



The Relationship between the Level of Knowledge of Quality and Price of Biodegradable Tote Bags from Seaweed Carrageenan *Eucheuma Cottoni* against Purchasing Decisions Case Studies in Cibinong District, Bogor Regency and Jatinangor District, Sumedang Regency

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study aims to see the relationship between the level of knowledge, product quality, and price of biodegradable tote bag products from seaweed carrageenan (*Eucheuma cottoni*) on purchasing decisions so that product improvements and modifications can be made. The research was conducted in Cibinong District, Bogor Regency as a general segmentation, and in Jatinangor District, Sumedang Regency as a student segmentation. This study used quantitative descriptive method with spearman rank correlation test. Samples were taken using purposive sampling techniques as many as 80 respondents. Based on the results of research on the consumer characteristics of biodegradable tote bags, which are dominated by women with an age range of 21-25 years, types of student work with income levels > IDR 1,000,000, have used tote bags with intensity of use every month and from fabric. The results of the spearman rank correlation test were obtained for the level of knowledge, product quality, and product price, namely 0.538, 0.474, and 0.505. Product quality and product price have a strong relationship with the purchase decision of biodegradable tote bags from seaweed carrageenan (*Eucheuma cottoni*). Meanwhile, the level of knowledge has a strong relationship to the decision to purchase biodegradable tote bags from seaweed carrageenan (*Eucheuma cottoni*).

Keywords: *Biodegradable tote bag; knowledge level; product quality; product price; purchasing decision; seaweed (Eucheuma cottoni).*

1. INTRODUCTION

Indonesia is an archipelagic country with enormous potential for aquatic resources. One of the aquatic resources that has high production value is seaweed. The amount of seaweed production in Indonesia in the first quarter, second quarter, and second quarter of 2022 was 2,224,478 tons, 2,236,900 tons, and 2,441,924 tons. Based on data, the amount of seaweed production in Indonesia in 2022 has increased from the first quarter to the second quarter. Seaweed produced is mostly exported abroad. The export value of seaweed based on data from the Ministry of Maritime Affairs and Fisheries in Indonesia in 2022 is 132,887,199 kg. The potential development of seaweed can be a huge market opportunity if properly utilized.

Indonesia is a country that plays a role in the market of seaweed products as raw materials. However, Indonesia still has not developed its processed products and when compared to other countries Indonesia is still far behind. According to the Ministry of Marine Affairs and Fisheries [1], stated that of the total market value of food hydrocolloids worth 3.7 billion US\$, as much as 31% came from processed seaweed products, namely carrageenan 0.7 billion US\$, agar 0.3 billion US\$, and alginate 0.2 billion US\$. Indonesia is the largest producer of raw lau grass for *Eucheuma cottoni* species in the world. However, for its processing products it has not become a sufficiently reputable manufacturer. Of the total *Eucheuma cottoni* of 1.04 million dry

tons, Indonesia is only able to process 5% into processed products in the form of carrageenan.

Processed products from seaweed type *Eucheuma cottoni* can be carrageenan. Carrageenan is widely used as a stabilizer, thickener, geller, emulator and others. The properties of carrageenan are widely used in the food industry, medicine, cosmetics, textiles, paint, toothpaste, and other industries. In addition, carrageenan can function as a stabilizer, suspension, binder, protective, film former, syneresis inhibitor (prevent water release), and flocculating agent (bind materials). Carrageenan is also easily hydrolyzed in acidic solutions and stable in an alkaline atmosphere because carrageenan is a galactose polysaccharide compound that is easily decomposed and biodegradable [2]. By utilizing the properties of carrageenan can produce a product with a new innovation, namely biodegradable tote bags.

