Utilisation of Squid Waste as Meal

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The squid waste which includes head, tentacles, viscera, fin, skin and pen amounts to 52% of the whole weight and is discarded at present. A method has been worked out for the conversion of squid waste into meal. The waste is boiled in salt solution (2%)/salt (2%) and alumn (0.5%) solution/and water for two minutes, drained and dried. All the dried samples including the control (dried without blanching) were analysed for physical and biochemical changes. Blanching reduced the yield but the product could be dried in a shorter period. The volatile bases were reduced significantly and the colour was improved. Blanching made pulverisation of the dried product easy. Pulverisation before drying yielded a granular product.

Squids are preserved by freezing, canning, drying, salting, fermenting and pickling and used for the preparation of paste products (Kreuzer, 1984). The main edible portion is the cone shaped trunk of the body (mantle) which forms about 48% of the total body weight (Table 1). The fins, head, tentacles, skin and viscera which forms about 52% of the total body weight are discarded. The skin is a good source of pigments. This paper reports the attempt of the authors to utilise the squid waste by converting to dried meal.

Materials and Methods

Squids were collected, kept under ice and transported to the laboratory and kept overnight. Head, tentacles and gut were removed by pulling it out and the skin along with fin was peeled of without breaking the ink sac. The weight of each part was taken separately and the percentage of each to the original weight of the sample was determined. All the wastes except the gut were mixed together and used for the studies. It was divided into four portions and the three portions were blanched in equal volume of boiling (i) water (ii) 2% salt solution and (iii) 2% salt solution and 0.5% alum for two min and drained. The fourth portion was not blanched. Half of all the samples were minced and dried in the sun and the remaining half was dried as such.

The yield as well as the physical and chemical qualities were determined. The moisture, crude protein (total nitrogen x 6.25) non-protein nitrogen (NPN), fat, salt and ash were determined by AOAC (1975) methods, alpha amino nitrogen by the method of Pope & Stevens (1939) from the trichlor acetic acid extract and TVN by the micro-diffusion method of Conway (1947).

Results and Discussion

The percentage composition of various parts of squid and the proximate composition of squid waste (excluding gut) are given in Tables 1 and 2 respectively. About 44% of the squid contributed by head, tentacles, fin and skin can be utilized for the preparation of meal. The pen which is a chitinous matter can also used for making meal. The proximate composition of the waste is comparable to that of a lean fish or squid mantle. The three samples used for the studies were of different qualities by sensory evaluation. Sample (a) collected from commercial trawler

Table 1. *Percentage composition of various body parts*

Average weight of whole squid – 225 g

Mantles	48.00
Head and tentacles	25.00
Fin	15.00
Guts	8.00
Skin	3.00
Pen	1.00

Table 2. *Proximate composition (%) of squid waste (head, tentacles, skin and fin)*

	a	b	c
Moisture	82.54	78.26	79.26
Protein	16.00	19.20	19.77
Fat (ether solubles)	0.85	0.72	0.92
Ash	1.08	1.19	0.89

a, b and c represents three different samples taken in 3 different seasons.

was not fresh but in the limit of acceptability. Sample (b) was in good condition while sample (c) was extremely fresh. The higher moisture content of sample (a) was due to the poor quality of the material and longer storage in ice which resulted in the high absorption of water.

Table 3 gives the process details, yields after blanching, final yields and moisture of the dried product. Raw material quality had a significant effect on the blanching yield and final yield. On blanching in water extremely fresh material (sample c) gave an yield of 69% while the yield from low quality material (sample a) was only 56% and the corresponding final yields were 16.9% and 12.14% respectively on dry weight basis. The effect of blanching medium was not significant as seen from Table 3, though there was a marginal increase in the yields for samples (a) and (b) in salt or salt and alum solution. Addition of alum did not increase the yield significantly and had no additional advantage over salt solution except an increase in the water loss on blanching. When the material was dried without blanching it was found that the final yield was higher, but it took a longer time for drying. During sun drying the material sticked to the surface, considerable leaching of the self-juice was noticed and attracted house flies. The pulverisation of the dry material was found to be very difficult because of the typical texture of the unblanched and dried material, but blanching facilitated pulverisation after drying. The drying of material was facilitated by mincing after blanching and the final dried product could be obtained in granular shape. Further pulverisation is required only if the meal is to be produced in fine powder. Mincing of the waste without blanching yielded a pasty mass and after drying it required pulverisation again. The appearance of the final product was improved considerably by blanching.

Table 4 gives the proximate composition of the raw material and that of the finished

Table 3. *Processing details and yield of squid meal*

Medium used for blanching	Time of blanching	Batch	% yield after blanching	% yield of dried material	Moisture
Water	2 min in boiling water	a	56.00	13.00	6.41
		b	64.00	14.35	7.85
		c	69.00	19.00	10.30
2% salt solution	2 min in boiling solution	a	62.70	13.33	5.82
		b	71.00	15.00	7.64
		c	71.00	19.00	11.30
2% salt solution+ 0.5% alum	2 min in boiling solution	a	54.00	13.62	6.21
		b	64.00	15.50	7.45
		c	67.00	19.00	10.50
No blanching	No blanching	a	—	15.82	7.90
		b	—	16.05	8.20
		c	—	20.00	13.70

a, b, c refers to three different lots

Table 4. *Proximate composition of the fresh squid waste and squid meal processed by different ways*

	Fresh material	Sun dried squid meal prepared by blanching in			Sun drying without blanching
		Water	Salt soln	Salt+alum soln	
Moisture %	79.26	10.30	11.30	10.50	13.70
TN%	3.26	10.85	11.65	11.30	10.90
NPN mg%	686	913	895	885	2100
Alpha amino nitrogen mg %	280	434	483	413	1050
TVN mg%	21	56	42	56	168
Chloride %	nil	nil	1.17	0.67	nil

products processed by different methods from sample (c). The notable change is in non protein nitrogen, alpha amino nitrogen and total volatile bases between the blanched and dried and sun dried without blanching materials. On blanching in salt solution the salt absorption was slightly above 1%.

Drying squid waste after blanching in salt solution has the advantages of imparting the salty taste to the material, supressing the spoilage during drying, facilitating the drying operation, making pulverisation easier and improving the appearance.

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