard *Specialty Coffee Association of America (SCAA)*[19].

Figure 2. Coffee Beans Quality Test

Physical quality test is a system that is used to assess the quality of coffee beans based on their physique, either using AIDS or using human senses in accordance with the prevailing standards. The quality standard of coffee beans has been encouraged since 1978 through *DECREE* of the Minister of Trade No. 108/Kp/VII/78 dated 1 July 1978. The quality standard of coffee beans used is the triage system. But from October 1, 1983, until now, to determine the quality of coffee, Indonesia uses the *Defects Value system* in accordance with the decision of the *International Coffee Organization (ICO).* In this defect system, the more the value of the defect, the lower the quality of the coffee, and the smaller the value of defect, the better the quality of the coffee. Coffee beans are a coffee that is ready to be traded, the form of dried coffee beans that have been detached from the fruit flesh, horns skin, and skin.

| | |
|---|---|
|  | Coffee beans caused by insects that cause perforated beans and damaged beans due to post-picking or harvesting |
|  | Seeds are subjected to depreciation. The cause is due to drought and less fertile beans |
|  | Coffee beans in good condition, do not suffer damage and uninfected with coffee bean crop pests |
|  | Coffee beans in good condition, do not suffer damage and uninfected with coffee bean crop pests |

Figure. 3. Defect of ***Ranah Minang*** Coffee Beans

The rupture bean is the coffee beans are not intact, have the same size or less than 3/4 parts of intact seeds. Young seeds are small coffee beans and wrinkles on all parts of the outside. This is due to the harvesting of the fruit that is too young. One hollowed bean is a coffee bean that is one hollowed due to insect attack. More than one perforated beans are coffee beans that are perforated more than one due to insect attack. Spotted beans are coffee beans that are spotted on the outside. This is due to the of the pulper or washer which is less appropriate (too tightly) so that injuries to the surface of the bean. Rupture Black bean is black coffee beans are not intact, have the same size or less than 3/4 parts of intact beans. The rupture of this black bean is due to the adjustment of pulper, washer, or huller that is too tightly, direct Peeling after drying or a very low water content coffee peeling [23,24,25, 26]. The Black bean is a coffee bean that is half or more outside of it is black. Black coffee beans are caused by fruit disease and fruit decay during the hoarding or too young fruit picking. While the partly black beans are coffee beans are less than half the outside is black. This is due to injuries that occur during pulping or washing. The roll coffee is dried coffee fruit, or dried coffee beans are still wrapped in the skin of the fruit. This is caused by the too high water content of coffee in the time of peeling. The brown beans is a coffee bean that is half or more outside of brown. Red coffee beans are caused by overripe fruit harvesting, absorption of fruit flesh that is destroyed during bean fermentation, and imperfect washing or too dry drying

temperatures. Therefore, the fermentation process is an important step in the processing of coffee in a wet manner, considering its positive influence on the improvement of Taste [27,28]. On physical sightings, arabica coffee beans testing does not indicate the presence of mold or live insects, so that still meet the quality requirements according to the Indonesian National Standard; likewise, the aroma, the aroma of arabica coffee beans do not indicate the presence of rotten smell like moss or rotten coffee skin. Before further processing, coffee beans are dried with the method of sunbathing.

Referring to the history of the implementation of quality standards on the commodity of coffee has existed since the Dutch era, then known as OVEIP or organizers Atie Verenigde Eksporteurs Van Indonesiche Producten. This organization is an institution that standardizes the commodity products exported from Indonesia. Subsequently applied TRIAGE system, or better known by a gross value system. The gross value in question is the coffee beans of black, brown, and crushed seeds. The quality standard of coffee beans has been encouraged since 1978 through DECREE of the Minister of Trade No. 108/Kp/VII/78 dated 1 July 1978. The quality standard of coffee beans used is the triage system. With the development of tastes and demand for coffee commodities, then on 1 October 1983, set the standard of coffee quality with the name of defect value system . Coffee Quality system is known quality coffee 1 to quality 6. Renewal of quality standards with this system is intended to adjust the quality standards of Indonesian coffee with a quality level system or qualities in a country, especially the coffee-producing country. This system is adopted by *the National Standardization Agency* in setting *the Indonesian National Standard* for coffee beans quality.

As time goes by, coffee beans Indonesian National Standard undergoes several changes, and the latest Standard used today is Indonesian National Standard No. 01-2907-2008. In this standard, there is the definition and determination of the defect value for the type of coffee beans defect, and the quality classification based on the value of defects obtained. Defect in coffee is sensation characteristic of unpleasant (negative) coffee flavor that occurs due to several factors, including the processing of green beans are not careful, improper harvesting process, imprecision of water content During storage, or the presence of physical defects in coffee beans that cause taste defect or aroma defect. Renewal of quality standard with a defective value system is also meant to adjust the quality standard of our coffee with a system widely used in various countries of coffee producers, also to be more easily understood by buyers from consumer countries. This defective value system is still used with only a few revisions [18,19].

