

Evaluation of Organoleptic and Nutritional Characteristics of Traditionally Processed Shrimp Products Based on Its Quality Grade

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ABSTRACT

It is very common that to fit with the market segment, processor produces varied quality grade of product with different prices. However, there is no clue that the quality grade represents the organoleptic and nutritional characteristics of the product. And observation on organoleptic and nutritional characteristics of shrimp crackers (kerupuk udang), paste (petis udang), and cake (terasi udang) obtained from some processor in Sidoharjo, East Java, have been conducted based on product quality grade. Organoleptic characteristics of the three kinds of product in term of product appearance, taste, odor, and texture were assessed by sensory judgement, white measurement of linear expansion was applied only to fish crackers. Protein, carbohydrate, and ash contents were used as parameters for nutritive value. Result of evaluation revealed that for shrimp crackers, there were differences in protein and carbohydrate content between different quality grades and different prices. It seemed that the quality grade, and product price, which is determined by the processors, could represent the nutritive value in term of protein and carbohydrate content. On the contrary, there were no difference on organoleptic characteristics, ash content, and linear expansion of all grades of products. For shrimp paste, there were no significant differences on all quality attributes nor the prices. In this case, the quality grade and price did not represent the organoleptic and nutritional characteristics of the product. As for shrimp cake, differences among the product grade were assessed only on organoleptic characteristics, not the nutritive values. Based on this results, it seems that quality grading by the processor, and so does the product price, did not always represent the organoleptic and nutritional quality of the product. To overcome this,

it is now the time to develop and implement a process and product standardization of traditional processed shrimp, especially shrimp crackers, paste, and cake in Indonesia, as to give assurance to the consumers to get appropriate organoleptic and nutritional quality of the product equal to the amount of money they paid.

INTRODUCTION

Quality is all those attributes which consciously or unconsciously considered by the consumers and buyers should be present (Connel, 1975), while Haryono (1978) describes food quality as a combination of typical characteristics of the product which could differentiate the unit of product and significantly influenced the consumer acceptability. Thus quality will embrace among others, intrinsic composition, nutritive value, degree of spoilage, damage, deterioration during processing, storage, distribution, sale, and presentation to the consumer, hazards to health, satisfaction on buying and eating, and aesthetic consideration.

Since product quality is closely related to the degree of consumer acceptability, product characteristics which highly correlated to consumer acceptance can be used as the quality determinant factors. However consumer's attitude to food quality are not immutable, and it is necessary to be informed of changes in these attributes as they occur. The availability of appropriate quality determinant factors, therefore, will assure the consumers about the quality of the product they are going to buy. Consequently, they will pay more for higher quality product (Heruwati and Saleh, 1997).

Processing of traditional fish or shrimp product such paste, cake, crackers, salted dried, salted boiled, or fermented fish were highly varied in method, formula,

and material used. It is hardly surprising then that the product quality were also highly varied among processors, or even among batches of process. This condition will cause disappointment to consumers due to inconsistent product quality.

Processors, on the other hand, commonly produce many product with different quality grade to fit the market segment. So far, there is no clue that the quality grade represents its organoleptic and nutritional characteristics. In fact, processor's quality grade are almost related to product price. Since higher price is assumed identical with higher quality grade, being not provided with accurate product specification, consumer usually choose product with high price, without any assurance that they will get a good quality product equal to amount of money they paid.

Priono and Noor (1984) indicated that the price of fish crackers is more closely related to the consumer preference instead of to its nutritional and microbiological quality. To some extent, however product price are very dependent upon the product formulation or vice versa. Shaltout (1993) has recommended that the addition of 10 to 20% fish to the crackers dough is good in increasing the protein as well as amino acid content, especially lysine, but in fact, some processors formulate the product compositions depending on the desired profit margin. If fish is expensive, less fish or less expensive species will be used to maintain the price unfluctuated (Yu, 1997).

Considering the above facing problem, evaluation of some traditionally processed shrimp products was conducted to obtain information on whether the quality grade, which is determined by the processor, represents the organoleptic characteristics and the nutritive value of the product.

MATERIALS AND METHOD

Shrimp crackers (*kerupuk udang*), paste (*petis udang*) and cake (*terasi udang*) were sampled from processors in Sidoharjo, East Java. All 22 samples of shrimp crackers of varied quality grades were taken from 8 processors, 7 samples of shrimp paste were withdrawn from 3 processors, and 6 samples of shrimp cake were obtained from 2 processors. Samples were then brought to post harvest laboratory of Research Institute for Marine Fishery (RIMF) for organoleptic and nutritional quality assessment. Assessment of organoleptic quality were conducted by sensory judgement to the appearance,

color, odor, homogeneity, and surface condition of raw product, while judgement on product taste, flavor, and crispiness (only for shrimp crackers) were done in fried condition. Organoleptic characteristics were judged by 7 trained panelists using score sheet, with hedonical score 1 for the lowest and 5 for the highest quality. Linear expansion of shrimp crackers were obtained by measuring the length of crackers lid before and after frying. Evaluation of nutritional quality was done on protein (Kyiehdahl method), carbohydrate (Luff schroll method), and ash content (furnace method).

