Research Paper

Future of Food: Journal on Food, Agriculture and Society
11 (2) May 2023

Stakeholders' knowledge of organic rice quality in Indonesia

WAHYUDI DAVID[1*], FIRMANSYAH DAVID[2], AND NURUL ASIAH[1]

[1]Department of Food Science and Technology, Universitas Bakrie, Jakarta, Indonesia
[2]Departement of Information Technology, Institut Teknologi Padang, Padang, Indonesia

* Corresponding author: wahyudi.david@bakrie.ac.id

Data of the article

First received : 04 February 2023 | Last revision received : 09 May 2023
Accepted : 25 May 2023| Published online : 31 May 2023
DOI : 10.17170/kobra-202210056942.

Keywords

knowledge; consumer; farmer; processor; organic rice quality

In recent years, the demand for organic rice has increased along with the increasing consumer awareness of it. However, information or knowledge systems regarding consumer expectations of the quality of organic rice have not been well developed. In order to develop the quality of organic rice, this study intends to explain deficiencies in information or knowledge systems along the supply chain. Focus group discussions were conducted with farmers, processors, and consumers, from which key information or knowledge was categorised and weighted to describe which was the dominant factor for quality development. The study found that the definition of organic rice quality differs among farmers, processors, and consumers. The farmers tend to define the quality based on environmental context. However, processors consider the product's attributes, while consumers tend to focus on both the product's attributes and the process.

1. Introduction

Consumer knowledge of the latest products is an essential point in the discourse of service innovation. In this case, common knowledge becomes a bridge to improve the relationship between two parties, especially consumers and producers (Salunke et al., 2019). While achieving common knowledge means that both parties 'acknowledge' and 'agree' on common terms and procedures, the level of consumer knowledge and product characteristics have become a point of interest (Singh et al., 2021). This shows that the process of forming common knowledge is highly dependent on how consumers experience, feel, and use the product.

Since the level of knowledge can be a reference to accelerate the achievement of common knowledge, both consumers and producers must cooperate to create a dialectical situation. This suggests that common knowledge is developed by the process of synthesis that is carried out by both parties (Nonaka & Toyama, 2015). There is "room" for multiple points of view due to the level of product knowledge; producers and consumers may have opposing or complementary opinions regarding a given product. From both sides, the internalization of knowledge will continue to occur, and tacit knowledge is the reason for formulating common knowledge. However, common knowledge in product development is majorly driven by the customer perception of the product (Stolzenbach et al., 2013). In addition, knowledge acquisition between both parties is urgently needed to drive the adoption of 'new' products regarding both usability and social trends (Risselada et al., 2014). Consequently, the term 'consumer power' reinforced by the digital revolution has changed how consumers interpret a product, and

this has impacted the way producers capture consumer knowledge (Labrecque et al., 2014).

The growth of technological products and daily demands are influenced by a product's mastery of knowledge in a variety of ways. This may refer to products developed to meet needs (that evolve over time) or products that are cultural-based and whose processing is not eroded over time. In Indonesia, certain food products have been manufactured and consumed for generations, but only a few consumers are aware of the advantages of one product over another.

Consumers state that foods labelled as organic are nutritionally superior and safer than their conventionally produced equivalent (Bergam & Pandhi, 2023). For organic foods, organic rice is the second highest-demanded organic product in Indonesia (David & Ardiansyah, 2017a). Since 2010, the Indonesian government has been supporting organic food production. The Department of Agriculture pushed the enthusiasm to practice organic agriculture and to consume organic products with the slogan 'Go Organic 2010' (Dalmiyatun et al., 2018). Currently, organic food production has been increasing. Organic products in Indonesia represent 0.03% of global demand, with a per capita expenditure of USD 0.06 in 2021. With a growing number of consumers interested in organic products and the emerging economy in Indonesia, the potential for organic products seems optimistic when considered in the long term, with a forecast value CAGR of 6.1% for 2021 to 2026 (Euromonitor International, 2022). The demand for organic food has steadily increased in Indonesia, the global market, and developed and developing countries due to increasing consumer awareness of health and environmental issues (Joshi et al., 2019).