The provisions on bean quality at this time are generally based on the assessment on the content of coffee beans defect in the coffee bean party that is taken through examples or samples representing a coffee bean party. Determining the type or type of quality is based on the determination of Defect value [18,19]. According to the International Coffee Organization (ICO), the consumption of coffee increased from year to year, so that the increase in coffee production in Indonesia has the opportunity to export coffee to the major coffee consumption countries in the world such as the Europe, America, and Japan. Coffee beans in Indonesia are also supplied to coffee shops such as Starbuck and Quick Chek located in Indonesia and abroad [29].

Based on the general quality requirements shown in table 1 above is known that in all samples of coffee from the origin of Ranah Minang no found living insects and also odorless bean and or mold smelly. Based on the results of coffee impurity fraction analysis found in several samples, but still under the threshold of the coffee quality requirement of 0.5%. Some samples are even completely undiscovered there is the impurity, this indicates that the level of sorting has been done well, it is in line with the identification of post-harvest coffee handling by coffee farmers in West Sumatera. The smell is one of the determining parameters of coffee quality. According to *Sumarlin (2007)*, the taste defects that should be avoided from coffee is the presence of stink, smell of soil (earthy), smell of fungus (moldy), smell of moss (musty), unpleasant acid taste (sour), smell of petroleum (oily), smell of chemicals (chemical) and smell of Smoke (smoky) [30].

*4) Color and Small Value*

The test is done by using the senses in the form of carefulness in the observing and smelling; good coffee beans have a fresh smell and bright colors and not contaminated with foreign materials, either causing discoloration or smell.

***Solok***

***Solok Selatan***

Figure 4. ***Ranah Minang*** Coffee Beans Colors

*5) Coffee Beans Size Value*

Coffee beans used in the research of Ranah Minang Arabica coffee is from *Solok Regency, South Solok, Pasaman, Agam, and Limapuluh Kota Regency*. This test is done to determine the size of coffee beans, namely large bean size, medium bean size, small bean Size, as well as very small seeds/do not pass the screen (shells). The test is done using Screen consisting of several minimum levels of 4 levels. According to SNI 01-2907-2008, the quality requirement of coffee based on its size is divided into three size criteria, namely the large (not qualified to pass the diameter of 7.5 mm sieve/sieve No. 19, Medium (qualified to pass the diameter of 7.5 mm sieve, do not pass the sieve 6.5 mm/Sieve No.16), and small (qualified to pass sieve diameter 6.5, not qualified to pass sieve diameter 5,5 mm/ sieve No.14).

Some type of defects on a fairly common coffee found and should be avoided by any coffee farmer is ***a)*** Baked coffee; this defect occurs when the coffee is roasted too long with a low temperature without reaching the first crack. This defect can not be seen with the naked eye. Generally, coffee with defects like this produces a coffee flavor that is flat, a little sweetness or often described as a taste like fresh bread or paper. ***b)*** Underdeveloped Coffee, which is an imperfect coffee bean (underdeveloped), tends to have a grass-like flavor (grassy) or like eating a green plant stem. The most noticeable thing when doing this type of coffee cupping is the taste of muted acidity. ***c)*** Overdeveloped Coffee, this type of defect is the opposite of the underdeveloped. Between Overdeveloped and dark roast, the difference is very thin. However, when the roaster roasting the coffee is darker than the original goal, of course, this makes the coffee into a broken category (defect). The most obvious thing is the result of coffee that has been roasted to be dark close to black and oily. The characteristic flavor that can be felt is bitter; it feels like eating charcoal/coal and leaving a less comfortable aftertaste. ***d)*** Quakers are a common type of defect found, especially when purchasing packaged coffee (whole beans). Quaker is an immature coffee bean and generally has a wrinkled surface. It is difficult to identify Quakers while still in the form of green beans. Quaker generally occurs because it is caused by bad soil conditions so that the essence of sugar and starch in coffee beans is not developed perfectly. Technically this is not a defect due to the roasting method, but generally, we can only find Quaker after the coffee is roasted. To get the maximum flavor of the coffee, the Quaker should be sorted and discarded. Otherwise, brewed coffee will produce flavors such as paper, cereal, and dry. e) Overfermented, balanced coffee fermentation can produce an exotic and complex fruit flavor character and has an acidity like fresh grapes. However, what happens if the fermentation is left for too long will result in a taste like rotten fruit or vinegar. f) Baggy/Past Corp, this type of defect can be found when coffee beans are stored too long in bad condition. When sipping the coffee, it will produce less savory flavor, such as cardboard or wood.

