

## NUTRITIVE VALUE OF THE ROCK OYSTER, *CRASSOSTREA CUCULLATA*

M. D. RAJAGOPAL, SUMITRA VIJAYARAGHAVAN AND L. KRISHNA KUMARI

*National Institute of Oceanography, Dona Paula, Goa - 403 004*

Nutritive value of the rock oyster, *Crassostrea cucullata* was studied for a period of one year. The average caloric value was found to be 3937 cal/g dry wt. The caloric value was found to be significantly correlated with organic carbon and lipid values. The suitability of *C. cucullata* for culture purposes has been indicated.

In India considerable oyster resources exist but these largely remain unutilised as food. Four species of oysters belonging to the genus *Crassostrea* have been reported to occur in variable quantities all along the coasts of India (see Rao, 1974). Nothing is known about the nutritive value of any of the species of rock oyster and hence it was considered worthwhile to determine the caloric content of *Crassostrea cucullata* which at present is largely eaten by the poorer section. The material for this study came from the Goa coast.

Specimens of *C. cucullata* were collected from the intertidal rocks of Dona Paula at fortnightly intervals for one year. Oysters identified as females, males by an internal examination of the gonad and those in which identification was difficult or doubtful as unsexed (indeterminate) were analysed separately. The soft portion of the shelled animals was dried at 70°C in an oven and the dried samples were homogenised and their

caloric content and organic carbon were estimated according to the method described earlier (Qasim *et al.*, 1973). Lipid was determined by the technique given by Folch and Stanley (1956). The values for each fortnight were averaged.

Figure 1 shows the seasonal variations in the caloric content, organic carbon and lipid contents for males, females and unsexed specimens. In males the seasonal cycle was not clearly defined. The caloric values ranged from a minimum of 3.064 Kcal/g dry wt to a maximum of 4.716 Kcal/g dry wt. The organic carbon varied from 20.88 to 35.29% and the lipid from 9.21 to 14.41%.

In females the range of variation in caloric content was even greater (3.399 to 4.737 Kcal/g dry wt). Organic carbon and lipid contents followed a similar trend as that of calories and varied from 26.26 to 35.46% and 5.74 to 14.59% respectively (Figure 1). Unsexed specimens occurred from March to October

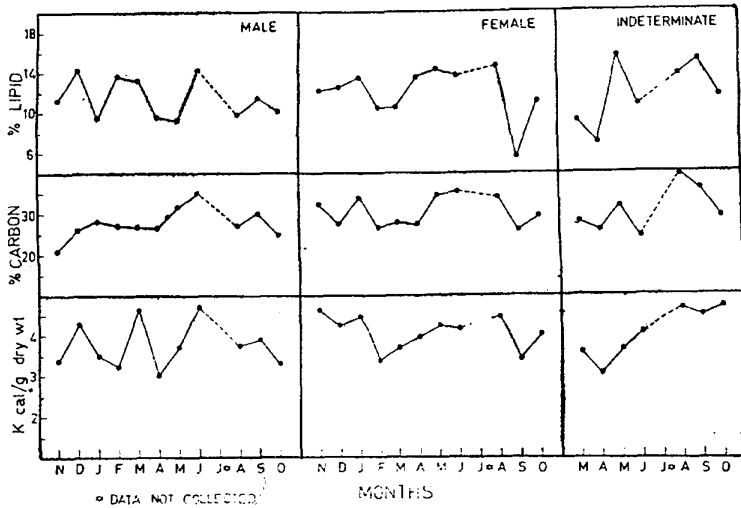


Fig. 1. Seasonal variations in the caloric content, organic carbon and lipid contents in the rock oyster *Crassostrea cucullata*

and the ranges in their caloric content, organic carbon and lipid were smaller than either in males or in females (Fig. 1) — calories: 3.093 to 4.731 Kcal/g dry wt. Organic carbon: 24.50 to 39.95 % and lipid: 7.0 to 15 %. The interrelationships between the three components — caloric content, organic carbon and lipid in males, females and unsexed forms were as follows:

