

## INSTANT SOUP POWDER FROM KING ABALONE (*CHICOREUS RAMOSUS*)

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### ABSTRACT

An instant soup powder was prepared from king abalone (*Chicoreus ramosus*) meat. The product was microbiologically sound and the characteristics of flavour was maintained throughout the storage period. The soup can be prepared in any style according to individual taste. This is one of the most successful methods in utilizing the tough gastropod meat.

### INTRODUCTION

The large gastropod *Chicoreus ramosus*, alias king abalone, is an important fisheries resource in the Gulf of Mannar, south east coast of India. Total landings constituted 809.9 ton during 1993-94 (Patterson *et al.* 1992). The meat of this gastropod is delicious and protein rich but it is not popular like other sea food because of its tough nature. An attempt to soften the meat quickly using herbs and chemicals (Ramesh & Ayyakkannu 1994) was not effective. It was felt that a modified and ready compounded food material which could easily be prepared appeared to be the best method for economic utilisation. Many ready to serve products have been prepared from fishes, prawns and bivalves (Krishnaswamy *et al.* 1962; Venugopalan & Govindan 1967; Venugopalan & James 1969; Chandrasekhar 1979; Vijayan *et al.* 1982; Gupta & Basu 1985; Behanam *et al.* 1990) while less attention has been put on gastropods (Dhanapaul *et al.* 1994; Patterson *et al.* 1995). In the present study, instant soup powder was prepared using *C. ramosus* meat and its shelf life was assessed.

### MATERIALS AND METHODS

Live *C. ramosus* were collected from the Gulf of Mannar region and brought to the laboratory. The shells were washed thoroughly and boiled in freshwater for 30 minutes, and the meat was sucked off. Foot and adductor muscle were removed and sliced into small

pieces. The meat was deodorised using the method of Sen & Rao (1966), and cooked in an equal amount of water at pH 5.5 adjusted by the addition of ortho-phosphoric acid. Boiling was repeated several times in pH adjusted water and the meat was deodorised. Then, it was dried at 40-50 °C in a hot air oven for 2 days and the dried meat was pulverised in a hammer mill and sieved through 180µm mesh size sieve. The meat powder was used for the preparation of instant soup powder using the standard recipe (Tab. 1). The prepared soup powder was packed in air tight containers and the shelf life was assessed by microbial and organoleptic characteristics.

Total Heterotrophic Bacteria (THB) was enumerated monthly employing ZoBell's 2216E marine agar and standard pour plate technique. Serial dilution of the samples

Table 1. Standard recipe for the soup powder.

Ingredients	Quantity (g)
Meat Powder	500
Onion	300
Garlic	50
Ghee (or) butter	100
Maida (refined wheat flour)	200
Milk Powder	200
Glucose	100
Pepper	40
Carboxy methyl cellulose (CMC)	2.5
Mono sodium glutamate (MSG)	0.5
Butylated hydroxy toluene (BHT)	0.5

Table 2. Relative humidity (hygroscopic moisture) of salts.

Salt solution	% Relative Humidity
Lithium chloride	12.0
Potassium acetate	22.5
Potassium carbonate	43.7
Ammonium nitrate	63.5
Sodium chloride	75.8

Table 3. Sensory evaluation of soup during storage, mean scores.

Storage days	Taste	Flavour	Overall acceptability
0	8.3	8.6	8.5
30	8.6	8.4	8.5
60	8.8	8.4	8.6
90	8.9	8.6	8.6
120	8.9	8.4	8.6
150	8.8	8.6	8.7

Table 4. Chemical Composition of soup mix.

Protein	29.44 %
Fat	13.37 %
Moisture	8.54 %
Ash	6.83 %
Sodium	1.94 %
Potassium	0.69 %
Phosphorous	0.416 %
Calcium	0.34 %
Magnesium	0.377 %
Zinc	0.44 %
Iron	0.019 %
Vitamine B <sub>12</sub>	2.08 µg g <sup>-1</sup>
Calorific value	170 cal 100 g <sup>-1</sup>

Table 5. Total heterotrophic bacterial count (x 10<sup>3</sup> CFU g<sup>-1</sup>) during storage.