Overall, the coffee beans from Ranah Minang almost no one hundred percent can be declared zero defect, and always there will be expressed defects or damaged beans in it. It can be minimized by the sorting process. To determine the quality of specialty coffee, coffee farmers in West Sumatera use the Defects Value system according to the decision of ICO (International Coffe Organization). In this defect system, the more value of the defect, the quality of the coffee will be lower, and the lower the value of the defect, the quality of coffee is better. Specialty Coffee is the term for coffee with the highest grade because coffee is processed specifically with special provisions from the initial process of coffee is planted until it is served in a cup.

*6) Fat Content*

***Ranah Minang*** Arabica coffee fat content can be seen in Table 2, indicating that the fat content is different for each variety. The amount of fat content contained in the coffee beans affects the flavor of the coffee.

Table 2. West Sumatra *Single Origin* Arabica Coffee Beans Fat Content Various of Variety

| Sample Codes | Fat Content Average (%) |
|---|---|
| SC 1 | 2.75 |
| SC 2 | 2.93 |
| SC 3 | 3.11 |

| | |
|---|---|
| SC 4 | 3.14 |
| SC 5 | 2.26 |

The fat content of Arabica coffee is found in the cuticle, the beans protector, and coffee oil. In the cuticle contained five hydroxytryptophan fat acid from palmitic acid, Arachidate, Behenate, and Lignoserat. Fat on coffee is one of the chemical composition of coffee that makes up the coffee flavor. The total fat content of the Arabica coffee is between 2-6%, which is on the cuticle of beans protector. The increase of free fatty acids during storage will cause rancidity on the coffee powder, so it will affect the flavor as well as lowering the coffee powder quality. Fat content produced is the same as rice coffee beans [31].

### *B. Sensory Profile of Specialty Arabica Coffee in West Sumatera*

#### 1) Quality Diversity of Coffee Brewing

Planted Coffee and grow in the area around the plateau in West Sumatra precisely in the regency of Solok, South Solok, Pasaman, Agam, and Limapuluh Kota Regency. Coffee in Ranah Minang also picked directly by hand by the farmers with the method of handpicking/selective pick. The natural condition of the Ranah Minang Highlands has a great influence on the quality of the aroma and flavor of the coffee produced. Ranah Minang coffee is a strong specific aroma between the combination of fresh fruits and spices. Another characteristic is its full body coffee character and has a sweet flavor like vanilla/caramel/hazelnut. The combination of pleasant taste will be felt in the after taste.

The testing results of the quality of brewing characteristics show that the five local coffee origins (SC 1, SC 2, SC 3, SC 4, and SC 5) can qualify for the specialty based on the flavor test protocol of the SCAA (minimum final score 80). The final score difference between counties is very thin. Similarly, the scores of each flavor attribute are almost identical to all cultivars. The condition does not reflect the diversity of seed size among the five samples. These results also support the conclusion of Kathurima et al. (2009) that the size of the seeds is not real correlates positively with the quality of flavor. The interesting thing is the Clean Cup, uniformity, and sweetness attributes for all the tested coffee origins obtain a maximum score (10) so that the category is extraordinary (exceptional). Many coffee aroma forming components, including the oil in coffee that has been roasted very sensitive to damage mainly due to oxidation and hydrolysis.

Therefore, to suppress the damage, the oxygen and water access should be limited, for example, by vacuum packing of the powder or by modifying the air in the package with C02 or N2. Characteristics of the occurrence of aroma (and flavor) damage in the stored coffee are the smell of musty (staling) and rancid. In the process of brewing, most of the smell (fragrance) components of the coffee powder dissolve in water brewing. The volatilization of the smell component with moisture depends on the partition coefficient of each component. The volatile components carried by the water vapor will then be recognizable by the olfactory nerve in the nasal cavity when we were sipping (slurping) the coffee.

Based on the test result, the highest score for the body attribute is given to the SC 3 sample code whose caffeine content is lower than SC 1, SC 2, SC 4, and SC 5. The results tend to agree with *James J. E (1991)*, who reports that caffeine content in coffee beans is negatively correlated with most of its flavor quality character. The caffeine content also proved to be not real positive correlates with flavor components [32,33,34], which directly affects the quality of coffee as a whole. The physical characteristics of the beans are not really correlated with the caffeine content, so that it cannot be used as an indirect identifier in the selection process. On the other, Salva (2011) argues that the attributes of the body are closely correlated with protein and lipid content, while the caffeine content relates to the character of bitterness [35].

