

# A Study on Biochemical contents of XancusPyrum in Tuticorin Coastal Area of Gulf of Mannar Region

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**Abstract:** -The sacred chank *Xancuspyrum* is a gregarious and large gastropod, and it inhabits distinct chank beds. The chank flesh is found to be rich in protein and mineral and the nutritive values is almost equal with the flesh of any fish. The sacred chank *Xancuspyrum* forms a commercial fishery along the south-east coast of India. In the Gulf of Mannar (GoM), there are about 10 chank beds. It extends from off Vaipar to Tiruchendur, and Tuticorin as base. This paper is a report of research work carried out in Tuticorin which is a part of Gulf of Mannar. An Investigation was carried out to assess biochemical contents in the commercially important species *Xancuspyrum*. Protein, Total Carbohydrates, Total Lipid, Total Ash and Total moisture were studied from the *Xancuspyrum* collected from the Tuticorin Coastal Area. The study revealed that the biochemical contents to be Protein 37.9%, Total Carbohydrates – 14.8%, Total Lipid – 4.5%, Total Ash – 0.89% and Total moisture to be 82.5%.

**Keywords:** *Xancuspyrum*, Biochemical contents, Tuticorin, Gulf of Mannar

## I. INTRODUCTION

Even in prehistoric times, man had close relation with molluscus. The mysterious creation of the nature from marine source fascinated man and with time the man attributed magical and mythical powers to shells and started crafting monuments. The excavation of Stone Age cultures found to contain heaps of discarded shells in kitchen. There exists evidence for the shell trade between Protohistoric Iran and Southern Asia [1]. Molluscus are the second largest invertebrate group which represents about 12% of the world's production and it is only next to insects which comprise about 3340 species out of which gastropods consist of 2449 species [2]. Molluscus constitute an important component of marine biodiversity of India on East, West coasts and Lakshadweep and Andaman and Nicobar Islands. It is estimated that number of molluscan species varies between 80,000 and 1, 00,000 [3]. There are five kinds of Molluscan species found in India. They are Polyplacophora, Gastropoda, Scaphopoda, Bivalvia, Cephalopoda. [4]. Gastropods are the largest class of the phylum Mollusk [5]. Gastropods comprise a major fishery resource and are commercially important around the world. The awareness on the biochemical composition of edible organisms thus becomes important [6].

Indian Sacred Chank called *Xancuspyrum* has lot of therapeutic benefits [7]. Institutes like National Institute of Oceanography in Goa, Central Drug Research Institute in Lucknow, Bose Institute of Oceanography in Kolkatta are concerned with development of marine medicinal products [8]. Any species is recommended for consumption only by assessing nutrient values [9]. Sea foods are rich in proteins. In

developing countries, the demand for protein-rich food is dramatically increasing and it arouses the searching of unexploited resources. Marine mollusks are such food important for marine ecology and human diet since it possesses important nutrients [10]. In animal tissues, the ratio of carbohydrate was less as compared with other nutrients like protein and lipid, particularly in aquatic organisms [11]. Lipids are the main source of metabolic energy and it plays a vital role in the formation of cell and tissue membranes [12]. So, the present study intends to analyze the biochemical content of *Xancuspyrum* in Tuticorin sea coast of Gulf of Mannar region.

## II. MATERIALS AND METHODS

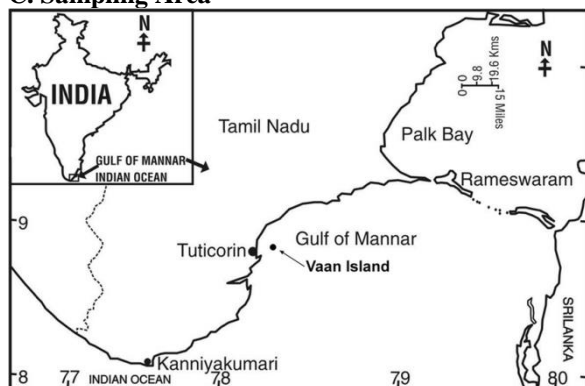
### A. Zoological Classification

Kingdom : Animalia  
Phylum : Mollusca  
Class : Gastropoda  
 : cladeCaenogastropoda  
(Unranked) : cladeHypsogastropoda  
 : cladeNeogastropoda  
Superfamily : Muricoidea  
Family : Turbinellidae  
Subfamily : Turbinellinae  
Genus : Turbinella  
Species : *T.pyrum*  
Binomial name : *Turbinellapyrum* Linnaeus, 1758  
Synonyms : *Buccinellacaerulea* Perry, 1811 and *Volutapyrum* (by Linnaeus).