Because the organic farming approach follows some basic principles such as health, ecology, fairness, and care, it is considered an efficient agricultural practice for environmental sustainability (Dhiman, 2020). Consuming organic food enables a healthy and environmentally conscious lifestyle, which in turn creates a global green movement known as green consumerism and a sign of green identity. (Wilujeng, 2021). Today, consumers and producers around the world have become more conscious of the danger of using synthetic chemicals in farming, which may have negative effects on human health and may equally cause environmental damage. Consumers need assurance that their food is safe and has a high nutritional value (Export News Indonesia, 2017).

According to David and Ardiansyah (2017b), in consumer perception of organic rice, health concerns, and less pesticide residue were essential factors that influenced the purchase of the product by the consumers. However, what consumers do not know is that when the organic rice is polished, like the conventional one, then the nutritional content of both will be similar (David et al., 2019; David et al., 2020). Meanwhile, the consumer spends more on organic rice's nutritional quality than the conventional one. The selling price of organic rice ranges from 1.5 USD to 4 USD. The wide price range is assumed to be asymmetric information along with the milling process.

The price cannot reflect the dilemma between the degree of milling and the nutritional properties of rice. Consumer perception of brown rice is lower where the nutritional properties are high. Meanwhile, for farmers and processors, the highest degree of milling reflects an increase in the price. In the area of organic food, consumers and their purchasing behaviour have been the subject of several studies. Even though there is still a lack of consistent findings and precise descriptions of consumers' perception of organic food quality in terms of its health benefits, safety, and environmental sustainability, as well as in terms of the determinants of perceived quality (Lamonaca et al., 2022). Food quality is commonly associated with nutritional and sensory aspects, especially taste. In the case of organic products, the notion that organic food is more nutritious than conventionally produced foodstuffs is still debatable, and the conclusion is not clear yet. Moreover, some people may be able to differentiate the taste of organic and non-organic food, but others may find no difference. Various factors influence food quality besides the farming process, such as harvesting time, post-harvest process, storage conditions, room temperature and packaging material, and cooking practices.

Given the above situation, this study aims to analyse the common knowledge of organic rice quality by its consumers and producers and how they develop a consensus of information. The study further identifies which knowledge/information is not fully understood by these stakeholders as well as the one that both can

ISSN-Internet 2197-411x OLCL 862804632

understand.

2. Methodology

To examine how the discourse of shared knowledge is formed between producers and consumers, we approached groups of stakeholders in organic rice in Indonesia. The stakeholders consisted of a group of farmers (n=13), a group of processors/intermediaries (n=10), and a group of consumers (n=18). We collected data by focus group discussion (FGD) which was performed in three groups of separate sections. The Group of Farmers (GF) is an organic rice grower practicing organic agriculture for about ten years. The GF were between 36 and 58 years old and all of them were males. The Group of Processors (GP) is a processor of rice milling and a middleman trader who has been practicing for more than 15 years. They mill both conventional and organic rice milling. Consumers of organic rice between the ages of 25 and 50 make up the Group of Consumers (GC). An FGD was conducted for about 90 minutes under the supervision of one facilitator. Data was collected and documented.

Data from the FGD was collected using an affinity diagram and was weighted according to the expert panel. The expert panel consisted of consumers, farmers, and processors. Data was coded and weighted to describe which key knowledge was the main gap/barrier. Data was translated from Indonesian into English, and all actors were asked what their expectation of organic rice was and what was yet to be accomplished. Five key questions were addressed to all actors (farmers = F) (Processor = P) and (consumer = C). 1) Are you satisfied with organic rice information/knowledge? (Yes/No) 2) Do you consider the milling degree to be the problem? (Yes/No/Do not Know) 3) How do you rate the current quality of organic rice? (1= low, 5= best) 4) Is the quality/price ratio satisfactory? (Yes/No) 6) Do all actors think the quality should be improved? (Yes/No/Don't know)

The qualitative data was computed to Xlstate (R) Base Version 2021. The Audio analysis was carried out using f4 software developed by Marburg University, Germany. After importing, editing, and formatting, content analysis was done. Data were analysed using Multiple Correspondence Analysis (MCA) which was performed by Xlstat Base Version 2021. Correspondence analysis aimed to represent as much of the inertia on the first principal axis as possible, with a maximum of the residual inertia on the second principal axis and so on, until all the total inertia was represented in the space of the principal axes.