Although quantitatively, the quality of the fifth flavor of the Arabica coffee sample is almost identical, each has a unique aroma profile. The sample with the SC 1 coffee, SC 2 each has a distinctive aroma resembling lemon (lemony), while SC 3 and SC 4 each have a honey fragrance (honeyed). Spicy Aroma is produced by SC 5 and SC1. Only SC 3, whose flavor produces a distinctive aroma resembling chocolate (chocolaty). It is suspected that the distinctive aroma ever attracted the roaster and gave a higher price at the farmer's level to the original coffee beans SC 1. According to Borém et al. (2008), the distinctive fragrance of the brew is proven to provide added value to the produced coffee products. The difference in the content of volatile compounds can be caused by differences in roasting degrees and the difference in the proportion of the compounds found in coffee-related to the distinctive aroma of coffee. Many components are forming coffee aroma, including the oil in roasted coffee. Oil in coffee is very sensitive to damage, mainly due to oxidation and hydrolysis. Therefore, to suppress the damage, the oxygen and water access should

be limited, for example, by vacuum packing of the powder or by modifying the air in the package with C02 or N2. Characteristics of the occurrence of aroma (and flavor) damage in the stored coffee are the smell of musty (staling) and rancid [36].

A variety of specialty coffee products then emerge as higher consumers demand to one of the coffee quality variables. The term of specialty coffee is intended for Arabica coffee products in certain regions that have prominent distinctive properties in stable quality, especially processed by the roaster, and traded specifically in the form of roasted coffee, ground coffee, or Coffee as a brew in certain retail markets [37]. The determination of specialty coffee in Indonesia is still based on the location of the development (origin). In fact, the availability of broad genetic diversity provides the opportunity to conduct specialty coffee single cultivar based selection, which grows in specific locations (single origin). Based on the results of the previous study has been proved to be a diversity of physical quality characteristics, Biochemic, and flavors among the Arabica coffee cultivar [38,39]. Overseas, coffee beans derived from single cultivars have been marketed as specialty coffees. Current product identification and certification can even be done with the help of molecular markers**.** With the advent of a new single cultivar-based specialty coffee, farmers are expected to obtain incentives in the form of higher prices for the crops of the cultivars concerned.

2) Cupping Test Value

Sensory test to know the profile of Ranah Minang Specialty Arabica coffee is done by the Cupping method. Cupping coffee is a method used to assess the taste of the coffee. Because each type of coffee has several different characteristics, so cupping coffee is felt good enough to distinguish the characteristics of the coffee. The cupping method of coffee is done to know the sensitivity of a person through the aroma and despair of the coffee that will be tested by relying on the sense of smell and sense of taste (mouth). Coffee Tasting Test (Cupping) is well known in the mid-19th century in San Francisco. In addition, some are tested to know the characteristic of coffee is the fragrance (dried smell of coffee), aroma, flavor (typical smell of coffee), body (viscosity), acidity (sour taste), aftertaste (sense of taste), sweetness (sweetness), balance (balance of taste and Aroma), clean cup (clean coffee), uniformity (consistency of flavor), overall and defects (delicious or not flavor produced). Some characteristics of the assessment of coffee cupping method are Aroma (fragrance), the aroma of coffee that will be sniffed, that is, the dried smell of coffee beans that have not been brewed but have been finely ground and also smelled wet from coffee beans that have been brewed.

Flavor, this process the tongue is used to translate what has been a smell of the coffee is detected by the tongue or not. The flavor is a combination of perception that is recognized by the tongue and aroma, which is recognized by the overall smell organ. The flavor component of coffee is the main element of the brewing value of a coffee, as it covers two elements at once. In organoleptic Assessment generally, the flavor is usually associated with other effects such as temperature, coarse/fine, etc. In the assessment of coffee flavors usually only include the flavor and aroma in unison and intact. It is true that other elements such as the heat level of the brewing also determine especially the aroma, which is associated with the level of volatility of the aroma-forming compounds. The cooler is usually the weaker the aroma value, as a result of the lower the number of volatile compounds in brewing water vapor. Therefore in the assessment of coffee brewing is usually in the condition that is quite hot or warm (± 65°C). For flavor can be done together with aroma, acidity, and after taste. After taste is detected when the first time to drink coffee, it will feel like there is a taste left in the base of the tongue or when swallowed it just passing, and to judge it, the less taste is left, then the better its Value.

Acidity is the process of sensing the acidic presence of coffee while sipping. In addition to the flavor, the assessment of coffee is known as Body element, which is the level of the flavor concentrations of coffee brew. It can easily be imagined between a light coffee (flat) with a heavy coffee. The body value of a coffee is determined by the compounds that are water-soluble when brewed. Compounds such as carbohydrate groups, aromatic compounds, alkaloids, and oils greatly determine the body of a coffee. The higher the compounds that dissolve or form a colloid in a brew fluid than the higher the body value of the coffee. Thus, the body is usually associated with viscosities (viscosity) of liquids, strength (imaginary), and slippery or rough properties, from the brewing fluid. The body referred to here is the thick or light of coffee when it was sipped. Assessment, if the body is thick, then the value to be given should be greater. The body can be given if it is not very fond of coffee; it can not be too distinguish whether the coffee body is thick or thin. Balance of some assessments such as flavor, after taste, and body. And if it is not a balance or less one of all the flavors that come mixed, then the given value is low. Sweetness, in the coffee, also has a sweet flavor, but the sweetness that is inflicted

differs from the sweetness of sucrose. The interaction between the taste and aroma components is usually prominent, but there is a balance. There is a particular coffee more acid (arabica in general) known as the acidity, but there is a more dominant coffee sweetness known as acidy.

