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Fortification of Milkfish Bone Flour (*Chanos chanos*) and Seaweed Flour (*Sargassum* sp.) on Tortilla Chips as a Calcium Foods

***Fiona Bayun Probowati*[1], *Mochammad Amin Alamsjah*[2*], *and Dwi Yuli Pujiastuti*[2]**

[1]*Study Program of Fisheries Product Technology, Faculty of Fisheries and Marine, University of Airlangga, Surabaya, Indonesia*
[2]*Department of Marine, Faculty of Fisheries and Marine, University of Airlangga, Surabaya, Indonesia*

Abstract. Tortilla chips are one of the typical snacks that come from Mexico, and have a shape like chips made from corn. The level of public awareness of the need for milk consumption is indeed very low. Alternative foods with calcium are snacks by fortification. Calcium intake in the recommended range is between 800-1200 mg per day. This study aims to determine the combination of milkfish bone flour and *Sargassum* sp. with different concentrations of tortilla chips as a calcium food. This study was experimental using a completely randomized design (CRD) with four treatments and five replications. The treatment in this study was the concentration variation of the combination of milkfish bone flour and *Sargassum* sp. seaweed. (0%, 5%, 10%, 15%). Analysis of the organoleptic test data used the Kruskal-Wallis test and the Mann-Whitney advanced test while the chemical test used the ANOVA test and Duncan's advanced test. The results showed that there was a significant influence ($P<0.05$) on the best results of the organoleptic test and calcium test on tortilla chip products.

Keywords: fortification, milkfish bone, *Sargassum* sp., tortilla chips

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1. Introduction

Calcium is one of the most abundant minerals in the body, that is, there are 99% of calcium which will seep into the bones and teeth. The recommended calcium intake ranges from 800-1200 mg per day [1]. In children and adolescents, the need for calcium increases with age, children aged 1-10 years consume 800 mg of calcium per day, while adolescents aged 11-24 years consume 1,200 mg of calcium per day [2]. The level of public awareness of the need for milk consumption is still very low [1]. According to Susilawati et al. [3], that some people are lactose intolerant or allergic to milk, so they cannot consume milk. Lactose intolerant is a digestive disorder that results

*Corresponding author at: Department of Marine, Faculty of Fisheries and Marine, University of Airlangga, Surabaya, Indonesia

E-mail address: alamsjah@fpk.unair.ac.id

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in the body not being able to digest lactose. Therefore, alternative calcium foods are needed besides staple foods or drinks, namely snacks, one of which is tortilla chips.

Tortilla chips are one of the typical snacks that come from Mexico, and have a shape like chips made from corn [4]. One of the efforts to improve nutrition in tortilla chips is fortification. Fortification is an addition of ingredients to foodstuffs that can improve the quality [5]. One of the animal and vegetable fishery resources that has the potential to be used as a provider of calcium in tortilla chips is milkfish bones and *Sargassum* sp. seaweed. With fortification from animal and vegetable sources, calcium will be obtained which plays a role in maintaining bone health in humans, especially children [6].

Milkfish bones contain 4% calcium and 3% phosphorus [7]. The choice to use milkfish bones is due to the fact that milkfish bones are a form of food waste that contains calcium [8]. *Sargassum* sp. is one of the Phaeophyceae class of seaweed (brown algae) which has quite high economic value [9]. *Sargassum* sp. has mineral content such as calcium 420 mg per 100 g dry weight [10]. Based on this background, a study was conducted in order to determine the fortification of milkfish bone flour and *Sargassum* sp. seaweed flour as calcium-containing foods.

2. Materials and Methods

2.1. Place and time of research

This research was conducted from December 2022 to April 2023 at the Chemistry and Food Laboratory, Faculty of Fisheries and Maritime Affairs, Airlangga University.