RESULTS AND DISCUSSION

For shrimp crackers, and shown in Table 1, it seemed that the protein and carbohydrate content as well as the product price were significantly differ among varied quality grades of product, but not the organoleptic characteristics, ash content, and linear expansion. From protein analysis, 50% of first grade crackers having protein content of more than 7%. The second grade composed of 3 levels of protein contents, i.e., 25% protein content of higher than 7%, 37.5% had moderated (between 5 to 7%), and 37.5% had low protein content (less than 5%). On the other hand, 62.5% of the third grade had low protein content. As from carbohydrate analysis, 67% samples of first grade product contained less than 55% carbohydrate, 33% contained between 55 to 65% carbohydrate, and no sample contained more than 65% carbohydrate. For the second grade samples, 37.5% had carbohydrate content of less than 55%, 25% had between 55 to 65%, and the rest 37.5% had more than 65%. Of the third grade samples, 50% had carbohydrate content of more than 65%.

Table 1. Organoleptic and nutritional characteristics of different quality grades of shrimp crackers

Parameter	grade-1	grade-2	grade-3
Organoleptic scores	4.05 ^a	3.96 ^a	3.81 ^a
Protein ct., %	7.48 ^a	5.44 ^b	4.32 ^b
Carbohydrate ct., %	53.99 ^a	58.93 ^{ab}	65.18 ^b
Ach ct., %	3.59 ^a	3.63 ^a	3.69 ^a
Linear expansion, %	356.92 ^a	331.73 ^a	358.66 ^a
Price, Rp ^c	5,642 ^a	5,344 ^{ab}	4,406 ^b

^c 1US\$ = 3.600

^{a,b} Values in rows followed with the same superscript were not significantly different at P = 0.05

This result reflects that the quality grading seemed to be based on product formulation. The better the quality, the more shrimp and the less flour used in the formula. Tapioka flour, was added in a small amount since it was intended as a filling material. However, further addition of shrimp would not affect its organoleptic characteristics (especially taste, flavor, and odor) and the linear expansion. In fact, increasing proportion of fish or shrimp in the dough, will increase the product acceptability on crackers' taste, but in contrary will reduce the linear expansion as well as the crispiness of the product (Perangin-angin *et al.*, 1995). In this experiment, the linear expansions were more closely related to the organoleptic scores of the product than to the product grade; meaning that whatever the grade was, the product with high organoleptic scores were also having a high linear expansion. This might be due to the relationship between organoleptic assessment and linear expansion. Product with low linear expansion is usually tough and uncrispy so that will reduce the organoleptic scores (Purnomo and Choliq, 1987).

Different phenomenon was found on shrimp paste and cake. For shrimp paste (Table 2), there were no significant differences between quality grades on all parameters, not even the prices. In detail, only 50% of first grade paste had protein content of not less than 23% and 75% of samples had carbohydrate content of less than 5%, while in the second grade, 33% of samples contained 20 to 23% protein, and 33% of samples contained carbohydrate less than 3%. It means that there were great variation among the processors on the formulation of the products as well as the determination of quality grade and the price. It could be mentioned that there is no guarantee for the consumers to get better organoleptic characteristics nor higher nutritive value from the first grade product. Base on this result, there is no reason at all for the consumers to choose the more expensive products.

Table 2. Organoleptic and nutritional characteristics of different quality grades of shrimp paste

Parameter	grade-1	grade-2
Organoleptic scores	3.90 ^a	4.00 ^a
Protein ct., %	22.28 ^a	20.13 ^a
Carbohydrate ct., %	3.73 ^a	4.79 ^a
Ash ct., %	20.17 ^a	20.55 ^a
Price, Rp [*]	1,500 ^a	1,267 ^a

*1 US\$ = Rp 3.600

a-b Values in rows followed with the same superscript were not significantly different at P = 0.05

As for shrimp cake (Table 3), the only parameter which could differ the two grades of product was the organoleptic characteristics. All sample of first grade product had organoleptic scores of more than 4.3 while the second grade only had score between 3.2 to 4.0 The nutritive values (protein, carbohydrate, and ash content) were absolutely not good as the determinant factors. This could be seen from the fact that all samples of the first grade product had protein content between 5 to 7% and 50% of the samples had carbohydrate content more than 8%, while surprisingly, 50% of the second grade contained more than 7% protein and less than 8% carbohydrate. Again, it seemed that the formulations of this product were greatly varied between the processors. However, in the case of shrimp cake, processing method (most probably the fermentation method) had played a big role in developing a good taste and flavor of the product, in turn, it determined the product quality.

Table 3. Organoleptic and nutritional characteristics of different quality grades of shrimp cake

Parameter	grade-1	grade-2
Organoleptic scores	4.40 ^a	3.60 ^b
Protein ct., %	6.35 ^a	6.49 ^a
Carbohydrate ct., %	9.06 ^a	7.43 ^a
Ash ct., %	42.31 ^a	48.82 ^a
Price, Rp [*]	4,500 ^a	2,300 ^a

*1 US\$ = Rp 3.600

a-b Values in rows followed with the same superscript were not significantly different at P = 0.05

CONCLUSION

Quality grade of shrimp crackers and so did the price represented its nutritive value, but not the organoleptic characteristics. For shrimp cake, on the contrary, quality grade could only figure out its organoleptic characteristics, while for shrimp paste, there was no clue at all that quality grade was related to both organoleptic and nutritional characteristics or even the price. It is, therefore, recommended that to assure the consumer, product and process standardization should be developed and implemented not only for foreign market, but also for domestic market purposes.

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