Clean Cup, this is done at the start of the cupping method. And this assessment can be done coincide with the after taste: uniformity, uniformity between glass one with the other. Overall, the overall assessment of all the characteristics that have been assessed, and the value will be good when what is felt and sniffed as expected. Defects here is more to the flavor and aroma caused by the coffee. Cupping method has a distinctive way of implementation to get good results and satisfying so that the flavor and aroma produced not too tasteless or even too thick. The cupping method is carried out by weighing coffee as much as 8 grams, and the water measurement is given to 150 ml of glass with a temperature of 90-95°C. Then the coffee that will be tasted of its flavor and aroma to be left for 4 minutes and not mixed with sugar at all during the cupping process. This is done so as not to damage the taste of the coffee itself.

Specialty Coffee is the term for coffee with the highest grade because the coffee is processed specifically with special provisions start from the coffee is planted until it is served in a cup. Arabica coffee from the Ranah Minang can be said to be a specialty coffee because the condition of a coffee can be categorized as a special coffee grade is fulfilled. Coffee that is picked when harvested must be red-colored only, which is then processed into a green bean. It has a total defect of < 4%. If in 1 kg of green bean Specialty Coffee, then the total defect or the damaged beans should not be more than 40 grams. Green bean Specialty Coffee has a test cupping value of more than 80.

Table 3. The Profile of Ranah Minang Specialty Coffee Fully Washed Method

| Name Of Coffee | altitude (mdpl) | Body | Acidity | Taste Profil |
|---|---|---|---|---|
| Agam | 1250 - 1450 | Mediu m | Low | *Enough sweetness*, spicy like *cinnamo n,* herb, *fruit* |
| Solok Selatan | 1100 - 1500 | Mediu m | Mediu m | Spicy, herb, vanilla, tea like, tamarin Clean after taste, Sweet, *fruity, flowery,* |
| | | | | *sugar browning, dried fruit, vinegar smell, sour, chocolate.* |
| olok | 1250 - 1500 | Mediu m | Mediu m | *sugar browning, dried fruit, vinegar smell,* Sweet, *fruity, flowery,* lemon, Cokelat, herb, cinnamon after taste |
| asaman | 1250 - 1450 | Mediu m | Low | Herb, dark chocolate, lemony, sugar browning, cinnamon after taste, flowery, spicy, Green Apple, Citric acid, lime, sweet, ripe fruit, |
| ima uluh ota | 1000 - 1350 | Mediu m | Low | *Herb, enough sweetness spicy* like *cinnamon,* herb. |

South Solok is one of the areas in West Sumatera, which is famous for its coffee, which has a very wide area of coffee plantations. Coffee cultivation can now be said to be one of the principal professions for most residents there. No wonder if the interest in planting coffee in the South Solok population is increasing. That's why South Solok coffee is increasingly popular among Indonesian coffee lovers. Sumatera itself has many distinctive coffees. However, the South Solok is better known for its coffee than other regions in West Sumatra. In accordance with the region's name, this coffee is called South Solok Coffee. Although not as popular as Aceh coffee and other famous coffees, coffee is no less good results and can be enjoyed by coffee enthusiasts.

This coffee plantation is located in the South Solok precisely between Twin Lakes and Mount of Talang. As it still includes Minang Land, this coffee is also known by the

name of coffee Solok Minang. The South Solok coffee is planted close to the slopes of Talang Mountain. The altitude of this area ranges from 1,200M to 1,600M Above The Sea Levels, which has a character of various flavors such as lemon, chocolate, spices, and spicy. Spices and spicy This is the most vicious taste of this coffee. Whatever its name, the coffee is well received by the wider community, not just in Sumatra but throughout Indonesia. Even when properly processed, the quality will not lose with coffee from other countries. In fact, this coffee is also sold to foreign countries. Solok Coffee is increasingly known for at least the last three years. The unique character makes this type of coffee fast-paced and, no wonder if this Solok specialty immediately turned into a new star in the class of Sumatran coffees.

