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Research Note: Vege-Fish Noodle: Its Quality and Acceptability

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ABSTRACT

Three levels (1, 5 and 10%) of fishbone powder and (25, 37.5 and 50%) squash paste were used in the production of vege-fish noodle. Expansion ratio, bulk density, oil absorption, and percent yield were determined. Sensory attributes were evaluated employing Quality Scoring in combination with the 9-Point Hedonic scale. Proximate composition of the most acceptable formulation was analyzed. Consumer evaluation of the recommended formulation was assessed and the cost of production was determined.

Levels of fish-bone powder and squash paste have no significant effect on the physical qualities of noodles except percent yield. Sensory attributes of vege-fish noodles were significantly influenced by the incorporation of fish bone powder and squash paste except taste of the product. General acceptability is significantly higher in treatment with highest level of both fish bone powder and squash paste.

The proximate composition of vege-fish noodle is higher than its commercial counterpart except ash. The calcium content of the product is 1,918.08 mg/kg. The vege-fish noodle is acceptable among 70.80% of the consumers. The cost of production is lower with the break-even price of P28.70/350 grams.

Keywords: fish bone powder, squash paste, vege-fish noodle

INTRODUCTION

Eastern Visayas is the center of mariculture today. Fourteen mariculutre zones with 180 maricultre cages for bangus are distributed along San Juanico Strait, Cabalauan, Isabel, Eastern Samar, and Biliran (BFAR, 2007). Development of mariculture farming resulted in the increase of bangus production and this encouraged fish processors to venture on boneless bangus production and commercialization. At present, a number of processors are producing boneless bangus for domestic market. Samonte (2007) pointed out that Unifish Incorporated is producing boneless bangus for domestic and export market. Bangus is bony in nature. Eleven percent of bangus are bones therefore a great bulk of bones are produced every processing operation.

Fish bones are rich in protein and calcium in addition to other important nutrients and minerals. Protein is an important nutrient for growth while calcium

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necessary for healthy bones, teeth, and for normal growth. These nutrients should be met through life (http//www.calcium to com).

Osteoporosis, protein calorie malnutrition (PCM), and vitamin A deficiency are the common malnutrition problems faced by the government today. Osteoporosis is a condition manifested by weakening and deformation of bones. It is a condition caused by inadequate calcium in the diet. Older people are the common victims of this problem. One out of three Filipino adults is at risk of osteoporosis (TV ad. 2007) PCM, another malnutrition problem caused by inadequate protein and calorie in the diet. It is exhibited by muscle wasting and stunted growth among children. Vitamin A deficiency is a health problem prevalent in the country today. This problem is brought about by insufficient intake of beta-carotene, a precursor of vitamin A. *Bitot* spot and night blindness are the common signs of vitamin A deficiency and the usual victim of this illness are children and pregnant and lactating mothers.

Meat, milk, and their products, are excellent sources of calcium and protein but these foods are relatively expensive thus unaffordable to people with meager income – the same people who are the common victims of malnutrition..

Noodles are among the favorite foods of Filipinos, young and old. It is often served in any occasion. It is used as a side dish, snack food, and a one-dish meal. The popularity of noodle makes it an ideal food for nutrient supplementation.

Utilization of fish bone in the production of noodle maximizes bangus utilization, increases income, and provides nutritious and affordable food to common people. Incorporation of squash enhanced the nutritional value of noodle making it rich in beta carotene thus makes the product nutritious and hopefully will minimize if not totally solve the problem of malnutrition in the region in particular and in the country in general.

METHODOLOGY

Sample Preparation

Fish bone powder. Freshly collected bangus bones were sorted out, washed, and pressure-cooked at 15 psi for one hour. The cooked bones were dried, ground, and allowed to pass through a 60 mesh sieve and kept in clean and covered container.

Squash paste. Squash fruit was washed with mild detergent solution, rinsed with tap water, and dipped in 10 ppm hypochlorite solution for 30 seconds. The squash was split-opened, de-seeded, and steam-cooked. The pulp was carefully scraped off from the skin, and homogenized till smooth texture was obtained.

Product Formulation

The vege-fish noodle was processed following the methods of producing rootcrop noodle developed by Lauzon (1998). The materials and methods were followed except for the use of fish bone powder and squash paste instead of sweetpotato and ube. Three levels (1, 5, and 10%) of fish bone powder and (25, 37.5 and 50%) squash paste were used in the formulation of vege-fish noodle.

Product Evaluation

Expansion Ratio. The diameter of randomly selected freshly cut vege-fish noodle strands was measured using a micrometer caliper. The same noodle strands were deep-fried and the diameters of the fried noodle strands were re-measured using the same micrometer caliper. The expansion was calculated as the ratio of the diameter of fried noodle to the diameter of freshly cut vege-fish noodle strands.

Bulk Density. The vege-fish noodle strands were placed into 500 ml graduated cylinder. The bottom of the cylinder was continuously tapped until there was no more reduction in volume and the cylinder was completely filled up to 500 ml. The weight of the 500 ml noodles strands was determined. The bulk density was calculated as the weight of the noodles divided by 500 ml.