No. of days	THB (x 10 <sup>3</sup> CFU g <sup>-1</sup> )
0	0.637
30	0.628
60	0.599
90	0.524
120	0.518
150	0.511

were prepared using sterile 50 % sea water. One ml of diluted samples were pour-plated in ZoBell's agar in triplicates. Inoculated plates were incubated for 48 hours at room temperature (>27°C). Bacterial colony counts were made in plates containing 30-300 colonies. The heterotrophic bacterial population was expressed as colony forming

units (CFU) per gram.

Organoleptic characteristics: colour, taste, flavour, and overall acceptability of the soup was evaluated at monthly intervals. The prepared soup along with a questionnaire were given to 10 panellists to mark their findings in the appropriate place. The maximum limit of acceptability was fixed as 10. Chemical composition of the soup powder was analysed using AOAC (1980) methods. The calorific value was assessed by chromic acid oxidation method (Sharma *et al.* 1965). Equilibrium Relative Humidity (ERH) of the instant soup powder was examined using the method of Iyengar & Sen 1965. Five gram lots of the samples were weighed and spread uniformly in petri dishes and exposed to different humidity obtained by placing saturated solutions of different salt solutions (Tab. 2) in desiccators. The loss or gain in weight of the samples were determined at intervals of 1, 2, 3, 4, and 5 hours and thereafter every 24 hours until constant weights were attained. Equilibrium moisture content was determined by drying a sample at 100-105 °C for 6 hours. Making use of original moisture content and the amount of moisture gained or lost in desiccators, the equilibrium moisture content of the product was calculated.

## RESULTS

The instant soup powder has a cream colour with a characteristic flavour. The mean panel scores for all the organoleptic characteristics are given in Tab. 3. According to opinions of all panellists, the soup is very tasty. No remarkable changes in colour, flavour and taste were observed during the storage period and the soup powder did not show any signs of caking.

The biochemical composition, vitamins, minerals and calorific value of the soup powder are presented in Tab. 4. From the data it is clear that the instant soup powder is highly nutritious.

Tab. 5 presents data on the changes in heterotrophic bacterial population of the soup

powder during storage period. Initially THB was high ( $0.637 \times 10^{-3}$  CFU  $g^{-1}$ ). Stepwise reduction was observed along with the storage period and at the end of 150 days it was  $0.518 \times 10^{-3}$  CFU  $g^{-1}$ .

The equilibrium moisture content of the soup powder corresponding to different relative humidity (RH), shows that equilibrium moisture content did not vary much up to a RH of 40 % after which it increased steadily with the RH. Samples kept in 75.8 % RH were spoiled due to mould growth after 12 days. From this, it is clear that the instant soup powder is hygroscopic.

### DISCUSSION

Shelf life of the instant soup powder packed in air tight containers was more than 150 days. Total heterotrophic bacterial count showed a stepwise reduction during storage. THB of soup powder was safe according to limits in Venugopalan & James (1969). The product is of remarkably good quality from a microbiological point of view. Initial high count of THB probably is due to secondary contamination during preparation. Secondary contamination is prevalent in seafood which is handled repeatedly during process-

ing (Ramamorthy & Natarajan 1987). Decrease of THB during storage may be due to the use of preservation as well as condiments, *viz.*, onions, garlic, and black pepper. Reduction in *Staphylococcus aureus* growth due to these condiments were reported by Nkanga & Uraih (1981) and Kumar & Gupta (1984).

The soup powder was hygroscopic because above 40 % relative humidity the equilibrium moisture content exhibits a steep rise. At 75.8 % RH mould growth was observed, so instant soup powder should be packed in moisture vapour proof packaging material to increase shelf-life. Equilibrium moisture contents of dried fish products and fish soup mix also exhibit steep rise above 50 % and 65 % RH, respectively (Iyengar & Sen 1965; Venugopalan & James 1969).

Instant soup powder is one of the best methods of utilising tough gastropod meat. The recipe and the methodology is applicable for all gastropod meat. The powder can be prepared for the table by boiling the suspension of powder for 2-3 minutes. It can also be prepared in any style by incorporating vegetables, noodles *etc.*, according to individual taste.

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