4. ORGANOLEPTIC CHARACTERS OF CRAB

4.1. INTRODUCTION

When the quality of food product is assessed by means of sensory organs, the evaluation is said to be sensory or organoleptic. Sensory science is defined as the study of the reaction of the five senses, that is – sight, smell, taste, touch and hearing (Huss 1995 and Olafsdó et al., 1997). Freshness and spoilage are the most important criteria to determine the overall quality of food products. Clearly, quality is a complex function of raw material characteristics and a variety of extrinsic factors such as freshness, pre- and post-slaughter handling procedures (Dunajski, 1979; Clydesdale, 1993; Johnston, 1999). The most important intrinsic quality traits are the colour, texture, processing characteristics, fat content, and chemical composition of the flesh (Johnston, 1999; Grigorakis et al., 2003; Periago et al., 2005) that influence food acceptance and choices.

Different kinds of attributes are responsible for the quality of food such as odour, flavour and freshness. Jayaram et al., (1980) and Tahir (2008) have studied the organoleptic characteristics of Indian major carps and found non-significant differences among species for taste and overall quality when reared under different organic and artificial feed. Volatile compounds contributing the characteristic odour of fish, and it can be measured by evaluating the freshness of fish (Josephson et al., 1986; Kawai, 1996; Olafsdó and Fleurence, 1997). Olafsdó et al., (1997) recorded that 2, 6-nonadienal and 1, 5-octadien-3-1 as the most influent odour compound for fishes. Shahidi and Cadwallader (1997) reported that the flavour of fresh seafoods including both fin fishes and shell fishes are primarily affected by lipoxygenase derived lipid based volatiles. Baixas et al., (2001) has listed Trimethylamine (TMA-N), Total Volatile Basic Nitrogen
(TVB-N), Carbonyls (C6-C9), short chain alcohols, sulfur compounds, amines, sweet esters, aromatics and dienals are indicators of freshness and food spoilages. Venugopal, (2002) reported that the post mortem muscle content of Volatile amines provides information on the progression of spoilage and is suitable for confirming sensory data.

The activity of microorganisms is the main factor limiting the shelf life of fresh seafoods. Shelf life of seafood defined as the length of time, is fit for human consumption (Martinsdo et al., 2001). Basically, the spoiling signs are off-odour, off-flavour, slime formation, gas production, discoloration and changes in texture (Huss, 1994). The development of these spoilage signs in fish and fishery products is due to the combination of chemical, autolytic and microbiological changes. Sikorski et al., (1990) have reported that post mortem quality changes in fish vary with season, species, fishing method, handling, and holding temperature; therefore physical and chemical muscle changes should be correlated with sensory assessment results. So the sensory evaluation is the simplest and rapid method to analyze the quality of food products.

Sensory evaluation has been the most commonly used method for assessing freshness and quality of fish and fishery products (Martinsdo et al., 2001 and Ponsanchez et al., 2006). Hence, organoleptic study was designed to measure the colour, appearance, texture, flavour and taste by adopting Hedonic Rating Scale 1-9 in the study animal, S. serrata as these sensory attributes reflect the quality and nutritional values of the food.
4.2. MATERIALS AND METHODS

Crabs were evaluated organoleptically by a group of well trained and experienced sensory panel members. The group was constituted with ten members familiar with quality control and quality assurance of fish and fishery products. Panel members were asked to analyse the attributes such as colour, appearance, flavour, taste and texture one by one according to US FDA sensory analysis method (ORA Laboratory Manual, 2003). The products were served in the following order of soft shelled crabs, chlorine (100ppm) treated crabs, Ozone treated crabs, and combination of Ozone + Chlorine treated crabs. A sip of water was provided to the members of panellist in between samples to cleanse the palate before tasting the next product. Before presented to panellists, all the products were cooked individually in the Soya bean oil (Plate – 6, showing the soft shelled mud crab after cooking) and uniformly presented to panellists in isolated booths immediately (each panellists evaluated approximately 30g of sample in each). The overall acceptability was determined by using Hedonic rating scale of 1-9, this scale cover the following attributes viz, like extremely, like very much, like moderately, like slightly, neither like nor dislike, dislike slightly, dislike moderately, dislike very much and dislike extremely (Amerine et al., 1965). Product with scores above 6 were considered as good and below 5 as poor as unacceptable.
4.3 RESULT

4.3.1 Overall acceptability of the products

The respondents overwhelmingly liked (100%) the soft, and combined use of chlorine + ozone treated crabs after cooking (Plate 6). The ozone treated crabs were liked extremely by 80% of the respondents and remaining 20% liked very much. Only 40% of the juries liked the crabs treated with chlorine (100ppm) moderately and slightly and another 20% disliked slightly. The overall acceptability of the crab sample is represented as percentage in the Fig. 16.