2.2. Research Equipment and Materials

The materials used in this study were milkfish bone flour, *Sargassum* sp. seaweed flour, corn flour, wheat flour, garlic, salt, water, cooking oil, distilled water, $CuSO_4$, K_2SO_4 NaOH 45%, H_2SO_4, H_3BO_3, HCl, Bromine Cresol Green indicator, Methyl Red indicator, N-Hexane, eriochrome black T, murexcide indicator, $ZnSO_4$ and 0.05 M Na_2EDTA. The equipment used in this study were basins, plates, pressure cookers, knives, LPG stoves, cutting boards, trays, spoons, digital scales, analytical scales, wooden rolling pins, baking paper, electric ovens, glass funnels, 80 mesh sieve, burettes and static, food processor, blender, dropping pipette, volume pipette, stirring rod, measuring pipette, rubber suction cup (rubber bulb), beaker glass, measuring flask, Erlenmeyer 125 ml, 250 ml, condenser, petri dish, spatula, desiccator, furnace, kjeldahl flask, fume hood, distillation flask, fat tube, filter paper, paper and pen.

2.3. Research Methods

The research method used in this study was a completely randomized design (CRD). This study used an experimental method with RAL consisting of four treatments with five repetitions. In the treatment of this study, referring to the research of Nafsiah et al. [11], which has been modified.

The treatment in this study is: P0 = 0% combination of milkfish bone flour and *Sargassum* sp. seaweed flour; P1 = 5% combination of milkfish bone flour and *Sargassum* sp. seaweed flour; P2 = 10% combination of milkfish bone flour and *Sargassum* sp. seaweed flour; and P3 = 15% combination of milkfish bone flour and S*argassum* sp. seaweed flour

2.4. Making Milkfish Bone Flour

The process of making milkfish bone flour is based on research by Darmawangsah et al. [12], which has been modified. Making milkfish bone flour begins with washing and weighing fish bones. At a temperature of ±80° for 30 minutes the fish bones are boiled, then drained. After that, wash the fish bones using water clean flowing water to separate the milkfish meat that is still attached on the bones, then drained again. The next step is to soften the bones fish using a pressure cooker for 2 hours. Then wash the bones again Fish use running water to remove remaining fat stick. Drying fish bones using an oven at 125ºC for 1.5 hours, then grind the dried fish bones using blender, then sift with an 80 mesh sieve. Lastly, consider fish bone flour to find out the yield.

2.5. Making Tortilla Chips

The process for making tortilla chips is based on research by Syarifah and Amrih [13], which has been modified. The first thing to do is to weigh the ingredients needed. Mix the dough with 100 ml of hot water and then knead. The dough that has been kneaded will be flattened to form a sheet using a rolling pin and cut into a square shape. The dough that has been formed is fried over low heat for 3 minutes then drained, then the dough is stored for further analysis.

2.6. Organoleptic Test

To obtain data on the organoleptic characteristics of food products, the product sensory testing stage is carried out on untrained panelists. In the organoleptic test of tortilla chip products, 4 parameters related to snack products were determined, namely color, texture, taste, and aroma. Organoleptic testing on tortilla chips using organoleptic tests. The highest and lowest scores for each specification are 9 and 1. The organoleptic test is a sensory test in which the test method uses the human senses as the main tool to measure the acceptability of a product including the senses of sight, smell, taste, and touch. The panelists used in this study were 30 untrained panelists to observe the aroma, color, taste, and texture of the tortilla chips.

2.7. Proximate Test

2.7.1. Water Content

Water content measurements are carried out using a tool called moisture analyzer. Water content analysis was carried out according to SNI procedures [14]. The brand of the moisture analyzer is Bel Engineering i-Thermo. Testing water content using a moisture analyzer requires validation of the method by paying attention to the drying temperature range and mass of the sample to be analyzed [15]. The principle of determining moisture content analysis is to reduce the air content of the material which is done by heating, then the material is weighed. The air content of the material is before removing the weight of the material and after drying.

