EFFECT OF STORAGE ON THE KEEPING QUALITY OF FISH SCRAP MEALS

by

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ABSTRACT

Results of monthly analysis of moisture, fat and protein content of fish scrap meals prepared from trimmings in the canning of tamban (*Sardinella* sp.), bangos (*Chanos chanos*), and galongong (*Decapterus* sp.), stored at different experimental conditions for thirteen months, showed that stored samples packed in hermetically sealed containers have better keeping quality than the exposed samples after thirteen months.

INTRODUCTION

From the standpoint of national economy, fish utilization plays an important role in bolstering the nation's progress. Philippine waters are so abundant in fish that at times the supply of some species is greater that the demand. The problem of utilizing the surplus cheap species of fish including fish scraps or cannery trimmings could be solved by converting them into fish meal. Fish meal is universally known for its value as a protein source and supplement in animal feeds principally as a growth food. Especially prepared fish flour (meal) is also being studied as a food component to improve the diet of the people in some underdeveloped countries. Fishermen or fish dealers near fishing grounds could be encouraged to make fish meal for animal feed from abundant species during seasons of plenty. However, a knowledge of the effect of storage on the keeping quality of fish meal would stimulate fish meal producers and consumers to improve the quality of their products. The work of Grau *et al* (1959) on the technology of fish meal reveals that after six months of storage, the quality of the protein had not deteriorated in meals stored under any of the conditions of the experiment. Time and temperature relationships were studied as well as their effect on the nutritional value of the protein. No signifcant decrease in nutritional value was noted in meals of low moisture content. Stansby (1949) found that fish meal after six months storage gave a low fat value when extracted with ether. Nilson (1951) also reported that fish meals having low protein are those usually manufactured from fish scraps wherein fat and minerals are quite high. Such fish scrap meals are suitable as agricultural fertilizers due to high amounts of calcium and phosphorus, with traces of iron and copper. It is the object of this paper to make a study on the effect of storage on the keeping quality of fish scrap meals prepared from tamban (*Sardinella* sp.), bangos (*Chanos chanos*) and galongong (*Decapterus* sp.)

EXPERIMENTAL METHODS

Fish scrap samples obtained from the canning of bangos (*Chanos chanos*), tamban (*Sardinella* sp.). and galongong (*Decapterus* sp.) were converted correspondingly into fish meal. Scrap (tail, head and viscera) of each of the three species were prepared into fish meal with the following procedure: Scrap sample was steamed for 30 minutes; dried under the sun; and ground into fish scrap meal. Scrap meal samples were divided into two lots. One lot of samples was packed in glass jars then hermetically sealed and the samples composing the other lot were exposed to ordinary room conditions. Both lots were then stored at ordinary room temperature. Each sample of both lots was then analysed monthly for moisture, protein

TABLE I

The Monthly Chemical Analysis of Fish Scrap Meals.

Monthly Analysis	Mean Temperature (°C)	Average Relative Humidity %	Bangos Scrap Meal		Herring Scrap Meal		Galongong Scrap Meal	
			Exposed %	Sealed %	Exposed %	Sealed %	Exposed %	Sealed %
Initial *September (1958)*	26.5	70						
Moisture			10.13	10.13	11.09	11.09	7.63	7.63
Protein			64.92	64.92	59.04	59.04	61.63	61.63
Fat			8.71	8.71	13.17	13.17	13.45	13.45
October	27.8	80						
Moisture			8.86	10.10	8.77	12.33	7.79	8.11
Protein			66.23	68.63	66.08	66.17	65.04	62.58
Fat			1.06	1.58	1.18	9.54	1.27	9.44
November	26.7	71						
Moisture			9.38	10.01	6.97	8.07	5.63	6.85
Protein			65.73	69.30	65.30	60.95	64.78	62.58
Fat			0.708	1.74	1.01	2.44	1.10	9.44
December	26.8	71						
Moisture			7.75	9.63	7.35	9.34	7.19	7.52
Protein			56.09	54.83	62.16	75.28	61.90	75.20
Fat			0.987	2.05	0.91	1.86	1.19	3.77
January (1959)	26.5	77						
Moisture			8.44	9.84	9.20	9.02	7.43	7.38
Protein			55.15	52.37	57.11	51.07	85.21	50.43
Fat			0.652	2.19	0.769	2.18	1.12	5.85
February	26.0	75						
Moisture			8.76	9.46	9.03	9.67	7.95	7.75
Protein			54.28	51.07	56.90	50.88	57.21	49.43
Fat			0.906	1 21	1.11	1.30	1.12	5.12
March	28.3	65						
Moisture			7.06	9.46	8.05	9.50	6.82	7.65
Protein			54.08	52.05	55.09	50.92	56.85	49.25
Fat			0.91	1.17	1.05	1.21	0.95	4.76
April	31.3	59						
Moisture			5.06	8.23	6.20	9.38	6.42	7.75
Protein			55.32	53.35	56.10	50.51	54.47	50.35
Fat			0.90	1.15	0.95	1.19	0.95	2.04