3. Results

The comparison of key information among the actors can be seen in Table 2. The GF recognised that the quality of organic rice was guaranteed by the information that no fertilizer or pesticide was used in its growth implying that there would be no additional chemical residue on their yield. The farmers agreed that when they practised organic farming, they gained a high yield and a better selling price. They believed that organic farming could be beneficial to the Environment. However, they still assumed that organic rice should be milled like conventional rice since more the degree of milling, the better the appearance of the rice.

Unlike farmer groups, for the processor, the indication of organic rice quality is based on the degree of milling and whiteness. These indicators are contrary to the aim of organic rice, while the increasing milling time reduces the nutritional value (David et al., 2019). In terms of price, processors expected a higher price for organic rice than conventional rice. Since the demand for white organic rice is high, processors continue to produce organic rice with a higher degree of milling.

Consumers define organic rice quality based on its sensory and non-sensory attributes. The taste of organic rice is an important attribute. David et al. (2020) confirmed that aroma and taste are the attributes that consumers appreciate before buying an organic rice product. However, the dilemma is that the better the taste, the higher the degree of milling, resulting in lower nutritional content in the organic rice. In addition, consumers rarely consider the freshness of organic products, whereas freshness greatly impacts food product taste and nutritional value. During processing, transporting, or storage, some chemical changes affect sensory perception and can result in the loss of some specific nutrients. Furthermore, some organic products are still being produced on a limited scale, making them less accessible than other products. In such cases, the organic product may be transported for quite a long distance and may stay on the market

Table 1. Characteristics of actors

Actors	Aged range	Education	Years exposed to organic product
Farmers (n=13)	20–30 (n= 0) 30–40 (n=3) 50 < (n=10)	Elementary School (n=9) Junior High School (n=1) Senior High School (n=3) University (n=0)	0–5 (n=2) 5–10 (n=11) 20< (n=0)
Processor (n=10)	20–30 (n= 0) 30–40 (n= 2) 50 < (n=8)	Elementary School (n=0) Junior High School (n=1) Senior High School (n=8) University (n=1)	0–5 (n=8) 5–10 (n=2) 20< (n=0)
Consumer (n=18)	20–30 y (n= 2) 30–40 (n=10) 50 < (n=6)	Elementary School (n=0) Junior High School (n=0) Senior High School (n=2) University (n=16)	0–5 (n=8) 5–10 (n=10) 20< (n=0)

long before it is sold and consumed. Further, a study showed that rice's physicochemical properties change during storage at various temperatures. Milled rice stored at higher temperatures contains higher fat acidity than the one at low temperatures. Storing milled rice above room temperature increases cohesiveness and hardness. Moreover, after 1 month of storage at 30oC and 40oC, there will begin a significant decrease in all sensory values (Park et al., 2012).

Even though the price of organic rice is now expensive for some individuals, the consumer is nevertheless eager to purchase it under these circumstances. Those who understand the advantages of organic rice nonetheless concur that the product is worthwhile for the money spent on it.

As shown in Table 2, the study results show that the differences in general knowledge about organic products between actors are quite prominent. We highlight three factors to explain how these differences occur, including personal preferences, social values, and breadth of literacy. Personal preference influences the actors' usage and consumption choice of organic products. This factor creates a gap among the actors since each of them has their way of describing the term 'organic'. When asked to define the quality of organic rice, each provided three distinct answers. The GF replied that organic rice is processed with fewer pesticides and no chemicals. The processors said that organic rice has to do with whiteness. The consumers replied that organic rice is a product of healthy and tasty rice. Using a definition of knowledge as a 'highly valued state in which a person is in cognitive contact with reality' (Zagzebski, (2017), personal preference is highly related to the cognitive aspect of actors toward the product. When the actors were asked about the expectation of organic rice, all of them replied from two different points of view. Farmers and processors have their knowledge as the 'sellers' while consumers have theirs as the 'buyers'. This describes the variation in the answers provided by these three institutional actors.

They expressed their views on organic food based on their norms, values, social statuses, and professional backgrounds. The practices and norms upheld by the actors are developed based on their institutional

ISSN-Internet 2197-411x OLCL 862804632

Table 2. The group has mentioned the most frequent choice of the word.

