

Smoke Curing of Mussels

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Substantial quantities of green mussels are available on the Kerala coast particularly from Calicut to north. But these are not properly exploited at present. Simple and economic methods of processing like drying and smoking can go a long way towards market promotion and better returns to the fishermen. This paper reports the method of preparation of smoked mussels which have a great potential for export as well as local marketing.

Large quantities of green mussels (*Perna viridis*) grow on the rocky structures of the sea coast of Kerala particularly from Calicut to north. But no reliable data are available on the annual collection of mussels in this region. Presently the mussels collected are consumed fresh in and around the locality. Consequently the fishermen get very poor returns, as people in far off places have no access to this delicious and nutritive commodity. The Central Institute of Fisheries Technology has developed a method of canning the mussels (Balachandran & Nair, 1975). Presently greater emphasis is laid on low cost technology and simple methods like drying and smoking, suitable for rural conditions, need greater attention. Dried and smoked mussels do have a great potential for export as well as for internal marketing. The paper presents the results of investigations carried out by the authors to prepare quality smoked product from mussels.

Materials and Methods

Fresh mussels collected from the rocky structures of the Korapuzha estuary, about 10 km north of Calicut, were employed in the study. Live mussels were washed in potable water and were given a "starvation treatment" as described by Balachandran and Nair (1975), followed by immersion in water chlorinated at 5 p. p. m. for 2 h, to reduce the sand content in the meat to an acceptable minimum level. The live meat was then shucked, washed well, to remove all extraneous matter. The meat was blanched in 5% brine (750 ml brine for every kg of meat). After 5 min blanching in boiling brine, the meat was drained well

and partially dried in an artificial dryer to a moisture level of 40-45% and smoked at 80-90°C for 30 min in a conventional vertical smoke kiln, in which smoke is generated by burning coconut husk and saw dust. The smoked product was finally dried in the dryer to a moisture level of about 10%. Estimations of moisture, sodium chloride, total nitrogen, ash and acid insolubles were conducted according to the AOAC methods (1960). Glycogen was estimated by the method of Van de Kleij (1951).

Results and Discussion

Subjecting the mussels to starvation in sand-free water for a day, followed by immersion in chlorinated water, helped to minimise the sand content in the meat. The mussels were opened with suitable sharp instruments without heating. Heating the mussels in open vats and then shucking the meat may involve some loss of nutrients. Again, when the shucked meat is subjected to blanching, the soluble nutrients are lost. To reduce the loss of nutrients to a possible minimum, the meat was shucked from live mussels.

Blanching the meat for 5 min in 5% brine gave about 3% salt to the product. Dipping the meat in brine of higher concentration for a prolonged period did not enhance the quality. As is evident from Table 1, it led to an increase in the concentration of salt in the meat and a consequent depletion of the total nitrogen content. To avoid this apparent reduction in food value, the concentration of brine was maintained at 5% and the duration of blanching 5 min.

Table 1. *Effect of salt concentration on the quality of smoked mussel*

Concentration of brine %	Blanching time min	Salt content % DWB	Total nitrogen % DWB	Remarks
5	5	2.81	7.652	Characteristic sweet taste and flavour; salt taste normal
10	5	4.25	6.951	Salt taste masks the sweet taste and flavour
15	5	6.14	6.548	Highly saltish
5	10	4.19	6.953	Prominently saltish, masking the sweet taste and flavour of the meat
10	10	6.35	6.604	Highly saltish
15	10	7.05	6.315	Highly saltish

Table 2. *Effect of smoking time on the quality of smoked mussel*

Moisture content before smoking %	Smoking time min	Moisture content after smoking %	Remarks
48.75	15	42.15	Partial smoke absorption; sticky to touch
	30	31.04	Uniform characteristic smoked colour and flavour which blends well with the sweet flavour of the meat
	60	22.54	Dark unattractive appearance; meat is shrunken and tough in texture
	120	15.75	Unattractive; very dark colour; reduced in size; tough texture

Table 3. *Proximate composition of smoked mussel*

Moisture	%	...	10.89
Chloride as NaCl (DWB)	%	...	2.81
Total nitrogen (DWB)	%	...	8.765
Ash (DWB)	%	...	11.32
Acid insolubles DWB	%	...	0.0581
Glycogen (DWB)	%	...	22.15
Fat (DWB)	%	...	11.51

Partial reduction in the moisture of the blanched meat to about 40-45% immediately before smoking was found necessary for better and uniform absorption of smoke. To achieve this, the meat was partially dried in a dryer for 30 min prior to smoking. In the smoke kiln the meat was spread on rust-free wire trays. Smoking at 80-90°C for 30 min gave the product the characteristic smoked colour and flavour. Less than 30 min was found insufficient for complete smoke absorption and prolonged smoking resulted in dark, tough and disfigured product (Table 2).

The smoked product was either sun-dried or dried in dryers to 10% moisture level. At this moisture the product could be stored without spoilage for more than six months. The yield of the final product was found to be 22%. The proximate composition of the smoked mussels is given in Table 3.

The authors are thankful to Shri G. K. Kuriyan, Director, Central Institute of Fisheries Technology for permission to publish the paper and to S/Shri V. Gopalakrishna Pillai and T. John of this Research Centre for technical assistance.

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