Monthly Analysis	Mean Temperature (°C)	Average Relative Humidity %	Bangos Scrap Meal		Herring Scrap Meal		Galongong Scrap Meal	
			Exposed %	Sealed %	Exposed %	Sealed %	Exposed %	Sealed %
May	30	77						
Moisture			5.13	8.05	6.32	8.38	6.42	7.75
Protein			55.83	54.51	55.78	50.51	54.57	50.35
Fat			0.95	1.13	0.86	0.86	0.95	2.04
June	28.8	73						
Moisture			6.98	8.76	6.81	8.01	6.03	6.64
Protein			54.72	53.22	54.63	49.32	55.20	48.27
Fat			0.94	1.68	0.84	1.48	0.84	1.11
July	26.3	83						
Moisture			9.97	4.82	55.58	50.79	53.83	48.15
Protein			53.34	9.72	7.40	9.37	8.45	6.73
Fat			0.88	1.53	0.72	1.20	0.78	0.97
August	26	84						
Moisture			8.99	8.49	9.41	8.76	7.39	6.82
Protein			54.35	49.27	58.22	50.91	53.51	51.59
Fat			0.75	1.35	0.68	0.87	0.65	1.29
September (1959)	29.4	78						
Moisture			4.42	8.20	4.93	8.98	3.57	6.18
Protein			56.20	49.80	54.80	51.69	48.50	55.45
Fat			0.62	1.28	0.55	0.69	0.43	1.16

and fat contents using the standard AOAC methods. Relative humidity and temperature of the surrounding atmosphere of the stored samples were recorded periodically.

RESULTS AND DISCUSSION

The results are shown in Table I.

Exposed samples: Table I reveals that during April, May and September, samples showed relatively lower moisture content than those of the other months. During April, May and September, the mean temperature was 31.2°C to 30°C which was relatively higher than the other months.

However, during October, July and August the moisture content of the samples was higher. The relative humidity prevailing during those periods were 80, 83 and 84% respectively. It was noted that the moisture content of the exposed samples varied inversely with temperature and directly with relative humidity. Samples having relatively higher moisture contents showed correspondingly low protein contents and vice versa. Fat content of all exposed samples showed decreased percentage during 13 months of storage.

Sealed samples: Table I also reveals that there is no marked fluctuation in the percentage of moisture as per monthly analysis. Likewise, protein percentage did not show marked fluctuations. However, fat content of meals showed decrease in percentage even after the first month of storage. Atmospheric conditions affect the keeping quality of exposed samples when stored. Sealed samples

are not affected by changes in relative humidity and temperature that prevailed during storage. However, in both exposed and sealed samples, fat contents were decreased irrespective of the prevailing conditions during storage.

CONCLUSIONS

Conditions of storage affect the keeping quality of fish scrap meals. Samples stored in hermetically sealed containers give better quality products than those exposed to the atmosphere. Decrease in fat content of fish scrap meals during storage gives a better quality product.

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