VALUE ADDED PRODUCTS FROM MACROBRACHIUM ROSENBERGII

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ABSTRACT
Prawn masala fry and prawn cutlets have been developed using meat portion of Macrobrachium rosenbergii. Both the products were well accepted with masala fry being the best accepted product. Bacterial load of the products was within the standard values. The products were rich in protein, calcium and phosphorus. Prawn masala fry had a shelf life of 29 days and ready to fry cutlets – 32 days, ready to eat cutlets – 28 days when stored at refrigerated temperature.

INTRODUCTION
Present market trends reflect a rapidly growing demand for ready to serve and ready to cook convenience products. The importance of conventional frozen and canned products is getting diminished day by day. The sophisticated consumer abroad as well as the urban consumer at home demand new type of value added, hygienically prepared, nutritious and attractively packed products. There are several factors which influence the demand for value added products like increasing number of working women, reasonable good expendable income and education (Gopalkumar, 1997). The term value added product can be defined as the value that is added to a product from the time it enters the processing plant to the time it leaves (Josopeit and Franssu, 1992). Attempt has been made to develop new products from Macrobrachium Rosenbergii. The reasons for new product development may be varied such as better utilization of available resource, consumer need and convenience.

MATERIAL AND METHODS
The prawn samples in bulk were purchased from the Fisheries Research Station, Hessarghatta, Bangalore, stored in deep freezer and processed within 24 hours. Head shell, appendages, tail and the vein passing through the dorsal side of the abdomen were completely removed. The yield was calculated as percentage of peeled and divided prawns. The meat was repeatedly washed with potable water to remove extraneous matter like mud and remaining veins. Following analysis namely moisture, protein, fat, ash, carbohydrate, calcium, phosphorus and energy was carried out in the raw sample (Table 1). AOAC (1980) method was used for all the estimation except carbohydrate, energy and bacterial count. Carbohydrate was calculated by the difference method. Gopalkrishna and Ranjan (1980) and ISI (1980), methods were used to estimate energy and bacterial load and prawn cutlets were developed and standardized for the study. The recipes for the same shown in Table 2a and 2b.

A panel of ten semi trained, panel members were selected to evaluate the products. The panel members were selected based on their familiarity with the basic raw material. The panel members were requested to evaluate each product for appearance, texture, aroma, taste and overall acceptability using 5 point hedonic scale ranging from poor to excellent. Overall mean scores for all the quality attributes for each product was calculated.

Moisture, protein, fat, ash, carbohydrate, calcium, phosphorus, energy and bacterial load of the best accepted products were estimated using standard procedures. Products were dried in hot air oven at 70°C and powdered. The dried samples were used for chemical analysis. Moisture content and bacterial load was analyzed in fresh sample.

The production cost of the products developed was computed based on the current
cost of raw ingredients in the retail market including overhead charges and packaging charges. Prawn masala fry and prawn cutlets (ready to fry and ready to eat) were packed in low density polyethylene pouches of 100g capacity, sealed air tight and repacked in plastic coated duplex cartons of 200g capacity and stored at refrigerated temperature for shelf life study.

RESULTS AND DISCUSSION

The meat of Macrobracchium Rosenbergii has a moisture content of 76.7 percent. This is in accordance with Sherief et al. (1992) who has reported a value of 76.5 percent. Meat had 78.3 of protein and 4.9g, 4.4g, 2.9g, 901mg, 575mg, 396Kcal of fat, ash, carbohydrate, calcium, phosphorus and energy respectively (Dry weight basis / 100g). The results indicate that Macrobracchium Rosenbergii is fair source of protein, calcium and phosphorus where as carbohydrate and fat contents are lower. The results of the same has been shown in Table 1.