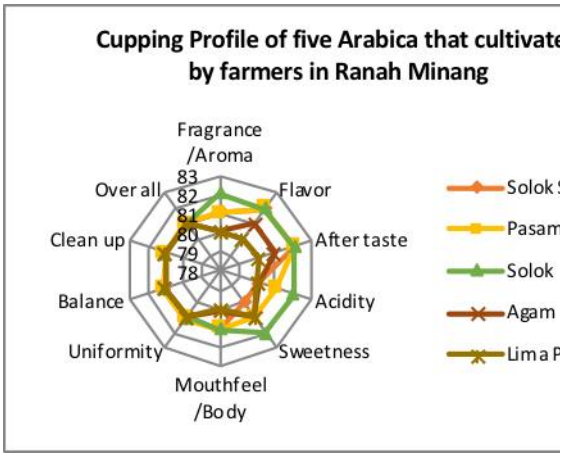


*Figure 5. Cupping profile of five Arabica coffees that cultivated by farmers in Ranah Minang,West Sumatra*

The Body is among the low-medium, sweetness with a lot of notes such as tropical fruits and fruity aroma, flowery, lemon, chocolate, so in general, Solok Coffee tends to be similar to typical African coffee. Limapuluh Kota Regency coffee is almost similar to Minang Solok Coffee; the production of coffee from Limapuluh Kota, especially from the district of Situjuah also increase significantly since the last three years. Arabica varieties have also gained more special attention from farmers since the year 2015. ***Situjuah*** Subdistrict of Limapuluh Kota regency is located around Mount of Sago; this area has altitude about 1200M-1450M Above The Sea level. Planting areas are scattered in several ***Nagari*** (district). ***Situjuah*** Coffee has a character with a medium body, low acidity, and enough sweetness spices, exactly like cinnamon and herbs. One of the advantages of a wet processing method is the process of fermentation and the cleansing of mucilage.

The specialty coffee was introduced the first time in 1978 by Erna Knutsen at an international coffee conference in France. The concept is very simple, namely: a special geographic micro-climate that produces coffee beans with a unique flavor profile. Specialty coffee refers to coffee that is different from ordinary coffee because of its high quality or because the production process obtained certification such as *Organic, Fairtrade, Utz Certified, Rainforest Alliance, c.a.f.é. Practices, Common Code for the Coffee Community (4C), Bird Friendly, and geographical indications.*

The main purpose of cupping is to ensure the best quality of the coffee that has been roasted. Cupping serves as an important method to identify defects caused by nature or that occur through the processing of coffee beans. Not only roasting but can identify any coffee that goes into the category of defect. Other indicators in judging the flavor are the balance of taste, hygiene taste, and the uniformity of the main sense of coffee that can be displayed starting from the fragrance (dried ground coffee smell). The main taste defects should not be the smell of coffee beans such as soil odor, moldy (mildew odor), stuffy (moss odor), sour (sour taste), oily (oil odor), chemicals (chemical odor), smoky (smoke smell), etc.

The aroma aspect includes Fragrance (the smell of coffee when it is still dry) and aroma (smell of coffee when brewed with hot water). One can assess these criteria by three stages in the cupping, which is a) smell of different coffee powder in the bowl before pouring with water. b) Smell the scent while stirring the coffee surface of the brew. c) Smell the coffee aroma when coffee is dissolved. The quality of the special aroma is influenced by the aroma of the dried coffee beans, stirring, and the aroma of the coffee after the coffee is dissolved has a value of 5 vertical scales on the form. The final value must be based on all three aspects: aroma (delicious smell), flavor (typical coffee smell). The flavor shows the special properties between the scent was the first kiss with acidity and ended with an after taste. Flavour is a combination of the tongue and steam aroma of the nose that flows from the mouth to the nose. The value given to flavor should include the influence, quality, and complexity of the combined flavor and aroma when the coffee is sipped into the mouth firmly so that it involves the entire palate in judging.

The Body is based on the flavor when the fluid enters the mouth in particular between the tongue and palate. Most examples with the viscous body have high scores. Some examples with a lightweight body can also have good taste in the mouth. Coffee that has a vicious body such as Sumatran coffee or coffee that has a light body like Mexico coffee becomes a reference

though different. Acidity (flavored sour taste), often described as an acidic flavor that is obviously tasty, or sour if not tasty. Good Acidity describing the coffee is delicious, sweet, and like the flavor of fresh fruit that is immediately felt at the time of coffee was sipped. Acidity that is too predominantly categorized is not tasty and inappropriate as an example to assess flavor. Sweetness, it's pleasant because coffee contains carbohydrates. The opponent of the sweetness in this context is sour, astringent, or raw. This Sweetness is not like the flavor of sucrose found in soft drinks.

After taste is the endurance of positive flavor (flavor and aroma) that comes from the palate of the mouth and survives after the coffee is discarded or swallowed. If the after taste is directly lost and not tasty, then given a low value, the final value is marked by a checklist on the horizontal scale should match the benchmark of the assessment based on the origin and other factors (temperature roasting and destination roasting, etc.).