Oil Absorption. Oil absorbed by noodles was determined employing volume difference method. A 100-gram blanched noodle was deep fried in 500 ml cooking oil. The sides of frying vessel were moistened with oil before use. After frying, the remaining oil was determined. The oil absorbed per gram of noodle was computed as the initial volume of oil minus the remaining oil divided by the weight of noodles to be fried.

Percent Yield. Percent yield was obtained by determining the weight of ingredients used, minus the final weight of the product divided by the weight of ingredients multiplied by 100.

Sensory Evaluation

Incomplete Block Design (IBD) was used as laid out by Cochran and Cox (1957). The set plan of t = 9, k = 6, r = 8, b = 12, E = 0.94 Type II was followed where t refers to the number of treatments, k the number of samples presented to panelists, r the number of replications, b the number of blocks, and E the efficiency factor. A total of 36 panelists were employed to evaluate the samples.

Proximate Analysis

Proximate composition of samples was analyzed at Central Analytical Laboratory of PhilRootcrops at VSU main campus, Visca, Baybay, Leyte.

Consumer Evaluation

The most acceptable vege-fish noodle formulation was subjected to consumer evaluation to determine consumers' reaction towards the product. One hundred consumers which consist of housewives, students, pupils, teachers, and "potpot" drivers were employed as consumer panel. The consumers were given two samples of noodles, the vege-fish and the commercial noodles as control. A scorecard was given and consumers were requested to rate the products based on their own judgement.

Cost of Production

The production cost was determined by recording all the expenses incurred in the production of the most acceptable formulation. The break-even price was determined by dividing the total cost of production by the total yield.

RESULTS AND DISCUSSIONS

Noodles

Physical Characteristics. Expansion ratio, bulk density, oil absorption, and percent yield of vege-fish noodle are presented in Table 1. Results showed that levels of fish bone powder and squash paste do not significantly affect the expansion ratio of the noodle strand. Although T_1 got the highest expansion ratio of 1.55 mm and T_4 got the lowest expansion ratio of 1.02 mm, statistical analysis showed that the expansion ratio of all the treatments evaluated does not significantly differ from each other. The same is true to oil absorption wherein fish bone powder and squash paste had no significant influence on the ability of noodle strand to absorb oil upon frying. It was noted that the level of squash paste and fish bone powder significantly influenced the yield of vege-fish noodles.

Sensory Evaluation. Quality description of noodles is summarized in Table 2. Results showed that the levels of squash influenced the color description of the product. Treatments with 50% squash got a color description that fell between "yellow" to "golden yellow", while treatments with lower squash level was described "pale yellow" to "yellow" regardless of the levels of fish bone powder used. Fish bone powder and squash levels had no significant influence on the textural attribute of the noodles. All treatments got a "crunchy" texture. Treatment with low level of squash got a "perceptible fish flavor". By increasing the levels of squash to 50%, fish flavor became imperceptible. It was noted that the taste of noodle was influenced by the levels of squash in the formulation. The increase of squash level to 50% resulted in a "slightly bland" to "bland" taste.

General Acceptability. The mean acceptability rating of vege-fish noodle is summarized in Table 3. Results revealed that the general acceptability was influenced by the levels of squash than fish bone powder. For T_1, the mean acceptability rating is 6.70 which falls under the "like slightly" category, but does not significantly differ from T_2, T_3 and T_4 whose mean acceptability rating falls under the "like moderately" category of the Hedonic scale. Increasing the level of squash results in a mean acceptability rating which falls between the "like moderately" to "like very much" category of the 9-point Hedonic scale.

Consumer Evaluation. Vege-fish noodles were found acceptable among consumers of different ages. Results showed that 70.80% of the consumers like the experimental noodle, 10% disliked it and 19.20% did not give any comment. For the commercial noodles, 66.66% liked, 17.50% disliked it, and 15.84% did not give any comment (Table 4). This result implies that there is market potential for the product.

Table 1. Expansion ratio, oil absorption, and percent yield of vege-fish noodle as influenced by the levels of squash and bone powder.

No.	Treatments X (%)	Y (%)	Expansion Ratio	Bulk Density (g/ml)	Oil Absorption (ml/g)	Yield (%)
1	1	25	1.55	.24	.19	84.53_{ab}
2	5	25	1.39	.28	.17	82.27_{b}
3	10	25	1.13	.26	.14	84.65_{ab}
4	1	37.5	1.35	.29	.12	82.16_{ab}
5	5	37.5	1.12	.32	.12	87.97_{a}
6	10	37.5	1.22	.28	.14	82.51_{b}
7	1	50	1.02	.24	.18	81.13_{b}
8	5	50	1.24	.23	.18	80.60_{b}
9	10	50	1.30	.22	.18	78.87_{c}

Values followed with same letter do not significantly differ from each other at 0.5 level of significance.
X = fish bone powder Y = squash paste

Table 2. Quality description of vege-fish noodle as influenced by the levels of fish bone powder, squash paste in the formulation.