2.7.2. Ash Content

Ash content is a measure of the total amount of minerals contained in a food [16]. Ash content analysis was carried out according to SNI procedures [14]. The principle of determining ash content analysis is to start by burning food ingredients containing fruit in an ash furnace by varying the heating temperature until white ash is obtained.

2.7.3. Protein Content

The measurement method used is testing protein levels using the Kjeldahl method. The analytical principles of this test method include destruction, distillation and titration [17]. Protein analysis was carried out using the Kjeldahl method, according to SNI procedures [14].

2.7.4. Fat Content

Analysis of fat content in this study was carried out using the Soxhlet method [17]. Fat content analysis was carried out by extraction using non-polar solvents, according to SNI procedures [14]. The principle of determining fat content analysis is to dissolve a material with an organic solvent to separate the crude fat from other components, then the organic solvent evaporates to obtain the crude fat in a material. The fat obtained from this fat content analysis test is not pure fat.

2.7.5. Carbohydrate Content

Carbohydrate content analysis was carried out according to SNI procedures [14]. The carbohydrate content test in this study was carried out using the carbohydrate by difference method which is included in the crude calculation method. Analysis of the crude carbohydrate content can be calculated using the formulation:

$$\%\ \text{Carbohydrate content} = 100\% - (\text{moisture content} + \text{ash content} + \text{fat content} + \text{protein content})$$

2.7.6. Fiber Content

Fiber content analysis was carried out according to SNI procedures [14]. The fiber content test in this study used the gravimetric method. The principle of determining crude fiber content analysis is the ability to bind water, cellulose, and pectin. Testing for crude fiber content aims to analyze proximates from food ingredients that cannot be hydrolyzed by strong acids or bases.

2.8. Calcium Content

Calcium content analysis was carried out according to SNI procedures [14]. The principle of the complexometric titration method is a type of titration that is based on the reaction to form complex compounds between target metal ions and complex-forming substances. Calculate the molarity of the titrant. The concentration of standardized Na_2EDTA can be calculated by the formula:

$M1 = \frac{(M2 \times V2)}{V1}$

$$M1 = \frac{(M2xV2)}{V1}$$

where: M1 = Na_2EDTA Molarity (mmol/ml); V1 = Volume of Na_2EDTA (ml); V2 = Volume of $ZnSO_4$ standard solution used (ml); M2 = Molarity of $ZnSO_4$ used (mmol/ml)

Do the titration twice. Calculate calcium levels.

$$\% \text{ Ca} = \frac{\text{MxVxBAxD}}{\text{BS x 1000}}\ x\ 100\%$$

where: M = molarity of Na2EDTA standard solution (M); V = Volume of Na2EDTA standard solution (ml); BA = Atomic Weight of calcium 40.08; D = Volume of Sample Solution; BS = Sample Weight

2.9. Analysis Data

This type of research is experimental research with a Completely Randomized Design. The data obtained were analyzed using SPSS version 22. The organoleptic test results were analyzed using the Kruskal-Wallis statistical test and then further tested with Mann-Whitney. The proximate analysis test data for tortilla chips were analyzed using the Analysis of Variance (ANOVA) test and then further tested with Duncan's Multiple Range Test (DMRT).

3. Results and Discussion

In the results and discussion of this study, tortilla chips a combination of milkfish bone flour and *Sargassum* sp. seaweed flour. is a snack made with milkfish bone flour and *Sargassum* sp. seaweed flour. The aim of this research is to study the effect of fortification of milkfish bone meal (*Chanos chanos*) and seaweed meal (*Sargassum* sp.) on tortilla chips as a calcium food. The research also carried out organoleptic testing, proximate analysis testing (water, ash, fat, carbohydrates, protein and fiber) and calcium level testing.

