Analysis of sensory characteristic rice of *Padi Gogo* (dry land paddy) at Aceh Province

R Jaya¹, F Ferayanti¹, Idawanni¹, F F Rahmah¹, R Ardiantsyah¹, C H Rahmi¹ Yusriana²

¹Assessment Institute for Agricultural Technology (AIAT) of Aceh, Jl. Panglima Nyak Makam No.27 Lampineung, Banda Aceh, Indonesia.
²Agricultural Product Technology Department, Agriculture Faculty, Universitas Syiah Kuala, Banda Aceh, Indonesia

*Corresponding author’s email: jaya.rachman@yahoo.co.id*

Abstract. Agricultural vision Indonesia on 2045 is to become world food producers. In status, there has been reduction of paddy field at Aceh province caused by land use changes, furthermore, the reliable solution is optimizing a dry land use, locally estimated reach up to 200,000 ha. Several institutions have been developing dry land of paddy varieties (*padi gogo*), which suitable planted in dry land and rainfed area. The objectives of this research were to obtain rice character and rice grains shape which suites on Acehnese preference. Location of rice planting was at Tangse sub district, Pidie district, Aceh province, the varieties including Inpago 8, 9, 11, Unsoed, Limboto and Tuwoti. To find out the sensory characteristic of the rice, hedonic test was performed with the number of panelist were 31 (half-classified). In this research, we observed parameters were taste, aroma, color, and texture as well as rice grains shape. The analyzing of the data used kruskal-wallis test. Result of the study shows that the main parameters was significant different (asym sig.000), on dry land paddy (*padi gogo*). Overall, the panelist more tends likes the Limboto variety.

1. Introduction

Generally, to optimize use of dry land is through dry land paddy (*padi gogo*) which technically suitable of its. Specifically, to Aceh Province where predicted about 200,000 ha, the dry land has been not maximal utilized. On the other hand, several research institutions such as university, research and development agency, non-government organization (NGO) has been producing the new superior varieties of *padi gogo*. Indonesian Agency for Agriculture Research and Development (Badan Penelitian dan Pengembangan Pertanian), Ministry of Agriculture has produced several dry land paddy such as Inpago 8, 9, 10, 11, Limboto, Tuwoti, Batutegi and Situpatenggang, meanwhile University of Jenderal Soedirman by Agriculture Faculty has produced Unsoed Variety. The productivity of those varieties was about 4.5- 5 ton/ha, whereas days after planting (DAP) was 120-125 [1, 2, 3]. That fact show by productivity and DAP of *padi gogo* is not different with *padi sawah* (low land paddy). Nowadays, there are decreasing of low land paddy area, the utilization of dry land is critical point to achieve national or locally food security.

Based on euphoria of *padi gogo* development at Aceh province, the research questions was what the varieties *padi gogo* which suitable by hedonic properties of rice character with Acehnese
preference? The hedonic parameters related to personal preference on a product, generally includes taste, aroma, colour and texture [4,5]. Besides, important to assess grain shapes because of this item give influence on decision to consume of rice. Especially to *padi gogo* the research which was related to hedonic assessment to sensory evaluation is limited, such as [5] for aromatic rice, [6,7] discussed rice low land, [8] have done for rice quality evaluation, while research of grain shape preference by [9]. This parameter was very important to Acehnese, this is related to tend of Acehnese who are prefer long grain shape than oval.

The activity of preference analyze to rice characteristic of *padi gogo* superior variety was critically to undertake, it’s to related with acceptance level (adoption by user) on superior varieties have done application in the field (specific location). The Acceptance of *padi gogo* is not based on productivity, pest and disease protected, but has to consider a rice character which suitable with locally judgments. According to [10], generally *padi gogo*, which is planted at a location will produce rice character different for each, such as taste, odour, flavour, colour, physical and chemical nutrition properties. The objective of this research were to obtain rice characteristic and grain shape of superior variety *padi gogo*, planted on Tangse Sub District, Pidie District, Aceh Province. Limitation of the research was only eating quality, next step we will undertake on physical and chemical properties and cooking quality of this rice.

