A Survey on the Mercury Content of the Persian Gulf Shrimp

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Summary:

The Persian Gulf Shrimp is one of the important sea food resources of Iran and it is exported in a large quantity. The mercury content of I00 different samples was measured by atomic absorption cold vapor technique . It was found that , the level of mercury in the samples examined ranged from 0.08 to 0.88 mg/kg with the mean value of 0.24 mg/kg and the standard deviation of 0.I8 . Eight percent of these samples which were taken from different fishery stations and the retail shops showed the mercury content higher than 0.5 mg/kg , but in most cases the value was less than 0.3 mg/kg .

Introduction :

Aquatic pollution with mercury and its resulting - uptake and accumulation by fish and crustacea and other sea foods has been given an special attention in many parts of the

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world . Mercury compounds are converted to methylmercury by the action of aerobic or unaerobic microorganismes which is believed to be highly toxic to man. Consumption of contaminated fish - containing methylmercury has been shown to corrolate with the - total blood mercury and also with the mercury content of erythrocytes (HOLDEN I973). The methylmercury compounds are almost - completely absorbed from the gastro-intestinal tract and readily pass through the blood - brain barrier and give high mercury level in the brain. They damage nerve cells and accumulate in liver and kidney (WHO Food Additives Series No. 4) , (WHO Techn. Rep. Ser., No. 505).

Because of the high toxicity of mercury compounds , most of the governments consider certain hygienic and toxicological - standard for mercury in foods and specially sea foods , which is important as far as the international trade is concerned . Shrimp (Genus = penaeus) is one of the most important products of Persian Gulf and is a popular source of food in the southern parts of Iran (PARVANEH et al I968) . There has not been any report concerning the mercury content of this product and because of its economical importance , it has been always subjected to some hygienic evaluation through the importing countries . This investigation was made to estimade the mercury content of this product .

Material and Method :

Random samples from I00 different packed frozen shrimps

were taken . The analysis were carried out on the edible part of the shrimp. The samples were digested with sulphoric , nitric and perchloric acid under digestion apparatus (Official Methods of Analysis , A.O.A.C. , I965) , and the mercury content was determined by flameless atomic absorption spectrophotometry technique by a varian-techtron (Model I000) instrument using standard addition method , (Varian Techtron , Analytical Methods for Spectroscopy I973).

Results and Discussion :

The level of mercury in the samples examined , ranged from 0.08 to 0.88 mg/kg with the mean value of 0.24 mg/kg and the standard deviation of 0.I8 . Eight percent of the samples showed the mercury content higher than 0.5 mg/kg and 80 percent of the samples contained mercury less than 0.3 mg/kg .

Shellfish and crustacea are known to be capable of accumulating various metals to a considerable degree ,but relatively few analysis of mercury in invertebrates have been reported. According to Holden (I973) concentration of mercury in lobster (Homarus vulgaris) has been found to be 0.I2-0.75 mg/kg in apparently unpolluted area.

The United Kingdom report on mercury in food (Ministry of Agriculture , Fisheries and Food , I97I) recorded relatively low level in shrimp with the mean value of 0.I542I mg/kg . It was also reported that the mean value of mercury in the samples of Alaska shrimp was 0.04 mg/kg (GOMEZ et al I974).

Regarding the acceptable amount of mercury , a limit of 0.5

mg/kg is now accepted for fish and sea foods .

Although in some countries the average daily intake of mercury calculated on the basis of even I mg/kg limit in sea foods is still well within the proposed amount as maximum acceptable for man (HOLDEN I973).

In this study 92 percent of the samples analysed showed the mercury content lower than 0.5 mg/kg and the maximum level found was less than I mg/kg (0.88 mg/kg).Thus it could be concluded that at the present time the mercury contamination is not a hygienic problem as far as the Persian Gulf Shrimp is concerned .

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