Questions	Farmers	Processor	Consumers
What is your definition of the quality of organic rice?	Less pesticide (n=10) No Fertilizer (n=13) No Chemical Residue (n=13) High Yield (n=10)	Refined rice (n=10) Degree of whiteness (10)	Taste (n=17) Healthy (n=15) Organic (n=17) Nutritional (n=18)
What are your expectations of the organic rice price?	The best-selling price of Paddy (n=10)	The best-selling price of rice (n=7)	The best buying price (n=17)
What is your Motive for producing or consuming organic rice?	Good for the Environment (n=11) Best Selling price (n=13)	There is a demand (n=7)	For health reasons (n=15) For Environment (n=5)
What is your opinion about the degree of milling?	Depending on the rice milling unit (n=10)	Important to keep the rice valuable to sell (n=9)	Taste (17) Aroma (n=9)

practices (Thornton and Ocasio, 2010). When the actors were asked about their motivation for producing organic rice, their three different answers suggested a variation in knowledge regarding such rice. The GF was motivated by the fact that growing organic rice is good for the Environment, while the consumers thought that organic rice is healthy. Lastly, we pointed out that the ability to acquire external knowledge of organic products is related to the literacy of the actors. The question regarding the opinion on the degree of milling shows the breadth of their literacy. A high level of literacy is needed to expand knowledge of organic products.

The distribution of knowledge of all actors based on the five keys of information can be seen in Figure 1 as follows:

Figure 1 explained: in the Upper Right Quadrant (URQ), farmers' and processors' responses are that the quality/price ratio of appropriate and current quality is reflected in range 4, which means that both farmers and processors are satisfied with the current quality/price as well as current quality. Conversely, in the Upper Left Quadrant (ULQ), most of the consumers' response shows the lowest current quality and their dissatisfaction with the information/ knowledge about organic rice. If we refer to Table 2, most of the consumers think that the definition of the taste is organic, healthy, and nutritional, but they do not get this information correctly. Therefore, they are not satisfied with the product. This condition is positively correlated with the importance of the degree of milling which also has been studied in the previous research (David et al., 2019). According to Fitzgerald (2017) translucence, shape, and uniformity are important aspects of rice end-use quality for consumers, millers, wholesalers, and retailers but not farmers.
Moreover, in the Lower Right Quadrant (LRQ), the farmer and processor respond that they are satisfied with the quality when the quality ranges are between three and five. This condition may be because of the Indonesian National Standard for Rice (SNI 6218 2020), which has grouped the quality of rice into three