### B. Sampling and Processing

Xancuspyrum were collected from trawl net by catch at the fish landing center of Tuticorin coast of the Gulf of Mannar region in September 2017. They were washed to remove impurities and dusts using distilled water and the outer shells were carefully removed and dissected out and dried in hot air oven at 40°C for 48h. The dried material was powdered, sieved and used for further analysis in triplicate to analyze the total protein, carbohydrate, lipid, ash and moisture contents.

### C. Sampling Area



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Gulf of Mannar is placed between India and Srilanka. It is broad range of coastal area from Dhanushkodi to Kanyakumari. It lies between 8°47' to 9°15' N latitude and 78°12' to 79°14' E longitude from Tuticorin to Rameswaram. Spread in an area of 10,500 sq km, it is bound by Palk Bay and Rameswaram Island in the north side; by Ramanathapuram district in the northwest and west; and by Tuticorin district in the south and by Bay of Bengal in the east. It comprises a chain of 21 islands along a stretch of 140 km between Rameswaram and Tuticorin, which are small and presently uninhabited. The Gulf of Mannar Biosphere Reserve is made up of a core area and a buffer zone. The core area comprises the 21 uninhabited islands ranging in size from 0.25 ha to 130 ha, lying one to four km off shore [13], [14], [15], [16]. These islands and their surrounding waters measuring a total of 560 sq.km has been notified as a National Park on 10th September 1986 under the Indian Wild Life (Protection) Act, 1972, Government of Tamilnadu, 1986. The buffer zone is comprised of the remaining Gulf waters to the south and an inhabited coastline to the north. Therefore the reserve is comprised of 560 km<sup>2</sup> core area of coastal islands and shallow marine habitat, surrounded by a 10Km wide, 160 km long buffer zone Government of Tamilnadu. Samples were collected from the sea coast of Tuticorin New Harbour of latitude 8° 45' 04' 'N and longitude 78° 11' 34" E.

### III. ESTIMATION OF BIOCHEMICAL PARAMETERS

#### A. Estimation of Protein

The fish freeze-dried material was re-suspended in distilled water and made up to the original volume. The fish samples were sonicated for 5 min, then analyzed for protein

concentration using the method of Lowry et al., (1951) [17] with BSA as a protein standard. Complete digestion of dried samples should be done. Liberated ammonia is distilled into 2 % boric acid, using bromocresol green methyl red as indicator. Crude protein was calculated by multiplying total nitrogen by factor 6.25 (for fish).

#### B. Determination of Carbohydrate

Carbohydrates were analyzed using the Anthrone method [18] and glucose as standard. Carbohydrate content was determined by calculation according to following equation:

Carbohydrate = 100 – (Protein content + Lipids content + Ash content).

#### C. Determination of Lipid

Lipids were extracted from the samples using chloroform: methanol (2:1); then subsamples were transferred to test tubes and evaporated to dryness. Total lipids were analyzed by the microanalytical method of Marsh and Winstein (1966) [19] with palmitic acid as standard. Dried samples (each about 2 g) were individually used for lipid extraction by chloroform as a solvent for 6 hours in a soxhlet apparatus at 65 °C. The extracted lipid was estimated by loss in weight before and after extraction of chloroform, and its percentage was calculated (A.O.A.C, 1980) [20].

#### D. Estimation of Water Content and Ash Content

The water content was estimated by subtracting the dry weight from the known wet weight of the sample [21]. Ash content was estimated by powdering 1g of tissue in porcelain crucible and kept in a muffle furnace at 60°C for 4 hours and weighed [22].

## IV. RESULTS

Protein is the indispensable component of life desired for the existence and it was expressed in %. It is found from the study that the Average Total protein content is around 37.91 % the carbohydrate content estimated in the Xancuspyrum is estimated to be 14.87 % on an average. The Total Lipid content is found to be 4.5% on an average. The ash content was expressed in percentage and it is found to be 0.89% in Xancuspyrum. The moisture content estimated is 82.57% in Xancuspyrum.