Biodegradable tote bag is an innovation from processing seaweed carrageenan into a fashion product that has high economic value. According to Rahayu [3], stated that the potential of the creative industry in the fashion sector must be developed because this creative industry can make a significant economic contribution, in addition to being a large source of foreign exchange for the country, and create a positive business climate, as well as build the country's image and identity. Biodegradable tote bags in addition to being fashion products can play a role

in reducing plastic waste pollution because they have biodegradability properties.

2. MATERIALS AND METHODS

2.1 Location and Time of Research

This research was carried out in Cibinong District, Bogor Regency as a general segmentation and Jatinangor District, Sumedang Regency as a student segmentation, especially Padjadjaran University students on October 28, 2022 – April 20, 2023.

2.2 Goals and Objectives

Biodegradable tote bags are a new innovation that is not yet known by the public. The market potential of biodegradable tote bags is determined by consumer decision making to purchase the product. Information about the product is very underlying the buying process so that finally a need arises, consumers will consider and understand these needs, if the assessment of the product is clear then consumers will look for the product in question, which will then continue to product evaluation and finally consumers will make a decision to buy or decide not to buy due to the product is not suitable and consider or postpone purchases at a later time will come [4]. This study aims to determine the relationship between the level of knowledge, product quality, and product price on consumer purchasing decisions.

2.3 Types and Methods of Data Retrieval

This research was conducted using quantitative descriptive methods to describe the results of the research conducted. Quantitative methods when research data in the form of numbers and analysis use statistics. The quantitative descriptive research method is carried out by describing the object of research at the time of the present situation based on facts as they are, then analyzed and interpreted [5].

The types of data used in this study are primary data and secondary data. Primary data is a source of research data obtained directly from respondents who meet the criteria. Primary data collection techniques were conducted through interviews and questionnaire filling by respondents. Secondary data is a source of research data obtained from research reports of an agency, the Ministry of Marine Affairs and Fisheries, and other library materials.

2.4 Sampling Method

The sampling technique used in this study was purposive sampling. According to Lenaini [6], stated that purposive sampling is a non-random sampling type sampling method where researchers ensure the citation of method illustrations through special identities that match the research objectives, so that they are expected to reach research cases. Meanwhile, according to Sugiyono [7], stated that the purposive sampling method is a method in order to ensure research illustrations with certain considerations aimed at ensuring that the information obtained later can be more representative.

2.5 Data Analysis Methods

2.5.1 Likert scale

Likert scale is a scale that can be used to measure a person's attitude, opinion, and perception of a particular object or phenomenon, this phenomenon has been specifically determined by the author which is hereinafter referred to as a research variable [6]. The Likert scale used in this study consists of positive statements.

Table 1. Likert scale

Answers	Score
Totally Agree	5
Agree	4
Disagree Less	3
Disagree	2
Storngly Disagree	1

Likert scale is used to measure the level of consumer knowledge, product quality, and price of biodegradable tote bag products on purchasing decisions in general segmentation, namely in Cibinong District, Bogor Regency and in student segmentation in Jatinangor District, Sumedang Regency.

2.5.2 Validity test

Validity tests are used to show the extent to which a measuring instrument is able to measure what it wants to measure. Validity tests are also used to suggest that a measurement instrument is said to be valid if the instrument can measure something exactly what it wants to measure. The validity test can be viewed using r count and r table. If r counts and r table with a significance

level of 0.05, then if r counts $< r$ table instrument is declared invalid and if r counts $> r$ table instrument is declared valid [6]. To test the validity of an instrument, research is carried out by correlating the score of question items or statements with the total score. Then use the Product Moment correlation as follows:

$$r = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{(N \sum X^2 - (\sum X)^2)(N \sum Y^2 - (\sum Y)^2)}}$$

Information:

- r : Product Moment Correlation Coefficient
- X : Free Variable
- Y : Bound Variable
- N : Number of Samples

2.5.3 Reliability test

According to Janna [8], stated that reliability tests are tests carried out with the aim of knowing the consistency of the instrument as a measuring instrument, so that the results of a measurement can be trusted. To test reliability in research using Cronbach's Alpha method, namely:

$$CA = \left(\frac{k}{k-1} \right) \left(1 - \frac{\sum \sigma_b^2}{\sigma_t^2} \right)$$