3.1. Organoleptic Test

Based on the results of the analysis of the organoleptic test data of the tortilla chips in table 1, with the Kruskal-Wallis test, the results showed that the P0, P1, P2 and P3 treatments had an effect on the parameters of color, aroma, taste and texture, then a further Mann-Whitney test was needed. Based on the results of the Mann-Whitney follow-up test with the parameters of color, aroma and taste, it showed that there were significant differences ($P<0.05$) in the treatments P0 and P1, P0 and P2, P0 and P3, P1 and P2, P1 and P3 , P2 and P3. However, for texture P0 and P1 is not different as well as P2 and P3, but it showed significant different between P0 and P2, P0 and P3, P1 and P2, P1 and P3.

Tabel 1. Average Tortilla Chips Organoleptic Test Results

Parameter	Column head			
	P0	**P1**	**P2**	**P3**
Color	8.07^{a}±1,015	4.60^{b} ±1.102	3.67^{c} ±0.959	1.93^{d} ±1.258
Aroma	8.73^{a}±0,691	7.00^{b} ±1.486	5.87^{c} ±1.252	4.80^{d} ±1.690
Taste	8.53^{a}±0.860	7.00^{b} ±1.050	5.73^{c} ±1.112	4.60^{d} ±1.522
Texture	6.93^{a}±1.929	6.33^{a} ±1.845	5.07^{b} ±1.856	4.47^{b} ±2.460

Note: a, b = similar letter notation means that there is no significant difference (P> 0.05) at the level of the Mann-Whitney test, P0 (control), P1, P2, P3 (the presence of a combination of milkfish bone flour and *Sargassum* sp. seaweed flour).

Color is one of the organoleptic parameters that appears for the first time and is assessed by the panelists because it uses the sense of sight [18]. The color parameter showed a significant difference (P <0.05) in all treatments with an average value ranging from 1.93 to 8.07. The brown color produced from tortilla chips was obtained by adding *Sargassum* sp. seaweed flour. This is in accordance with the results obtained by Yusuf et al. [19], that cereal flakes made from corn flour with the addition of more *Sargassum* brown seaweed flour make the resulting product browner and darker. Where this seaweed contains fucoxanthin compounds which produce a natural brown colored substance [20], so it greatly influences the color of the tortilla chip products.

Aroma is one of the parameters in organoleptic testing using an olfactory sensor by panelists [18]. Tests on the aroma parameter showed a significant difference (P <0.05) in all treatments with an average value ranging from 4.80 to 8.73. The higher the level of concentration of fish bone flour, the lower the preference level of the panelists for the aroma of tortilla chips [21]. This is in accordance with the results obtained by Yusuf et al. [19], that the more flour the seaweed *Sargassum* sp. When added to cereal, the resulting aroma becomes stronger. This is in accordance with the statement by Nuraeni et al. [22], that the higher the level of addition of milkfish bone flour, the lower the level of panelist liking for the resulting aroma. This is because the typical fish aroma in the donuts will increase.

Taste is one of the parameters in organoleptic testing using a taste sensor (tongue) which can determine whether a product is acceptable or rejected by panelists or consumers [18]. Tests on the taste parameter showed a significant difference (P<0.05) in all treatments with an average value ranging from 3.53 to 7.00. The higher the percentage of the addition of milkfish bone flour to the tortilla chips, the more pronounced the taste of the fish bone flour [23]. According to Ginting and Yusni [24], the more concentration of *Sargassum* sp. seaweed flour added to flakes products, the more fishy it is so the level of consumer preference for the taste of flakes products decreases.

Texture is one of the organoleptic parameters whose sensing is associated with touch or touch. Most textures in food products are soft and crunchy [18]. The texture parameters showed a significant difference (P <0.05) in all treatments with an average value ranging from 4.47 to 6.93. The increasing concentration of the addition of milkfish bone *flour*, the lower the level of preference of consumers or panelists for the texture of tortilla chips [21]. The texture of tortilla chips that are less crunchy can also be affected during the grinding process. In accordance with Wijayati et al. [23], the hard texture of tortilla chip products is due to the thickness of the dough during the grinding process, the dough with a thick texture will be hard, while the dough with a thin texture will be crunchy.