High Acidity, as in Kenyan coffee and low Acidity such as Sumatran Coffee, becomes a reference though different. Balance is all aspects of flavor, after taste, acidity, body that is balanced in the example is called balance. If one aspect is missing or exceeds on the samples causing the balance value will be reduced.

The Clean Cup indicates the absence of negative values from the beginning of taste until after taste as the end. In judging these criteria should be noted from the beginning of taste until the fluid coffee is swallowed or discarded. Coffee from a bowl that has no flavor and aroma is removed. The value of 2 digits will be given to each cup showing the Clean Cup. Uniformity, There is aroma uniformity from each bowl. Overall is an assessment that reflects the whole aspect above from an example that each assessor has felt. An example with a pleasing aspect but not fulfill the standard criteria will be given a low value. Coffee that has the expected criteria and has a distinctive aroma such as from the Origin state will be given a high value.

## III. CONCLUSIONS

The method of processing, the influence of cultivars, and the elevation of the place of analysis results indicate that there is no real interaction on the entire quality attribute, except for the aftertaste and body attributes as well as the total score. The growing place and the height of coffee is a real effect on the acidity, balance, overalls, and total score attributes.

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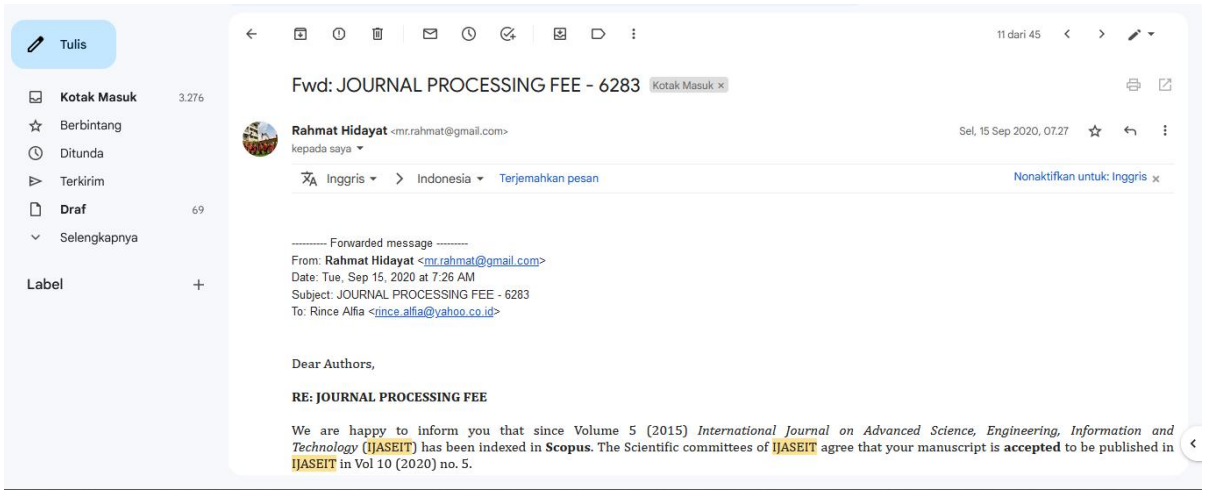

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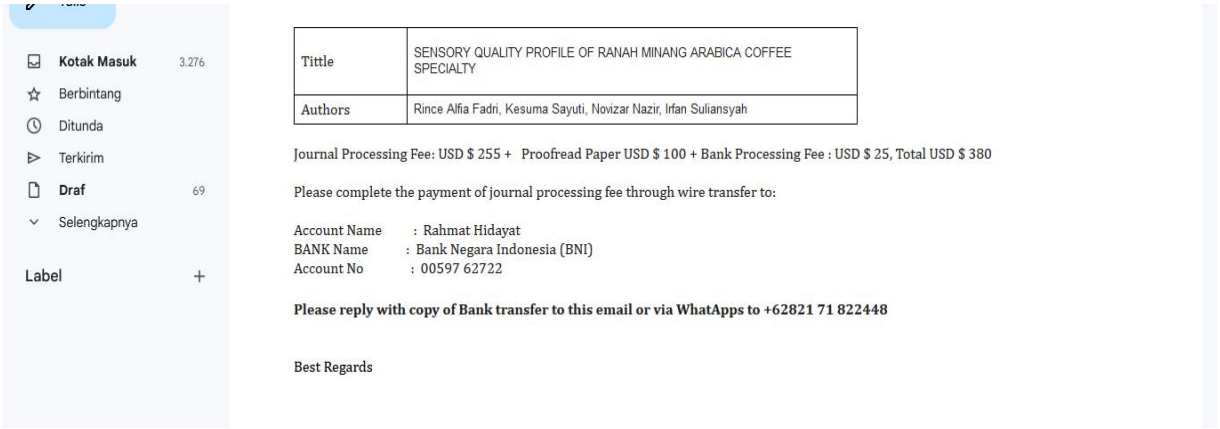