Information:

- CA : Cronbach Alpha coefficient
- K : The number of questions in the item
- $\sum \sigma_b^2$: Grain Variance
- σ_t^2 : Total Variance

2.5.4 Spearman rank correlation test

The spearman rank correlation test is a test to see three aspects, namely the strength of the relationship, the significance of the correlation, and also the direction of the correlation. The spearman rank correlation test aims to determine the relationship or real influence of two ordinal-scale variables, namely free variables and bound variables [9]. To test the correlation of spearman rank in research can be used the following formula:

$$r_s = 1 - \frac{6 \sum d^2}{n(n^2-1)}$$

Information:

- r_s : Spearman Rank Coefficient
- d^2 : Difference of Rank Pairs
- n : Number of Rank Pairs
- 6 : constant number

In determining the level of strength of the relationship between variables, it can be guided by the value of the correlation coefficient which is the result of the SPSS output with the following conditions.

Table 2. Spearman rank correlation relationship level

The value of the relationship	Level coefficient
0.00 – 0.25	Very weak relationship
0.26 – 0.50	Relationship enough
0.51 – 0.75	Strong relationship
0.79 – 0.99	Very strong relationship
1.00	Perfect relationship

3. RESULTS AND DISCUSSION

3.1 Characteristics of Respondents

The characteristics of respondents used include gender, age group, type of work, income level, experience using tote bags, and tote bag material used.

3.1.1 Gender

The results of filling out the questionnaire obtained a total of 80 respondents with the following results:

Table 3. Consumer characteristics by gender

Gender	Respondent (People)	Percentage (%)
Male	26	33
Female	54	68
Total	80	100

Based on Table 3, it is found that the characteristics of biodegradable tote bag consumers based on gender are dominated by female sex as many as 54 people or 68%.

3.1.2 Age group

The age group in this study was divided into five groups, namely < 15 years, $15 - 20$ years, $21 - 25$ years, $26 - 30$ years, and > 30 years to productive age. Based on the results of filling out the questionnaire, the following results were obtained.

Consumer characteristics based on age groups are dominated by age groups in the range of $21 - 25$ years as many as 39 people or 49%. This is because there is a division of segmentation in

data collection, namely general segmentation and student segmentation where 50% of respondents are students.

Table 4. Consumer characteristics by age group

Age Group	Respondent (People)	Percentage (%)
< 15	0	0
15 – 20	11	14
21 – 25	39	49
26 – 30	5	6
> 30	25	31
Total	80	100

3.1.3 Types of jobs

The types of respondents' jobs for general segmentation consist of Lecturers, Employees, Civil Servants, Researchers, and Students. Based on the results of filling out the questionnaire, the following results were obtained:

Table 5. Consumer characteristics by type of work

Types of jobs	Respondent (People)	Percentage (%)
Lecturers	4	5
Employees	3	4
Civil Servants	15	19
Students	50	63
Researches	8	10
Total	80	100

Based on Table 5 for the type of work that is widely dominated, namely as students / students as many as 50 people or 63%, then followed by the type of work as Civil Servants (PNS) as many as 15 people or 19%. This is because 40 respondents came from student segmentation and 40 other respondents came from general segmentation.

3.1.4 Income level

Consumer income levels are divided into five groups, namely < IDR 1,000,000, > IDR 1,000,000 - IDR 2,000,000, > IDR 2,000,000 - IDR 3,000,000, > IDR 3,000,000 - IDR 4,000,000, and > IDR 4,000,000. Based on the results of filling out the questionnaire, the following results were obtained.

Consumer characteristics based on income level are dominated by income levels < IDR

1,000,000, which is 37 people or 46%. The average respondent is a student who has an income level of < IDR 1,000,000 every month.