4.3.2. Sensory attributes Analysis:

The sensory quality scores of soft crabs, chlorine (100ppm), Ozone and chlorine + ozone treated crabs are presented in the Fig’s. 17 to 21. The mean score of soft crabs, chlorine (100ppm), ozone and chlorine + ozone treated crabs were 8.4, 7.6, 8.2 and 8.6 respectively (Table 19). The highest score (8.6) was obtained by the combined use of chlorine + ozone treated crabs and the lowest (7.2) was received by the chlorine (100ppm) treated crabs.

4.3.3. Texture of the Muscle

Plate 7 and 8 are the section of the soft edible muscle portion of the soft shelled crab and Chlorine + Ozone (combined) treated crabs respectively. The muscle texture showed no difference even after the treatment.
4.4. DISCUSSION

In the present organoleptic study, one of the processing methods such as cooking might have altered the sensory attributes of the soft shell crabs. Remarkable changes had been observed in the meat colour of crabs after cooking. Colour is one of the most economically important flesh quality traits to consumer level while preferring the products. The soft and combined chlorine + ozone treated crabs received the higher score indicated that the colour was more attractive and desirable quality which made the appearance of the flesh so good. The result is in supportive of the findings of Cai and Corke (2001) in *Amaranthus bitacyanin* and Fageria and Choudhary (2003) in *Prosopis cineraris*.

Chlorine (100ppm) treated crabs received lower score with respect to the next organoleptic character to taste and this could be correlated with the residual formation of deposit on the surface of the flesh slightly, altering the taste of the sample. Flavour is often the most important determinant of food acceptance by the consumer during consumption. Besides, the palatability and the overall quality of the food is mainly depends on flavour or taste. Flavour and taste are related to each other to a certain extent which contributes more to select the right choice of the quality product to the consumer. The present findings were well supported by the report of Brungs (1973) and XU (1999).

Even though the texture for all the samples received high score but there was a variation among the samples which could be correlated with the pH of all the samples. Cowie and Little (1966) found that pH is a major factor affecting the texture of frozen fish and reported that pH had little influence on the textural deterioration of
chu mackerel. Besides, the amount of essential amino acids such as histidine and arginine were found to be higher than the rest of the amino acids which may sustain the quality of the crabs’s muscle. The textural variations among the samples could be attributed to the relative ratios among various protein fractions as reported by Ram and Nigam (1982). Histidine protects fish against changes in pH by serving as energy fuel during starvation. Ogata (2002) has reported that histidine improve flavour and taste of the feed during dietary supplementation in aquaculture marine foods. Mommsen et al., (1980) has reported that the gradual increase in the concentration of intra muscular histidine before migration. In the present study, regarding the texture, the maximum score was received by all the soft shell crabs products that may be due to keeping the crabs in confined water bodies for moulting before being processed for export. Cultured fish tend to have a softer texture and milder less robust flavour than wild fish, which has been linked to differences in muscle structure and proximate composition. This was further supported in sea bass (Periago et al., 2005) and also in gilthead sea bream (Grigorakis et al., 2003).

The chlorine (100ppm) treated soft shell crabs had minimum score for all the attributes such as colour, appearance, flavour, texture and taste. From the score, it might be concluded that all the attributes could be inter-related to one another at consumer level to prefer the products. The present finding was in accordance with the results of Lowe and Butryn, (2007).
Since the cooking process didn’t affect the quality of the product, sensory analysis for the combined chlorine + ozone treated crabs received high score indicating that all five organoleptic attributes were positive and strongly correlated with each other to contribute the overall acceptability of the product. Hence, it could be concluded that Chlorine + Ozone treatment method was found to be more suitable in improving the quality for the exportable mud crab *S. serrata*. 