3.2. Proximate Test

Based on the results of the analysis of the proximate tortilla chips test data in table 2, with the ANOVA test, the results showed that the P0, P1, P2 and P3 treatments had an effect and did not affect the parameters of water, ash, protein, fat, fiber, and carbohydrates, then if it had an effect need to be tested further with the Duncan test. Based on the test results with the parameters of water, ash, protein and fat, it showed that there were no significant differences (P>0.05), but there were significant differences (P<0.05). However, the test results with fiber and carbohydrate parameters showed that there was a significant difference (P<0.05).

Tabel 2. Average Tortilla Chips Organoleptic Test Results

Parameter	Column head			
	P0	**P1**	**P2**	**P3**
Water	$1.73^{a} \pm 0.04$	$1.63^{a} \pm 0.06$	$1.68^{a} \pm 0.49$	$2.20^{a} \pm 0.49$
Ash	$1.85^{c} \pm 0.56$	$3.15^{c} \pm 0.94$	$5.14^{b} \pm 0.14$	$7.46^{a} \pm 1.09$
Protein	$5.34^{c} \pm 0.27$	$7.01^{b} \pm 0.09$	$7.12^{b} \pm 0.25$	$11.42^{a} \pm 0.22$
Fat	$6.30^{c} \pm 0.61$	$7.39^{b} \pm 0.11$	$8.77^{a} \pm 0.45$	$9.55^{a} \pm 0.47$
Fiber	$1.03^{d} \pm 0.11$	$1.99^{c} \pm 0.22$	$5.96^{b} \pm 0.56$	$10.09^{a} \pm 0.45$
Carbohydrate	$83.74^{a} \pm 0.39$	$78.83^{b} \pm 0.91$	$71.33^{c} \pm 1.71$	$59.27^{d} \pm 2.14$

Note: a, b = similar letter notation means that there is no significant difference (P> 0.05) at the level of the Mann-Whitney test, P0 (control), P1, P2, P3 (the presence of a combination of milkfish bone flour and *Sargassum* sp. seaweed flour.

Based on the results of the ANOVA test, show that there is no significant difference (P>0.05) between the water content of P0 tortilla chips and P1 tortilla chips with the average value of P1 tortilla chips being lower, namely 1.63% compared to P0 tortilla chips, namely 1.73%. Based on the results of the ANOVA test, show that there is no significant difference (P>0.05) between the water content of P0 tortilla chips and P2 tortilla chips with the average value of P2 tortilla chips being lower, namely 1.68% compared to P0 tortilla chips, namely 1.73%. Based on the results of the ANOVA test, show that there is no significant difference (P>0.05) between the water content of P0 tortilla chips and P3 tortilla chips with the average value of P3 tortilla chips being higher, namely 2.20% compared to P0 tortilla chips, namely 1.73%. The water content values of P1, P2, and P3 still meet SNI 2886:2015, which states that the maximum water content value of extruded food is 4%. In accordance with Syah et al. [25], the addition of milkfish bone flour had a real influence on the water content of rambak crackers, the water content decreased with the addition of calcium flour. Apart from that, there is a fairly high fiber content in *Sargassum* sp. seaweed. can also affect the water content of the food product [26].