2. Methods

2.1 Planted Area

Preference analyze was to one activity in decision system to *padi gogo* development in an area. Rice characteristic analyzed from superior varieties of *padi gogo* which planted on Tangse sub district (figure 1), Pidie district. The superior varieties of *padi gogo* were Inpago 8, 9, 11, Unsoed, Limboto as well as Tuwoti (figure 2). Inpago 8,9,11, Limboto and Tuwoti produced by Indonesian Research Rice Center (Balai Besar Penelitian Padi) Sukamandi, whereas Unsoed variety produced by Faculty of Agricultural, University of Jenderal Sudirman, Purwokerto, Jawa Tengah province. Those varieties are Planted at Krueng Meriam Village 6 ha [11], between May-September 2018 (120-125 days after planting), average productivity was 4.3 ton/ha. In this research, planting system used skip row (*larikan gogo*) 2:1, numbers of farmers were 12, who members of group farmers. The justification of site selection based on cultural condition (purposive), where long time ago this area was a producer *padi gogo/padi ladang* (dry land paddy), with marketing area reach up Banda Aceh, Pidie, Lhoksumawe, Langsa and Medan, Sumatera Utara Province.
2.2 Hedonic Test

One of the requirements of superior varieties *padi gogo* will be accepted by end user (farmers and local rice business) was rice sensory characteristic has to suitable on locally citizens preferences, besides high productivity and easy to find the seeds as well as relatively resistant to pest and disease. According to [12] and [13], hedonic analyze related to mechanism of a product test using panelist like this research. Mechanism of hedonic analyzed used a rice, which planted at Tangse sub district, Pidie district. In this research, we involves panelist of 31 peoples (half-classified). The backgrounds of panelist were employees of Assessment Institute for Agricultural Technology of Aceh (AIAT), extension worker and researcher as well as lecture in Post Harvest Technology, Agricultural Faculty, University of Syiah Kuala. Hedonic analyzed held in AIAT of Aceh, Banda Aceh.

Before cooking, rice used as sample has to dry after water content 10% through conventional drying, and then polishing to convert the rice. Before hedonic analyzed by panelist, rice (300 gr) washed in water 300 ml and drained for five minutes. The sample cooked in 450 ml using rice cooker (heated box, 60°C±5°C) to serve [14]. The Sensory attribute included aroma, taste and texture as well as grain shape (visual judgment) generated by preliminary focus group guided by panel leader. During analyzed, the samples kept freshly until ready for serving. Data collecting used score-sheet, for each panelist was serve tree sample (40 gr), used code by three random numbers (xxx). The panelist rinsed their mouth with drinking water before testing for each samples. Likert scale is used in this research [12], the category were 1 (very unlike), 2 (unlike), 3 (fair), 4 (like), 5 (very like). To collect a panelist expression, used score sheet (figure 3). All activities were completely in 1 days.

2.3 Data Analyzed

In our research, the data analyzed using non-parametric statistic, due to ordinal category of data [15]. Futhermore, Kruskal-wallis test [15], the analyzing of the data used Statistical Package for Social Science (SPSS) created by IBM Corp. (version 19) and excel solver for window (version 2007). Data processing step was first collect panelist judgments by score sheet for each varieties and variable, second determine average and standard deviation (st.dev), next steps analyzed with statistical by SPSS to obtain mean ranks as the outputs of analyzation. After scoring, panelists interviewed for recorded information on name, phone numbers, gender, age, occupation and education. Interviewed was no more than 15 minute.
The score sheet hedonic test of rice characteristic of *padi gogo*

| Name       | Phone   | Age     | Address | Gender | Education       | Occupation |
|------------|---------|---------|---------|--------|-----------------|------------|

**Figure 3.** The score sheet of hedonic test

### 3. Results and Discussion

#### 3.1 Respondent Characteristic

The respondents completed questioners were 31 and socio economic indicators, be grouping on gender, age, occupation and education are given in Table 1. Respondent (51.61%) was woman and 48.39% as man. This fact due to women mostly purchased of rice, furthermore, we suggest that the dissemination on this topic might be more successfully [14]. Based on age respondents were dominated by 50-60 (48.89%) years old, then 30-40 (29.03%) and 40-50 (19.35%). According to [16] that rice purchase decision in their household, will fixed when the leader of its 40-60 years old, caused by family expenses tends increase for education cost. Meanwhile, related to education level, mostly educated respondents were master degrees (51.61%) and graduate (35.48%), with standard of deviation 6.9. This is due to our respondents as extension worker, researcher and lecturer, which have education minimally master degree and graduate.

