Utilization of *Trygon walga* (Sting ray) from the Arabian Sea

A. LEKSHMY NAIR and K. GOPAKUMAR

Central Institute of Fisheries Technology, Cochin - 682 029

Proximate composition and nutritive value of fish powder prepared from *Trygon walga* caught from the off shore waters of the Arabian sea are reported. The fish powder has high protein and low fat content and is free from pathogenic organisms. PER of the fish powder is higher than that of casein. It can be stored in sealed metallised polyester/LDPE pouches at ambient temperature for nine months without appreciable deterioration of quality.

It is now generally seen that our traditional fish stocks are getting depleted mainly due to over exploitation, thus making it necessary to exploit, unexploited/under exploited fishery resources. A thorough knowledge of the chemical and nutritional characteristics of such species is necessary for proper utilization of these resources. One of the species identified is *Trygon walga* which has an annual landing of 2,500 tonnes and a resource potential of 4,800 tonnes (MPEDA, 1980). The aim of the present investigation is to study the properties of *Trygon walga* caught from the Arabian sea and assess its suitability for human consumption.

Materials and Methods

Trygon walga caught from the off shore waters of the Arabian sea was collected from the vessels of the Integrated Fisheries Project, Cochin and was stored at –23°C for two weeks before use.

The fish was thawed, cleaned, filleted and the filltes were cooked in 0.5% acetic acid for 20 min and the cooked meat was dried in a tunnel drier at 45–50°C. The dried meat was converted into fine powder in a pulveriser and this powder was used for the studies.

Moisture, crude protein, fat and ash contents of the fish powder was determined according to AOAC (1975) procedure. The bacteriological quality was evaluated by APHA (1966) methods.

Protein efficiency ratio of the fish powder was determined following the method of Chapman *et al.* (1959) with eight male weanling rats (Wistar strain) for the experimental diet and the control diet using casein as the reference protein. Protein, fat and minerals of both diets were adjusted to the levels as advocated in the method. The rats were given food and water *ad libitum* and the daily intake of food and weekly gain in weight were recorded for four weeks. The rats were sacrificed after the experimental period and liver, kidney, spleen and blood samples were collected. The organs were weighed and the nitrogen content of the organs and serum samples was determined by the microkjeldahl method (Hawk, 1971). Observations on the behaviour and physical changes, if any, on the rats were also recorded periodically.

Results and Discussion

Yield of fish powder was 8% based on whole wet fish. The powder was light yellow in colour and possessed good taste and

flavour. The proximate composition is presented in Table 1. The protein content of the powder was high and mineral content moderate. It is richer in protein compared to fish powder prepared from threadfinbream and sole (personal data).

Table 1. *Proximate composition (%) of fish powder from sting ray**

Moisture	8.34
Protein	84.96
Fat	1.40
Ash	6.94

* Mean of two samples

Table 2. *Protein efficiency ratio of fish powder from sting ray*

	Casein	Fish powder
Initial weight, g	43.0 ± 2.8	43.9 ± 4.5
Final weight, g	106.1 ± 11.8	109.6 ± 11.6
Gain in weight, g	63.1 ± 9.2	65.7 ± 10.9
Diet intake, g	240.2 ± 16.4	232.8 ± 17.4
Protein intake, g	24.0 ± 1.6	23.3 ± 1.7
PER	2.6 ± 0.3	2.8 ± 0.3
Adj. PER	2.5	2.7
FER	0.26 ± 0.03	0.28 ± 0.03

The fish powder had a total plate count of 8.5 x 10^3 organisms per gram. Pathogenic organisms were absent. The product was bacteriologically safe.

The results of protein quality evaluation studies are summarised in Table 2. The control casein diet had a PER of 2.6 and the fish powder recorded a slightly higher PER value of 2.8. The variations in diet intake is only marginal. The higher PER value of the fish powder may be attributed to a better balance in the essential amino acid pattern of the fish protein. However, the difference in PER values between the two groups is not significant. The feed efficiency ratios of both groups are also comparable. The appearance and behaviour of the rats during the entire experimental period were normal. Untoward symptoms like seborrhoea, diarrhoea etc. were not manifested during the entire feeding period. The rats remained lively throughout the feeding trials. No adverse toxicological effects were noticed.

The relative weights and nitrogen content of organs and nitrogen content of blood serum are shown in Table 3. The organ weights of the two groups are similar. There is no appreciable difference in the liver and serum nitrogen contents of the groups fed

Table 3. *Organ weights and nitrogen contents of rats fed on experimental and control diets*

		Casein	Fish powder
Organ weight, g	Spleen	0.31 ± 0.08	0.28 ± 0.05
	Kidney	0.82 ± 0.06	0.86 ± 0.11
	Liver	3.74 ± 0.55	3.73 ± 0.40
Nitrogen content	Spleen[1]	32.29 ± 1.39	31.87 ± 1.15
	Kidney[1]	31.04 ± 0.83	29.45 ± 1.88
	Liver[1]	24.20 ± 2.23	25.33 ± 1.89
	Serum[2]	11.51 ± 0.31	11.26 ± 0.38

1 — mg/g; 2 — mg/ml..

with test diet and control diet. Elevation of serum nitrogen is usually indicative of some deficiency or imbalance in the essential amino acid content of a protein. The unutilized amino acids will remain in the blood stream until metabolised for energy. Since such an increase in serum nitrogen compared to the control group is not observed in the experimental group, it may be assumed that the essential amino acid pattern is similar to that of the reference protein. The method of preparation of the fish powder seems not to have adversely affected the nutritional quality of the protein.

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