Based on the results of the ANOVA test, show that there is no significant difference (P>0.05) between the ash content of P0 tortilla chips and P1 tortilla chips with the average value of P1 tortilla chips being higher, namely 3.15% compared to P0 tortilla chips, namely 1.85%. Based on the results of the ANOVA test, show that there is a significant difference (P<0.05) between the ash content of P0 tortilla chips and P2 tortilla chips with the average value of P2 tortilla chips being higher, namely 5.14% compared to P0 tortilla chips, namely 1.85%. Based on the results of the ANOVA test, shows that there is a significant difference (P<0.05) between the ash content of P0 tortilla chips and P3 tortilla chips with the average value of P3 tortilla chips being higher, namely 7.46% compared to P0 tortilla chips, namely 1.85 %. This is in accordance with Sumadi and Ansar [27], that the addition of the percentage of milkfish bone flour to crackers can influence the amount of ash content. The more milkfish bone flour you add, the greater the amount of ash content produced so increasing the amount of ash content will increase the amount of minerals in the crackers. Apart from that, the high ash content in tortilla chips P1, P2, and P3 is also caused by the mineral content contained in *Sargassum* sp seaweed flour. According to by Abdullah [28], there is mineral content in the seaweed *Sargassum* sp. such as the lowest mineral Fe and the highest mineral, causing increased ash content in prebiotic cracker products without and with the addition of salt.

Based on the results of the ANOVA test, show that there is a significant difference (P<0.05) between the protein content of P0 tortilla chips and P1 tortilla chips with the average value of P1 tortilla chips being higher, namely 7.01% compared to P0 tortilla chips, namely 5 .34%. Based on the results of the ANOVA test, show that there is a significant difference (P<0.05) between the protein content of P0 tortilla chips and P2 tortilla chips with the average value of P2 tortilla chips being higher, namely 7.12% compared to P0 tortilla chips, namely 5 .34%. Based on the results of the ANOVA test, show that there is no significant difference (P>0.05) between the protein content of P1 tortilla chips and P2 tortilla chips with the average value of P3 tortilla chips being higher, namely 7.12% compared to P0 tortilla chips, namely 7.01%. Based on the results of the ANOVA test, show that there is a significant difference (P<0.05) between the protein content of P0 tortilla chips and P3 tortilla chips with the average value of P3 tortilla chips being higher, namely 11.42% compared to P0 tortilla chips, namely 5 .34%. In accordance with the opinion by Alisa et al. [29], stated that the addition of milkfish bone flour to the product will affect the protein content because milkfish bone flour is known to have a high protein content of 5.63%. According to Ginting and Husni [24], the high and low levels of protein in flakes are influenced by the type of seaweed added, namely *Sargassum*.

Based on the results of the ANOVA test, it shows that there is a significant difference (P<0.05) between the fat content of P0 tortilla chips and P1 tortilla chips with the average value of P1 tortilla chips being higher, namely 7.39% compared to P0 tortilla chips, namely 6.30%. Based on the results of the ANOVA test, show that there is a significant difference (P<0.05) between the fat content of P0 tortilla chips and P2 tortilla chips with the average value of P2 tortilla chips being higher, namely 8.77% compared to P0 tortilla chips, namely 6 .30%. Based on the results of the ANOVA test, show that there is no significant difference (P>0.05) between the fat content of P2 tortilla chips and P3 tortilla chips with the average value of P3 tortilla chips being higher, namely 9.55% compared to P2 tortilla chips, namely 8.77%. Based on the results of the ANOVA test, it shows that there is a significant difference (P<0.05) between the fat content of P0 tortilla chips and P3 tortilla chips with the average content value there is a significant difference (P<0.05) between the fiber content of P0 tortilla chips. with P3 tortilla chips with a higher average value of P3 tortilla chips, namely 10.09% compared to P0 tortilla chips, namely 1.03%. The high fiber content in tortilla chips P1, P2, and P3 is also due to the addition of *Sargassum* sp seaweed flour. According to Ginting and Husni [24], the higher the fiber content of the *Sargassum* seaweed used, the higher the crude fiber content. flakes.

