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PROXIMATE COMPOSITION AND NUTRITIVE VALUE OF SOME IMPORTANT FOOD FISHES FROM THE ARABIAN GULF

The unique value of fish for supplementing the nutritional qualities of man's diet, as also for animal feeding, is well recognized. Literature on the composition and calorie value of fish reported from various parts of the world is exhaustive. Love (1970), Sidwell et al. (1973, 1974), Bonnet et al. (1974), Stansby (1976), Sidwell, Loomis, Loomis, Foncannon, and Buzzell (1978), and Sidwell, Loomis, Foncannon, and Buzzell (1978) have provided good reviews on the subject.

The Arabian Gulf countries, including Kuwait, have rich fish faunas and Kuwait with a coastline of about 140 km, has at least 131 fish species in 64 families which are taken in commercial trawls

(Kuronuma and Abe 1972). The total quantity of fish sold in Kuwait market in 1976 was 4,452 t as estimated by the Kuwait Ministry of Planning (Anonymous 1977). In a recent survey of the fish consumption of local populations in Kuwait, Afzal and Hayat (1977) reported that the consumption of fish in Kuwait is fairly high and that a majority of respondents had no clear idea about the nutritive value of fish. It was emphasized that a program was necessary to disseminate such information.

With the exception of the work of Das et al. (1976) on a few fishes from Shatt Al-Arab and the Arabian Gulf, nothing seems to have appeared on nutritional values of Arabian Gulf fishes. Here we report on the proximate composition and nutritive value of some of the important food fishes from Kuwait for use of consumers, dieticians, and the fishing industry.

Methods

The study was based on fish samples obtained from the local fish market. These are caught by shrimp trawlers and dhow boats operating in the Arabian Gulf. For each species, fresh specimens representing the common marketable size were selected (Table 1). Analysis used minced muscle from the trunk portion of each individual from which skin and all bony elements had been removed. Standard methods of chemical analysis were used (Horwitz 1975). Gross energy content was calculated from the mean values of fat, protein, and carbohydrate following equivalents as used by Jafri et al. (1964). All samples were taken during November and December 1978.

Results

Most of the fishes were found to be fairly high in protein content. The maximum value (22.6%) was observed in the barred Spanish mackerel whereas

TABLE 1.—Average proximate composition (\pm standard error of the mean) and energy content of some important food fishes sampled in November and December 1978 from the Arabian Gulf.

Species	No.	Total length (cm)	Protein (%)	Fat (%)	Moisture (%)	Ash (%)	Energy (cal/100 g)
Spotted Spanish mackerel, <i>Scomberomorus guttatus</i>	7	47.1 \pm 0.6	20.5 \pm 0.0	3.4 \pm 0.4	73.9 \pm 0.3	1.4 \pm 0.0	119.0
Barred Spanish mackerel, <i>S. commersoni</i>	5	103.5 \pm 7.2	22.6 \pm 0.6	1.8 \pm 0.2	73.5 \pm 0.1	1.5 \pm 0.0	111.7
Silvery croaker, <i>Otolithus argenteus</i>	5	33.4 \pm 1.1	21.8 \pm 0.3	1.1 \pm 0.3	74.5 \pm 0.4	1.3 \pm 0.0	104.8
Four-thread threadfin, <i>Eleutheronema tetradactylum</i>	5	53.0 \pm 0.6	20.7 \pm 0.2	5.3 \pm 1.1	72.1 \pm 0.7	1.3 \pm 0.0	136.6
Silvery grunt, <i>Pomadasys argenteus</i>	7	55.4 \pm 2.0	20.5 \pm 0.2	.5 \pm 0.1	77.6 \pm 0.3	1.2 \pm 0.0	89.4
Silvery pomfret, <i>Pampus argenteus</i>	5	30.4 \pm 6.4	18.5 \pm 0.3	1.4 \pm 0.3	78.3 \pm 0.3	1.3 \pm 0.0	91.0
Mullet, <i>Liza macrolepis</i>	12	17.5 \pm 0.2	17.2 \pm 0.2	1.1 \pm 0.0	79.6 \pm 0.2	1.3 \pm 0.0	83.9
Yellow finned black porgy, <i>Acanthopagrus latus</i>	5	31.2 \pm 0.8	19.7 \pm 0.3	.3 \pm 0.1	77.9 \pm 0.5	1.2 \pm 0.1	87.6
Crimson snapper, <i>Lutjanus coccineus</i>	5	64.0 \pm 1.4	19.1 \pm 0.3	.2 \pm 0.1	77.6 \pm 0.2	1.2 \pm 0.0	87.7
Brown-spotted grouper, <i>Epinephelus tauvina</i>	5	84.3 \pm 1.5	19.5 \pm 0.3	.5 \pm 0.0	74.1 \pm 0.1	1.2 \pm 0.0	104.1

the minimum value (17.2%) was noted in the mullet. Other fishes with high protein content were silvery croaker, four-thread threadfin, silvery grunt, and spotted Spanish mackerel. The value of protein observed for the silvery pomfret was found to be higher than the value reported by Das et al. (1976) for this species from Shatt Al-Arab.

The fat content ranged from 0.2% in crimson snapper to 5.3% in four-thread threadfin. Except for the four-thread threadfin and mackerels, fishes were generally low in fat content. The magnitude of variation in fat values for individual species was higher in comparison to that observed for protein. Of the various constituents of the fish body, fat is perhaps the most variable component varying with factors like age, sex spawning cycle, feeding, season, etc. Generally low fat values observed during the present investigation could possibly be the result of relatively poor winter condition of these fishes.

Moisture content varied from 72.1% in four-thread threadfin to 79.6% in mullet.

Ash content varied little. Except for the mackerels which showed slightly higher values, ash content varied between 1.2 and 1.3%.

Gross energy content was highest (136.6 cal/100 g) in the muscle of the four-thread threadfin, followed by mackerels and silvery croaker. Lowest value (83.9 cal/100 g) was noted for the mullet. The energy content for the silvery pomfret and silvery grunt resemble closely the values reported by Sidwell et al. (1974). The energy content for the various species of mullet quoted by Sidwell et al. (1974) was, however, higher than that obtained for *Liza macrolepis*.

Acknowledgment

Thanks are due to Nazar Hussain, Head, Mariculture and Fisheries Department, Kuwait Institute for Scientific Research, for his keen interest in the program.

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