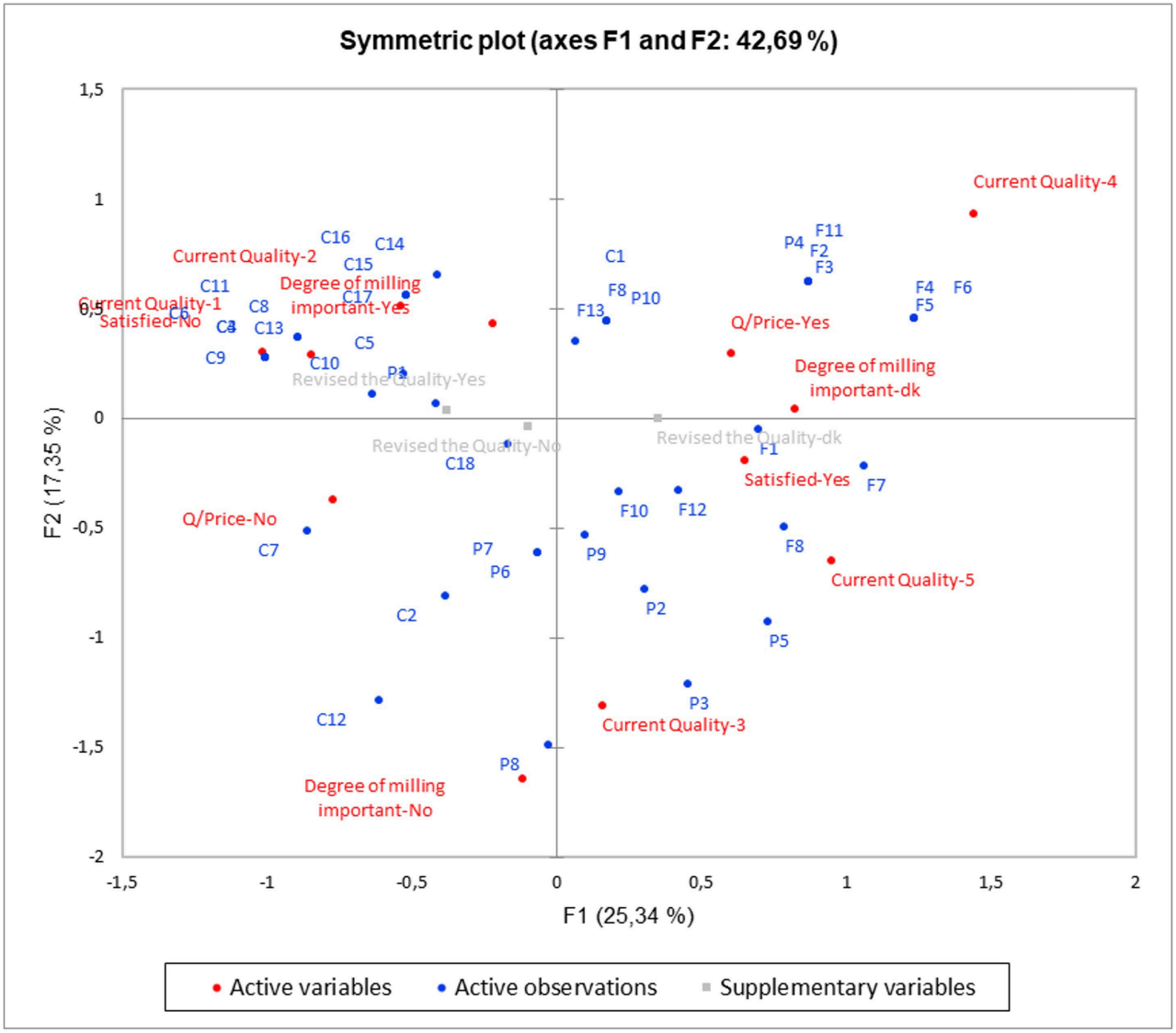

Figure 1. Distribution of knowledge of all actors regarding the five keys information/knowledge

different classes. The Lower Left Quadrant (LLQ) belongs to the group that thinks there is no satisfaction with the quality/price and to which the degree of milling is not that important.

4. Conclusion

Based on this study, we conclude that farmers have some knowledge in terms of defining quality with more focus on the environmental issue. At the same time, the processor is more focused on the degree of milling. Conversely, consumers have their definition of quality as closely related to the nutritional value of the product. In terms of common knowledge, there are gaps among actors in defining and perceiving the term 'organic'. This is also indicated by people's perceptions and knowledge of the advantages of using organic rice in the organic food ecosystem. We can say that farmers/processors fulfil the term organic by growing rice with its high selling price.

On the other hand, consumers do not pay more attention to price than to the benefits of organic rice for their health and life quality. However, knowledge of the nutritional value should be connected to the degree of milling to fill the consumer's expectation gap. When the degree of milling meets the appropriate nutritional ingredient of the rice the gap can be reduced. On the other hand, farmers should communicate with processors regarding price/quality, as this may be a

ISSN-Internet 2197-411x OLCL 862804632

barrier to these two actors in defining which degree of milling will benefit both actors. Our paper provides a direction for further study, positing that common knowledge concerns the same knowledge among actors. This may be achieved with different stakeholders and different pieces of knowledge, but it forms knowledge ecosystems.

Conflict of Interest

The authors declare that there is no conflict of interest.

Acknowledgement

We would like to thank Kemendikbud for funding this research. We also like to thank all participants (consumer, farmer, and processor) for participating in the focus group discussion.

References

Bergman, C., & Pandhi, M. (2023). Organic Rice Production Practices: Effects on Grain End-Use Quality, Healthfulness, and Safety. Foods, 12(1), 73. doi: 10.3390/foods12010073

David, W., & Ardiansyah, A. (2017). Organic Agriculture in Indonesia: challenges and opportunity. Organic Agriculture, 7(3), 329-338. doi: 10.1007/s13165-016-0160-8

David, W., Ardiansyah, Budijanto, S., Kahl. J., & Strassner C. (2020). Bioactive Compounds and Sensory Properties of Organic Rice: The Impact of Degree of Milling. Current Research in Nutrition and Food Science, 8(2). doi: 10.12944/CRNFSJ.8.2.04

David, W., Ardiansyah, Budijanto, S., & Strassner, C. (2019). Sensory evaluation and nutritional information on organic brown rice. Organic Agriculture, 10, 243-252. doi: 10.1007/s13165-019-00269-z

Dalmiyatun, T., Dyah, P. W., & Setiyawan, H. (2018). Strategic Development of Oranic Rice Farm of Susukan District of Semarang. Agricultural Socio-Economics Journal, 18(2), 61-69. doi: 10.21776/ub.agrise.2018.018.2.3

Dhiman, V. (2020). Organic Farming for Sustainable Environment: Review of Existed Policies and Suggestions for Improvement. International Journal of Research and Review, 7(2), 22-31.