Based on the results of the ANOVA test, show that there is a significant difference (P<0.05) between the carbohydrate content of P0 tortilla chips and P1 tortilla chips with the average value of P1 tortilla chips being lower, namely 78.83% compared to P0 tortilla chips, namely 83 .74%. Based on the results of the ANOVA test, show that there is a significant difference (P<0.05) between the carbohydrate content of P0 tortilla chips and P2 tortilla chips with the average value of P2 tortilla chips being lower, namely 71.33% compared to P0 tortilla chips, namely 83 .74%. Based on the results of the ANOVA test, show that there is a significant difference (P<0.05) between the carbohydrate content of P0 tortilla chips and P3 tortilla chips with the average value of P3 tortilla chips being lower, namely 59.27% compared to P0 tortilla chips, namely 83 .74%. The carbohydrate content value of P0 tortilla chips is higher compared to P1 tortilla chips due to the addition of a combination of milkfish bone flour and *Sargassum* sp. seaweed. In accordance with research by Ginting and Husni [24], which states that a decrease in carbohydrate value can occur as the concentration increases *Sargassum* seaweed is used in flake products. The decrease in carbohydrate levels can also be caused by analyzing the calculation of carbohydrate levels based on by differences which can be influenced by other nutritional components, namely protein, fat, water and ash, so that the lower the other nutritional components, the higher the carbohydrate levels will be [30].

3.3. Calcium Test

Based on the results of the ANOVA test, show that there is a significant difference (P<0.05) between the calcium levels of P0 tortilla chips and P1 tortilla chips with the average value of P1 tortilla chips being higher, namely 0.99% compared to P0 tortilla chips, namely 0 .50%. Based on the results of the ANOVA test, show that there is a significant difference (P<0.05) between the fiber content of P0 tortilla chips and P2 tortilla chips with the average value of P2 tortilla chips being higher, namely 1.02% compared to P0 tortilla chips, namely 0 .50%. Based on the results of the ANOVA test, show that there is a significant difference (P<0.05) between the fiber content of P0 tortilla chips and P3 tortilla chips with the average value of P3 tortilla chips being higher, namely 1.10% compared to P0 tortilla chips, namely 0 .50%. The carbohydrate content value of P0 tortilla chips is lower compared to P1, P2, and P3 tortilla chips due to the addition of a combination of milkfish bone flour and *Sargassum* sp. This is in accordance with research by Syah et al. [25], who stated that the higher the concentration of milkfish bone flour in crackers, the higher the calcium content in the cracker product. According to Wulandari [31], the calcium content contained in Sargassum is able to increase calcium in food products. This is also in line with research by Dahlia et al. [32] which states that the calcium levels in ice cream products are higher along with the concentration of *Sargassum* sp seaweed flour used.

Table 3. Average Tortilla Chips Organoleptic Test Results

	Column head			
	P0	**P1**	**P2**	**P3**
Calcium	$0.50^{d} \pm 0.0024$	$0.99^{c} \pm 0.004$	$1.02^{b} \pm 0.0021$	$1.10^{a} \pm 0.0014$

Note: a, b = similar letter notation means that there is no significant difference (P> 0.05) at the level of the Mann-Whitney test, P0 (control), P1, P2, P3 (the presence of a combination of milkfish bone flour and *Sargassum* sp. seaweed flour).

4. Conclusion and Recommendation

Based on the research results, it can be concluded that. Fortification of a combination of milkfish bone flour and *Sargassum* sp seaweed flour had a significant effect (P<0.05) on the organoleptic (color, aroma, taste and texture) of tortilla chips in each treatment and had a significant effect (P<0.05) on the proximate analysis and calcium test between tortilla chips P0 (control) and Fortified tortilla chips combined with milkfish bone and *Sargassum* seaweed P1, P2, and P3 (5%, 10%, 15%). The best concentration of milkfish bone and *Sargassum* sp seaweed flour on organoleptic tests in making tortilla chips, namely in treatment P1 because of the aroma, taste, and texture produced by milkfish bone flour and *Sargassum* sp seaweed flour not too sharp. The best concentration of milkfish bone flour and *Sargassum* sp seaweed flour. for the calcium test in making tortilla chips, namely in the P3 treatment because the more you add this nutrient, the more the nutritional value of the product increases.

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