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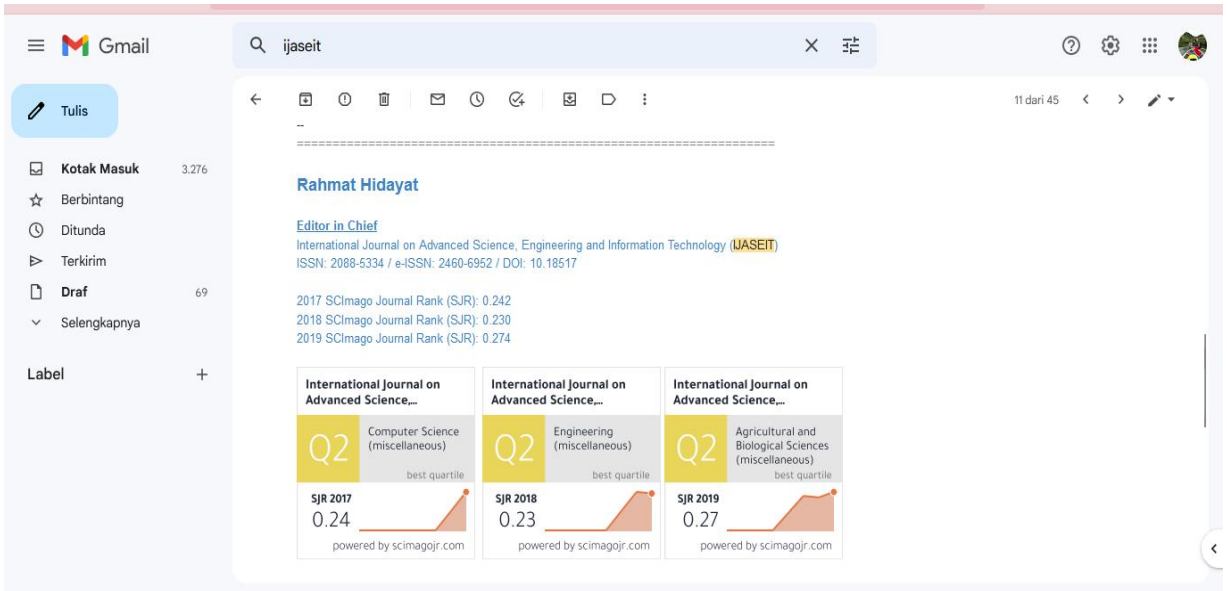

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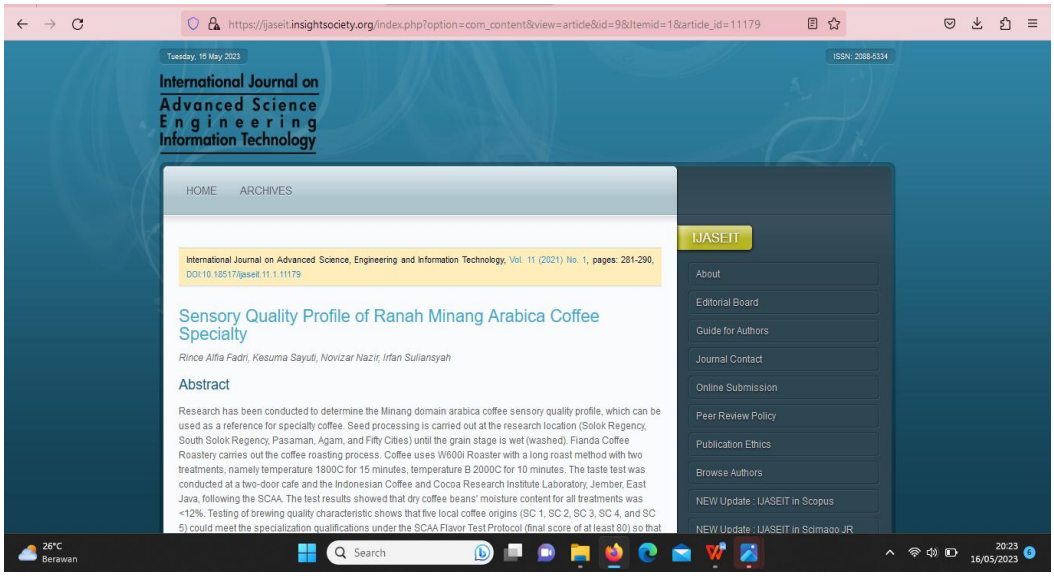
**Submission Metadata**

Gambar 5a. Status Published




Gambar 5b. Published