**Males:**

$$\% \text{ organic carbon} = 13.4166 + 3.9124 \text{ Kcal/g dry wt with } r = 0.54.$$

$$\% \text{ Lipid} = 2.906 + 2.272 \text{ Kcal/g dry wt with } r = 0.64.$$

**Females:**

$$\% \text{ Organic carbon} = 5.5262 + 6.1409 \text{ Kcal/g dry wt with } r = 0.82.$$

$$\% \text{ Lipid} = 0.1256 + 2.566 \text{ Kcal/g dry wt with } r = 0.72.$$

**Unsexed forms:**

$$\% \text{ Organic carbon} = 1.2763 + 7.7564 \text{ Kcal/g dry wt with } r = 0.87.$$

$$\% \text{ Lipid} = 0.1255 + 2.414 \text{ Kcal/g dry wt with } r = 0.69.$$

Thus the correlations between the three parameters studied were highly significant.

Edible rock oysters of India are known to be highly nutritive (Durve, 1964). The present study clearly indicates that *C. cucullata* has a high fat content and since there is not a well marked seasonal variation in its nutritive value during the year it can be exploited practically throughout the year. Oysters inhabit the mid-littoral zone and they extend even in the superlittoral zone because of the availability of suitable substrata. The rock oyster is particularly

hardy and survive under fairly high temperature conditions to which they are exposed during the sunlight. Oysters can be induced to spawn by increasing the salinity and temperature of water. It is also possible to accomplish artificial fertilisation successfully in oysters (see Rao *et al.*, 1976). Oysters are not usually infested by many large parasitic forms and hence they are well suited for culture operations.

At present *C. cucullata* is not cultured in India although it is in demand in some restaurants of big cities. By collecting the young oysters and growing them in specially prepared pans in the intertidal regions, it is possible to grow them in fairly large numbers.

In the absence of information on the caloric content of the rock oyster from other parts of India, it is difficult to make a comparison of its nutritive value in different regions. However, a comparison with the other known bivalves, prawns and fishes indicates that its average caloric value (3937 cal/g dry wt) lies within the range of reported values for bivalves of Goa region (Sumitra *et al.*, 1974). It is higher than the reported values for prawns and lower than those of the oil sardine, mullet and mackerel (Qasim *et al.*, 1973 and Sumitra *et al.*, 1974.)

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#### REFERENCES

- Durve, V. S. 1964. On the percentage edibility and the index condition of the oyster *Crassostrea gryphoides* (Schlotheim). *J. mar. biol. Ass. India*, 6: 128-135.
- Folch, J. M. Lees and G. H. Solane Stanley. 1956. A simple method for the isolation and purification of total-lipid from animal tissues. *J. Biol. Chem.* 226: 497-509.
- Qasim, S. Z., Sumitra Vijayaraghavan and D. C. V. Easterson. 1973. Caloric values of the ingested food of some marine fishes and prawns. *Indian J. Fish.*, 20: 318-325.
- Rao, K. Satyanarayana. 1974. Edible bivalves: Mussels and oysters. In: *The Commercial Molluscs of India*. ICAR, Bull. of CMFRI. No. 25. pp 4-49. Nair, R. V. and K. S. Rao (Ed.).
- Rao, K. Virabhadra, L. Krishnakumari, and S. Z. Qasim. 1976. Studies on aquaculture-I Spawning, fertilisation and larval development of the green mussel, *Mytilus viridis* in the laboratory. *Indian J. mar. Sci* (in press).
- Sumitra Vijayaraghavan, M. V. M. Wafar, P. G. Jacob, T. Balasubramanian, M. D. Rajagopalan, and L. Krishna Kumari, 1974. Caloric value of estuarine and marine organisms from Goa. *Mahasagar Bull. natn. Inst. Oceanogr* 8: (1 & 2): (in press).