#### 3.2 Hedonic Analyze of Rice Characters (*Padi Gogo*)

In our research, hedonic analyzed to rice character of *padi gogo* was tested by subjective (panelist) are given on Table 2. Result of Kruskal-wallis analyzed of the study show that, the judgments of all panellists confirmed significant different on sensory attribute. This facts based on Asymp.six <0.05 for all attributes. Thus, it can be that on all superior variety of *padi gogo* has different on sensory attributes. According to mean rank (outputs of SPSS) for each superior variety of *padi gogo* (Limboto), the color and shape of rice tends like by panellist. Whereas, by taste attributed our panelist more like Unsoed superior variety. Based on visual judgment to grain shape, mostly panellist tends likes Limboto superior variety. In decision purchase of rice, generally first consideration of Acehnese was grain shape namely oval-slender.
Table 1. Socio economic indicators of respondents interviewed

| Demographic Variables | Frequency | Percentage (%) | Remarks |
|-----------------------|-----------|----------------|---------|
| Gender:               |           |                |         |
| Women                 | 16        | 51.61          |         |
| Man                   | 15        | 48.39          |         |
| St.Dev                | 0.070     |                |         |
| Age (years old):      |           |                |         |
| >30                   | 1         | 3.23           |         |
| ≥30≥40                | 9         | 29.03          |         |
| ≥40≥50                | 6         | 19.35          |         |
| ≥50≥60                | 15        | 48.39          |         |
| St.Dev                | 5.85      |                |         |
| Education:            |           |                |         |
| Senior High Scholl    | 2         | 6.45           |         |
| Diploma               | 1         | 3.23           |         |
| Graduate              | 11        | 35.48          | Completed |
| Master                | 16        | 61.61          |         |
| Doctor                | 1         | 3.23           |         |
| St.Dev                | 6.90      |                |         |
| Occupation:           |           |                |         |
| Extension Worker      | 12        | 38.7           | AIAT of Aceh |
| Researcher            | 10        | 32.2           | AIAT of Aceh |
| Agricultural Local    | 7         | 22.5           |         |
| Government Employee   | 2         | 6.45           | Agricultural Faculty of Syiah Kuala University |
| St.Dev                | 4.34      |                |         |
| N                     | 31        |                |         |

According to color attribute, mostly superior variety (padi gogo) which is tested show significant different each sample. Mostly panelist tends more like Limboto variety. [17] Argued that rice color is influenced by quality of polish degree and the composition of amylosa and amylpectins content, but higher of polish degree, influenced on a husk waste. This condition also on rice shape, taste, odor, texture as well as grain shape attributes, where the panelist more like Limboto superior variety.

Table 2. Hedonic analyzed on rice characteristic of padi gogo

| Varietas  | Color  | Rice shape | Aroma  | Taste  | Texture | Grain shape |
|-----------|--------|------------|--------|--------|---------|-------------|
| Inpago 8  | 69.26  | 75.26      | 91.21  | 78.53  | 93.11   | 92.69       |
| Inpago 9  | 115.71 | 102.27     | 81.42  | 66.95  | 72.13   | 75.87       |
| Inpago 11 | 57.00  | 56.10      | 64.03  | 66.68  | 69.00   | 63.50       |
| Unsoed    | 100.79 | 105.19     | 136.05 | 130.71 | 109.65  | 93.03       |
| Limboto   | 136.29 | 136.10     | 114.66 | 120.50 | 125.37  | 131.18      |
| Tuwoti    | 81.95  | 86.08      | 73.63  | 97.66  | 91.74   | 104.73      |