Table 1. Proximate composition of raw meat (on dry weight basis / 100g)

<table>
<thead>
<tr>
<th>Nutrients</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture*</td>
<td>76.7</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>78.3</td>
</tr>
<tr>
<td>Fat (g)</td>
<td>4.9</td>
</tr>
<tr>
<td>Ash (g)</td>
<td>4.4</td>
</tr>
<tr>
<td>Carbohydrate (g)</td>
<td>2.9</td>
</tr>
<tr>
<td>Calcium (mg)</td>
<td>901</td>
</tr>
<tr>
<td>Phosphorus (mg)</td>
<td>575</td>
</tr>
<tr>
<td>Energy (kcal)</td>
<td>369</td>
</tr>
</tbody>
</table>

Recipes (prawn masala fry and cutlet) were standardized in the laboratory and subjected for organoleptic evaluation and the same has been presented in Table 2 (a) and 2 (b).

Prawn masala fry was the best accepted product with a total score of 23.3 (considering all the sensory parameters) and an overall mean score of 46 which ranges between excellent and very good. When individual mean scores for each attribute was observed highest mean score of 5 was obtained for acceptance which indicated that the product has a very appealing and pleasing appearance. Aroma and taste had a score of 4.5 and 4.6 respectively. This might be due to spicy nature of the product which Indians prefer much. Prawn cutlets obtained the score of 20.3. the scores obtained for all the sensory parameters was above 4.0 indicating that the product was very close to excellent. The coating of egg white and bread crumbs given to cutlets and shallow frying in oil gave the cutlet a light brown colour which was very appealing. The other ingredients used namely onion, green chillies, ginger, coriander leaves and prawn meat base the cutlets to taste well and to yield pleasant aroma. The results of the same are presented in Table 3.

The proximate composition of products on dry weight basis / 100g is presented in Table 4. Prawn masala fry had a moisture content.
of 21.7g and protein, fat, ash, carbohydrate, calcium, phosphorus and energy of 38.2g, 24.7g, 8.4g, 6.9g, 356mg, 402mg, and 407 Kcal/100g respectively. Prawn cutlets had 20.1g moisture and 36.7g, 30.3g, 7.6g, 5.1g, 232mg, 308mg, 432 Kcal of protein, fat, ash, carbohydrate, calcium, phosphorus and energy / 100 g respectively. Prawn meat is a good source of protein, calcium and phosphorus. The storage period, the colour of the masala fry turned light yellow from golden yellow with off flavour and hard texture along with slight mold growth. Ready to fry prawn cutlets packed similar to the masala fry had a shelf life of 32 days. During this period it has developed an off flavour, turned pale with soft texture and mold growth. Ready to eat cutlets had a shelf life of 28 days during which it turned pale brown from light brown colour, had rancid odour and soft texture with mold growth.

Results of the bacterial load analysis of raw sample and cooked products are presented in Table 5. Bacterial load analysis of the raw samples were carried out within 24 hours of procurement. Meat had a load of $1.8 \times 10^5$ cfu/g. This is less than the value specified by ISI (1980). According to IS: 2237 (1980), for the peeled and divided the total bacterial count specified is 2,00,000. For the cooked product, analysis was carried out within 24 hours of preparation. Prawn masala fry and prawn cutlet had a bacterial load of $2.4 \times 10^6$ and $2.2 \times 10^6$ cfu/g respectively. All the values were within the standards (25,000) specified by IS: 2237 (1980).

Prawn masala fry kept at refrigerated temperature (7ºC) in LDPE pouch followed by duplex carton had a shelf life of 29 days. During the storage period, the colour of the masala fry turned light yellow from golden yellow with off flavour and hard texture along with slight mold growth. Ready to fry prawn cutlets packed similar to the masala fry had a shelf life of 32 days. During this period it has developed an off flavour, turned pale with soft texture and mold growth. Ready to eat cutlets had a shelf life of 28 days during which it turned pale brown from light brown colour, had rancid odour and soft texture with mold growth.

The peeled prawn costs Rs. 600/kg. Hence, the prawn masala fry with 64 percent of meat costs Rs. 59/100g and prawn cutlet with 36 percent of meat costs Rs. 38/100g. The shelf life and cost of the products is shown in Table 6.

CONCLUSION

The results of the present study indicates that Macrobrachium Rosenbergii can be successfully utilized for the production of convenience foods. The average shelf life of both ready-to-fry and ready-to-eat products from Macrobrachium Rosenbergii was found to be three weeks. As prawn is a delicacy among the elite population, these products can be successfully popularized.
REFERENCES