Export News Indonesia. (2017). Indonesian Organic Products. Indonesia: National Export Development, Ministry of Trade of The Republic of Indonesia. Retrieved from http://djpen.kemendag.go.id/app_frontend/admin/docs/publication/1911519011608.pdf

Fitzgerald, M. (2017). Chapter 12—Rice: Grain-Quality Characteristics and Management of Quality Requirements. In Wrigley, C., Batey, I. L., & Miskelly, D. (2nd ed.), Cereal Grains (pp. 291-315). Sawston, UK: Woodhead Publishing.

Joshi, H. C., Prakash, O., Nautiyal, M. K., Mahapatra, B. S., & Guru, S. K. (2019). A Comparison between the Grain Quality Parameters of Rice Grown under Organic and Inorganic Production System. Universal Journal of Plant Science, 7(2), 19-27. doi: 10.13189/ujps.2019.070201

Lamonaca, E., Cafarelli, B., Calculli, C., & Tricase, C. (2022). Consumer perception of attributes of organic food in Italy: A CUB model study. Heliyon, 8(3), e09007. doi: 10.1016/j.heliyon.2022.e09007

Labrecque, L., Vor-Dem-Esche, J., Mathwick, C., Novak, T. P., & Hofacker, C. F. (2013). Consumer power: Evolution in the digital age. Journal of Interactive Marketing, 27(4), 257-269. doi: 10.1016/j.intmar.2013.09.002

Nonaka, I., & Toyama, R. (2015). The knowledge-creating theory revisited: knowledge creation as a synthesizing process. In Edwards, J. S., The Essentials of Knowledge Management (pp. 95-110). London: Palgrave Macmillan.

Park, C.-E., Kim, Y.-S., Park, K.-J., & Kim, B.-K.. (2012). Changes in physicochemical characteristics of rice during storage at different temperatures. Journal of Stored Products Research, 48, 25-29. doi: 10.1016/j.jspr.2011.08.005

Risselada, H., Verhoef, P. C., & Bijmolt, T. H. A. (2014). Dynamic effects of social influence and direct marketing on adopting high-technology products. Journal of Marketing, 78(2), 52-68. doi: 10.1509/jm.11.0592

Salunke, S., Weerawardena, J., & McColl-Kennedy, J. R. (2019). The central role of knowledge integration capability in service innovation-based competitive strategy. Industrial Marketing Management, 76, 144-156. doi: 10.1016/j.indmarman.2018.07.004

Singh, A., Jenamani, M., Thakkar, J. J., & Rana, N. P. (2021). Propagation of online consumer perceived negativity: Quantifying the effect of supply chain underperformance on passenger car sales. Journal of Business Research, 132, 102-114. doi: 10.1016/j.jbusres.2021.04.027

SNI 6128: 2020. (2020). Indonesian Standard for Quality of Rice. Badan Standarisasi Nasional Indonesia. Retrieved from

Stolzenbach, S., Bredie, W. L. P., & Byrne, D. V. (2013). Consumer concepts in new product development of local foods: Traditional versus novel honeys. Food Research International, 52(1), 144-152. doi: 10.1016/j.foodres.2013.02.030

Thornton, P. H., & Ocasio, W. C. (2008). Institutional logics. United States: The Sage handbook of organizational institutionalism.

Wilujeng, E. P. (2021). Facing Paradoxical Identities: How Indonesian Organic Food Community Unify Consumers and Environmentalist Identities. Simulacra Jurnal Sosiologi, 4(1), 71-86. doi: 10.21107/sml.v4i1.10002

Zagzebski, L. (2017). What is knowledge? The Blackwell guide to epistemology, 92-116. doi: 10.1002/9781405164863.ch3

ISSN-Internet 2197-411x OLCL 862804632

UniKassel & VDW, Germany- May 2023