Kruskal-wallis test:

|   | N  | 31  | 31  | 31  | 31  | 31  |
|---|----|-----|-----|-----|-----|-----|

Df  | 5  | 5   | 5   | 5   | 5   | 5   |

Chi-Square  | 51.69 | 45.87 | 43.785 | 45.130 | 28.172 | 33.036 |

Asymp. Sig. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

Remark: Asymp. Sig. <0.05 it mean judgment panelist on several superior variety padi gogo were significant different, Mean Rank was outputs the Kruskal-Wallis analyzed.
Technically, related to agricultural development perspective based on zone of food commodity, especially paddy low land and dry land, [4] stated that critically to assess agronomy aspects such as productivity, climate changes and suitable of land, but very important too hedonic attributes. Nowadays, many superior varieties have been produced by research institution, but no more 2-5 which adopted by end-user (farmers). Therefore, through literature review, majority researches on paddy commodity related to agronomy, few discussed on evaluation sensory of its, even though, main influence factors on decision rice purchased was environment, education level, income and ethnic [18]. Futhermore, [19] by ethnic the decision-consumed rice was very important, such as on Indonesia area, there are communities who like rice characters. For instances, Minang, Banjar, Batak and Dayak ethnic tends like a dry-rice (*nasi pera*), but Sunda, Jawa, Betawi, Bugis ethnic tend likes a fluffier-rice (*nasi-pulen*). On the other hand, to make fried-rice which is one of the Indonesian favorite food have dry-rice.

4. Conclusion and Suggestion

Overall, there are significant different on all parameters sensory evaluation of superior variety of *padi gogo*. Meanwhile, majority of panelist tends likes to superior variety Limboto and likely this variety that have prospective to develop in Aceh province. In this research, we suggestion next time is needed research that addresses physical and chemical properties of *padi gogo*, as well as market survey on a wider scale. The dissemination system which more operational is needed to improve adoption an innovation.

References

[1] Fitria E and Ali N 2014 Widya Riset. 17 423-434
[2] Bakhtiar, Hasanuddin, Hidayat T 2013 Agrista. 14 49-54
[3] Idawanni, Bakhtiar, Hasanuddin 2016 J. Floratek. 11 88-95
[4] Juliano B O 1985 *Criteria and Test for Rice Grain Qualities* ed Juliano (St Paul: Sereal Chemist)
[5] Wijaya C H, Kusumaningrum H, Kusbiantoro B, Handoko B B 2011 *Pangan Media Komunikasi dan Informasi*. 20 63-80
[6] Setyowati I and Kurniawati S 2015 People preference of rice character of superior paddy variety: case study on Cibadak Banten Province Subdistrict *Proc National Seminar of Indonesia Biodiversity* (Jogyakarta July 4 2015) pp 889-893
[7] Jaya R and Nurbaiti 2017 Design of rice premium production system in business scale at jantho science park aceh besar district *Proc National seminar of innovation and creativity on post harvest technology supported national agroindustri development* (Banda Aceh October 15-16 2017)
[8] Wuryani S, Padmini O S, Brotodjojo R 2015 *Agrivet* 19 46-51
[9] Sujitno E, Fahmi T, Teddy S 2011 *Jurnal Pengkajian dan Pengembangan Teknologi Pertanian*, 14 62-69
[10] Yang D S, Lee K S, Kaysa J S 2010 *J. of the Sci. of Food and Agriculture* 90 2595-2601
[11] Ferayanti F, Idawanni, Lamhot E D 2019 Role of Inpago 8,9,11 and Unsoed variety to support production in aceh province *Technical report*
[12] Setyaningsih D, Apriantono A, Sari M P 2010 Sensory analyzed for food industry (Bogor: IPB Press)
[13] Kemp S E, Hollowood T, Hort J 2011 Sensory evaluation (Singapore:john wiley & sons)
[14] Tomlins K I, Manful J T, Larwer P, Hammond L 2005 *Food quality and preference* 16 79–89
[15] Siegel S 1992. Non-parametric statistic for social science trans. Zanzawi Suyuti (Jakarta Gramedia)
[16] Indrasari S D, Purwaningsih, Apriyati E, Ardhiyanti S D 2016 *Penelitian Pertanian Tanaman Pangan* 35 173-180
[17] Haryadi 2008 Technology of rice processing (Jogyakarta: Gadjah Mada University Press)
[18] Damardjati D S 1995 Characteristic of standardises and properties of rice quality as development agri-business and agro industrial pillar in Indonesia (Prof oration: IAARD press)

[19] Mardiah Z, Rakhmi A T, Indrasari S D, Kusbiantoro B 2016 An evakuatation of rice quality to determine preference consumer at Java Penelitian Pertanian Tanaman Pangan 35 163-170