Table 6. Consumer characteristics by income level

Income Level	Respondent (People)	Percentage (%)
< Rp 1.000.000	37	46
Rp 1.000.000 – Rp 2.000.000	12	15
Rp 2.000.000 – Rp 3.000.000	3	4
Rp 3.000.000 – Rp 4.000.000	28	35
> Rp 4.000.000	0	0
Total	80	100

3.1.5 Experience using tote bags

Determination of samples using the purposive sampling method, provided that respondents have used tote bags. Based on the results of filling out the questionnaire, the following results were obtained:

Table 7. Consumer characteristics based on experience using tote bags

Experience	Respondent (People)	Percentage (%)
Ever, Every Day	14	18
Ever, Every Week	30	38
Ever, Every Month	36	45
Total	80	100

Based on Table 7, the average respondent has used a tote bag with the intensity of its use every month and every week as many as 36 and 38 people or 45% and 38%. Tote bags at this time have become a trend in all circles, both students and the public, seeing the function of tote bags in addition to being bags for shopping and carrying tote bag goods are also used as fashion products.

3.1.6 Tote bag material used

Consumer characteristics based on the tote bag material that has been used will be a comparison to biodegradable tote bag products from seaweed carrageenan (*Eucheuma cottoni*). Based on the results of filling out the questionnaire, the following results were obtained:

Table 8. Consumer characteristics based on tote bag material

Material	Respondent (People)	Percentages (%)
Chain	79	99
Leather	1	1
Total	80	100

Based on the material of the tote bag, consumers use more tote bags with fabric as much as 79 people or 99%. According to Yusvita et al. (2021), the market opportunity for canvas tote bags on the market is 14%, this is in line with the use of plastic waste which reaches 14%.

3.2 Data Analysis

3.2.1 Validity test

Validity test is a test that serves to see whether a measuring instrument is valid or invalid [8]. The measuring instrument used is a research questionnaire. Testing the validity of this study is by correlating between each indicator item score with a total construct score with the significance level used, which is 0.05.

The technique used to measure the validity of questionnaire statements or questions is the Product Moment Correlation from Karl Pearson with the following conditions:

H_0 is accepted if r is calculated $> r$ table, the measuring instrument used is valid H_0 rejected r count $< r$ table, the measuring instrument used is invalid.

Table 9. Biodegradable tote bag validity test results

Variable	R calculate	R table	Description
Respondent Knowledge	0.891	0.220	Valid
Product Quality	0.878	0.220	Valid
Product Price	0.854	0.220	Valid
Purchase Decision	0.806	0.220	Valid

From the validity test results in the table above, the values of respondents' Knowledge (X1), Product Quality (X2), Product Price (X3), and Purchase Decision (Y) are valid. Judging from the calculated r value which is greater than the r table of 0.220 with $df = 78$ obtained from $(df = N - 2) = 80 - 2 = 78$ where N is the number of respondents with a significance level of 0.05.

3.2.2 Reliability test

Reliability test is a test conducted to measure the extent to which research measuring instruments in the form of questionnaires can be trusted or relied upon. So that reliability tests are used to determine the consistency of measuring instruments [8].

According to Hakim (2021), the reliability test was carried out as a whole on all question items contained in the questionnaire to be examined. The basis used in making reliability test decisions is that if the value of Cronbach's Alpha is greater than 0.70, the questionnaire can be called reliable. Meanwhile, if Cronbach's Alpha value is less than 0.70 then the questionnaire or questionnaire is called unreliable.

Table 10. Biodegradable tote bag reliability test results

Variable	Cronbach's Alpha	Alpha	Description
Respondent Knowledge	0.819	0.70	Reliabel
Product Quality	0.830	0.70	Reliabel
Product Price	0.846	0.70	Reliabel
Purchase Decision	0.880	0.70	Reliabel

The results of reliability testing in Table 10 the Cronbach's Alpha values obtained are 0.819, 0.830, 0.846, and 0.880 greater than 0.70, it can be concluded that all statement items and questions in this study are reliable.