No.	Treatments X (%)	Y (%)	Sensory Attribute			
			Color	Texture	Taste	Flavor
1	1	25	Pale yellow	Crunchy	Just right	Imperceptible
2	5	25	Pale yellow	Crunchy	Just right	Slightly perceptible
3	10	25	Pale yellow	Crunchy	Just right	Moderately perceptible fish flavor
4	1	37.50	Pale yellow to yellow	Crunchy	Slightly bland	Slightly perceptible fish flavor
5	5	37.50	Pale yellow to yellow	Crunchy	Slightly bland	Slightly perceptible fish flavor
6	10	37.50	Pale yellow to yellow	Crunchy	Slightly bland	Slightly perceptible fish flavor
7	1	50	Yellow to golden yellow	Crunchy	Bland	Imperceptible fish flavor
8	5	50	Yellow to golden yellow`	Crunchy	Bland	Imperceptible fish flavor
9	10	50	Yellow to golden yellow`	Crunchy	Bland	Imperceptible fish flavor

X = fish bone powder Y = Squash

Table 3. Mean* sensory rating** of vege-fish noodle as influenced by the levels of fish bone powder and squash in the formulation.

No.	Treatments		Sensory Attributes				
	X (%)	Y (%)	Color	Texture	Flavor	Taste^{ns}	General Acceptability
1	1	25	1.13_{d}	1.80_{c}	1.60_{d}	1.73	6.70_{d}
2	5	25	1.20_{cd}	1.87_{c}	1.73_{cd}	1.97	7.0_{cd}
3	10	25	1.47_{bc}	1.87_{c}	1.80_{bcd}	1.976	7.0_{cd}
4	1	37.5	1.47_{bc}	1.33_{c}	1.87_{abc}	1.97	7.10_{cd}
5	5	37.5	1.60_{b}	2.0_{bc}	1.90_{abc}	2.0	7.20_{cd}
6	10	37.5	1.67_{b}	2.30_{ab}	2.0_{abc}	2.0	7.27_{bc}
7	1	50	2.30_{a}	2.30_{ab}	2.03_{abc}	2.03	7.3_{bc}
8	5	50	2.33_{a}	2.33_{ab}	2.14_{a}	2.17	7.63_{ab}
9	10	50	2.53_{a}	2.47_{a}	2.17_{a}	2.17	7.87_{a}

Values followed with same letter do not significantly differ from each other at 0.5 level of significance.
*N = 24
**Range of score

Table 4. Consumers' response towards the fish-vegetable noodle in comparison to the commercial counterpart.

Sample	Consumer's Response (%)			
	Like	Dislike	No Comment	Total
Experimental Sample	70.80	10.00	19.20	100
Commercial Noodle	66.66	17.50	15.84	100

Housewives, potpot drivers, VSU employees and students from Tolosa, Leyte.

Table 5. Proximate composition of fish-vegetable noodle.

Proximate Composition	Experimental Treatment	Commercial Noodle
Crude protein (%)	22.5	18.37
Crude fat (%)	23.135	20.56
Crude fiber (%)	3.64	2.05
Ash (%)	1.030	1.381
Calcium (mg/kg)	1,918.08	342.523

Proximate Composition. Table 5 showed the proximate composition of vegetable-fish noodle. It was noted that the experimental noodle got a higher percentage of crude protein, crude fat, crude fiber, and calcium, but lower in ash content than the commercial counterpart. The higher percentage protein in the product can be attributed to the fish flesh, adhering on the bones which became part of the fish bone powder. The calcium content of the vege-fish noodle is higher than its commercial counterpart.

Cost of Production. The total production cost of vege-fish noodle is summarized in Table 6. The cost of producing one formulation noodle is Php144.29 and a yield of 1.75 kg giving a break-even price (BEP) of Php 28.70 per

350 grams pack, cheaper than the commercial counterpart whose current price ranges from PhP35.00 to Php45.00 per pack of the same weight.

Table 6. Cost of producing 1 kg formulation of vege-fish noodle.

Composition	Unit	Cost	Total
Flour	1 kg	24/kg	24.00
Squash	500 g	10/kg	5.00
Fish sauce	10 T	24/750 ml	0.32
Egg	8 pcs	4.50/pc	36.00
Oil	250 ml	206.75/4,000 ml	12.90
Water			5.00
Gas			10.00
Labor	(2 hrs)	25.00/hr	50.00
Packaging	7 pcs	0.15	1.05
Total			Php144.29
BEP = 0.82/g or 28.70/350 grams			
Yield = 1.75 kg			

CONCLUSION

Levels of squash paste and fish bone powder significantly affect the yield of the product. Sensory attributes of vege-fish noodles are affected significantly by the levels of squash paste and fish bone powder. The higher the levels of squash paste and fish bone powder, the more acceptable is the product. Vege-fish is liked by 70.80% of the consumers. The break-even price per 350 g of the product is Php 28.70.

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