#### A. Figures and Tables

Table 1

Sl. No	Protein %	Lipid %	Carbohydrate %
	37.99	14.86	4.6
	37.89	14.89	4.5

	37.86	14.87	4.6
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Figure 1

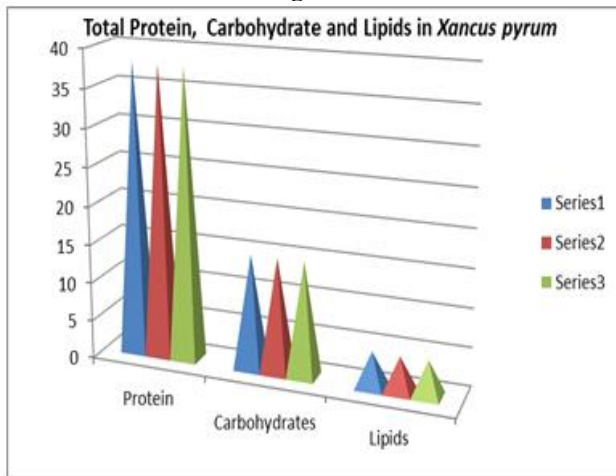
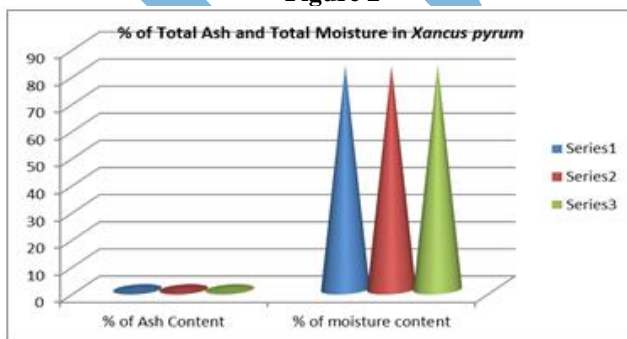


Table 2  
Total ash and Total Moisture in Xancuspyrum

Sl. No	% of Total Ash	% of Total Moisture
1	0.89	82.6
2	0.88	82.5
3	0.89	82.6

Figure 2



## DISCUSSION

The knowledge of the biochemical composition of any edible organisms is extremely important since the nutritive value is reflected in its biochemical contents [6]. Protein is essential for the sustenance of life and exists in largest quantity of all

nutrients as a component of the human body [23]. Seafood is important constituents of the human diet.

Proteins are important organic substances required by organisms in tissue building and play an important role in energy metabolism [24], [25], [26]. Protein is the basic building nutrient of any growing animal and usual account for (68-85) % of dry matter of most fish species [27]. Protein-deficiency increases in developing countries and this has resulted in the exploration of non-traditional resources [28]. The protein content in *Xancuspyrum* in the Tuticorin coastal region is estimated to be 37.9 mg/g. The study by Sekar [29] on proximate composition of *H.pugilinus* revealed that protein and lipid contents were high

The carbohydrate metabolism plays the important role in energy yielding process and its inhibition by the pesticides stress might lead to severe energy crisis at the cellular level. The carbohydrate content of *Xancuspyrum* in the present study is found to be 14.8 mg/g.

Lipids are major sources of metabolic energy and essential compounds for the formation of cell and tissue membranes. Lipids serve as energy depots for emergency when extra energy is needed. The Lipid content estimated is 4.57 mg/g in *Xancuspyrum*.

The total ash content was estimated and expressed in percentage and the value is 0.89% in *Xancuspyrum*. The present study confirms the study of Margret et al.,[21] that the total ash content of gastropods was very less which is about 1.18% in *B.zeylonica*. Govindarajalu Jayanthi et al.,[30] made a study on the biochemical composition of marine gastropods, namely, *Phaliumglaucum* (*P.glaucum*), *Tonnadolium*(*T.dolium*),*Hemifususpugilinus* (*H.pugilinus*), *B.spirata*, *X.pyrum*, *Chicoreusramosus* (*C.ramosus*), *Harpaarticularis* (*H.articularis*), *Ficusficus* (*F.ficus*) and *Babylonia zeylonica* (*B.zeylanica*) and found that *B.spirata* showed that the maximum values of protein, carbohydrate and lipid when compared with other gastropods.

The moisture content was observed to be 82.5% in *Xancuspyrum*. The gastropods had higher water content than the bivalves and the variation was not significant between the species of the same genus or between sexes [31].

The study by Khalua et al., [32] found that protein, carbohydrate and lipid were the maximum during pre-monsoon period than monsoon and post-monsoon periods. Hence a study on the variation in the biochemical contents of *Xancuspyrum* in the various seasons could be studied in-depth in future.

Earlier studies reported that marine mollusks reserve biochemical energy in the reproductive or somatic tissue for use when needed [33]. In the present study high values of

protein and other biochemical constituents were found in *Xancuspyrum* and hence it is recommended for human consumption owing to its nutritious values.

### CONCLUSION

The study has brought out the biochemical components in Indian Sacred Chank. The chank is used in variety of ways by people in Tamilnadu. Right from ornamental and religious values to medicinal values, the Indian Sacred Chank occupies a unique place in every Tamil home.

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