3.2.3 Spearman rank correlation test

The factors that influence the purchase decision of biodegradable tote bags are seen from the relationship between respondents' knowledge about biodegradable tote bags, the quality of biodegradable tote bag products, and the price of biodegradable tote bags with purchasing decisions. The following are the results of the spearman rank correlation test.

The results of the data processing above then obtained a correlation coefficient for respondents' knowledge with purchasing decisions, which is 0.538 which means that there is a relationship between respondents' knowledge and strong purchasing decisions. The second result is the significance value for product quality with a purchase decision of 0.474 which means there is a strong relationship. The third result is the significant value between product prices and

purchasing decisions of 0.505 which means a strong relationship. Based on data analysis using SPSS software, it can be seen that the variable that has a strong relationship with the purchase of biodegradable tote bags is consumer knowledge. This is because consumers are interested in buying biodegradable tote bags with materials used in making biodegradable tote bags that are environmentally friendly and have not been widely used. For product quality still have to make product modifications in the form of its appearance and size. Meanwhile, the price of biodegradable tote bag products is quite affordable for consumers.

Table 11. Spearman biodegradable tote bag rank correlation test results

Variable	Correlation Value r_s	Description
Respondent Knowledge	0.538	There is a Relationship, a Strong Nature, and a Positive Relationship Direction
Product Quality	0.474	There is a Relationship, a Strong Enough Nature, and a Positive Relationship Direction
Product Price	0.505	There is a Relationship, a Strong Enough Nature, and a Positive Relationship Direction

According to Lestiani et al. [10], consumer knowledge variables have a positive and significant effect on purchasing decisions. The higher the level of consumer knowledge about biodegradable tote bag products or environmentally friendly products, the higher the purchase decision for biodegradable tote bag products. According to Sihotang [11], stated that based on the results of his research, it was found that the variable of product quality spatially had a positive and significant influence on product purchase decisions with a significance level of 0.000. Meanwhile, according to Yerianinda [12], based on the results of her research, it shows that 15.5% of business owners consider that the effectiveness of biodegradable bags is an obstacle in using biodegradable bags. And 67.3% of business owners say they have problems using biodegradable bags in terms of cost.

The direction of the relationship between respondents' knowledge variables, the quality of

biodegradable tote bag products, and the price of biodegradable tote bags obtained positive results. Thus, the relationship between respondents' knowledge variables, biodegradable tote bag product quality, and biodegradable tote bag product prices has a positive direction. The increasing knowledge of respondents, the quality of biodegradable tote bag products, and the price of biodegradable tote bag products will have an impact on improving purchasing decisions. According to research by Pandapotan et al. [13], stated that product quality has a positive effect on purchase intention. Where price sensitivity has a positive effect on purchase intention and brand awareness, there is a significant influence on purchase intention and the three variables show that the three variables affect the purchase intention of a community in purchasing cassava-based plastic [14,15].

4. CONCLUSIONS

Based on the presentation and results of the validity test analysis, respondents' Knowledge (X1), Product Quality (X2), Product Price (X3), and Purchase Decision (Y) are valid. Based on the results of the reliability test analysis, the value of Cronbach's Alpha obtained is 0.878 greater than 0.70, it can be concluded that all statement items and questions in this study are reliable. And the results of the spearman rank correlation test analysis found that the relationship between product quality and product price on purchasing decisions was significant, quite strong, and positive, namely 0.474 and 0.505. While the relationship between the level of knowledge and purchasing decisions is significant, strong, and positive at 0.538. Based on the results of this study, it is recommended to improve and modify product quality so that many consumers can buy biodegradable tote bag products and provide product branding as a form of increasing consumer knowledge about biodegradable tote bag products from seaweed.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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