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Contents

Editorial Committee

News from the Research Front

Isolation and characterization of pharmacologically active lead compounds from marine Red algae, *Amphiroa anceps* (Lamark) Decaisne

Traditional medicines have been the starting point for the discovery of many important modern drugs. This has led to the screening of natural products and medicinal plants for pharmacologically active substances all over the world. In Indian ayurvedic medicine, marine algal extracts have been used for the treatment of various human ailments such as liver diseases, heart ailments, cancer, inflammatory disorders, etc. Oflate, isolation and characterization of bioactive compounds from marine sources has become one of the potential emerging fields in pharmacological research for the production of components of human healthcare importance. An attempt has been made in the Biochemistry & Nutrition Division of CIFT, Cochin to study the biochemical

Fig.1. Red algae (A. anceps)

केन्द्रीय मत्स्यकी प्रौद्योगिकी संस्थान
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Solar and sun dried Kiddi shrimp, Parapenaeopsis stylifera

Chloramphenicol Agar and sensitivity of the fungal isolates to NaCl was done by inoculating fungal colonies on Potato Dextrose Agar (0, 10, 14 and 18%).

Solar dried shrimps were sensorily more appealing as compared to traditional sun dried samples. There was a substantial reduction in the microbial load of dried shrimp samples as compared to the fresh samples. The total viable count (TVC) in fresh, sun dried and solar dried prawn was 2.4×10^5, 1.0×10^2 and 1.0×10^2, respectively. The TVC counts for sun and solar dried prawn samples were 2.6×10^2 and 1.29×10^2 and 2.0×10^3 and 1.25×10^3 after 1st and 2nd month of storage, respectively. The TFC was 1.65×10^1 and 1.4×10^1 and 1.0×10^2 and 2.1×10^2 for the 1st and 2nd month of storage, respectively. A slight increase in the levels of TVC and TFC was observed over a period of two months storage at room temperature but the counts were well within the permitted level. The solar dried prawn had better microbial quality as compared to the sun dried samples and could be attributed to faster drying rate when compared to traditional sun drying. The open exposure to environment in sun dried sample as well as atmospheric relative humidity also contributes to higher load in sun dried samples.

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Solar drying: An alternate drying method for quality improvement of squid rings

Squid is an important marine resource belonging to the group of cephalopods. They form one of the most important commercial fishery commodities in Gujarat coast, due to its abundant availability and for its nutritional and ecological significance. Indian squid, *Loligo duvauceli* contributes a major share to the cephalopod landings in India. An estimated squid landing in India during 2013 was 100,014 tonne (CMFRI, 2013). Fresh squid is highly perishable and the time to spoilage depends mainly on species, handling, processing and storage temperature. In India, squids are normally processed in frozen form. Although there exists improved freezing and cold storage facilities for providing fresh squid either in chilled or frozen form, a variety of dried and seasoned squid products are very popular in Japan and other south-east Asian countries. Sizeable quantity of squid is processed into these dried products annually in these countries. Traditionally, these are processed manually and sun dried.

Drying is a traditional method which has been used since long for fish preservation in many parts of the world. Drying helps in reducing the moisture content of the food to a level at which microbial spoilage and deterioration reactions are minimized, which allows safe storage over an extended period of time. Traditionally, drying is carried out in open air under direct sunlight, using the energy of the sun to evaporate the water and air currents to carry away the vapour. The major problems associated with open sun drying method are insect infestations, poor handling and improper processing which lead to contamination and spoilage. As a result, not only does the final product lack quality, but has to be sold at the lowest price in the market. To improve the quality of the dried products, various types of drying techniques have been developed. CIFT has designed different types of solar dryers varying from very

Solar and sun dried squid rings

simple direct dryers to more complex hybrid ones for hygienic drying of fish. One of the hybrid solar dryer developed has electricity as alternate back up heating source for continuous hygienic drying of fish even under unfavourable weather conditions. Solar energy is effectively harnessed using specially designed solar air heating panels and proper circulation of the hot air across the stainless steel trays loaded with fish with the help of blowers makes the drying process faster. The present study is aimed to develop a hygienic squid drying method which can be adopted by the entrepreneurs to tap the dry squid export market in Japan and other south-east Asian countries.

Fresh Indian squid (*Loligo duvauceli*), procured from Veraval fishing harbour was brought to the laboratory in thermocol boxes in iced condition. The samples were washed and the head, viscera and fins were removed. The skin was also removed from the mantle and the squid is cut into rings. One batch of rings was dried in a raised platform under direct sunlight for 9 h for four days and another batch was dried in solar dryer continuously till the moisture content reached 24%. Various biochemical and microbiological quality attributes were compared between solar and traditional sun dried squid.

Proximate composition of the sun dried and solar dried squid rings

Attributes	Fresh squid	Sun dried	Solar dried
Moisture (%)	82	24	24
Crude Protein (%)	15.68	65.00	66.40
Ash (%)	1.1	5.6	4.4
Crude Fat (%)	0.86	4.8	5.1

Biochemical and microbiological quality of squid rings

Parameters	Fresh Squid	Sun dried	Solar dried
TVBN (mg %)	10.69	29.00	24.00
TBA (mg malonaldehyde per kg)	0.312	1.8	1.2
pH	6.5	5.9	6.1
Mesophilic Count (log cfu/g)	2.67	4.54	3.12
Rehydration (%)	-	55	61

Fresh squid had a moisture content of 82%, crude protein content of 15.68%, lipid content of 0.86% and ash content of 1.1%. The moisture content was reduced to 24% in 36 h in sun dried samples and in 12 h in solar dried samples. Compared to open sun drying, moisture reduction was three times faster in solar drying. Initial bacterial count of the fresh sample was 2.67 log cfu g^{-1}. The total bacterial count in both sun and solar dried samples increased but was within the acceptable limit. The increase was higher in sun dried samples (4.54 log cfu g^{-1}) compared to solar dried samples (3.12 log cfu g^{-1}). This difference in the bacterial count of solar dried squid rings could be attributed to the continuous drying with the help of alternate electricity back-up heating system which enables the continuous drying even under unfavourable weather conditions. Apart from this, the contamination from pest, sand etc. was also avoided in solar drying process unlike open sun drying method. pH value of fresh squid was 6.5 which dropped to 5.9 and 6.1 in sun and solar dried squid rings. TVBN values of the sun dried samples were more than solar dried samples. TBA value of both sun and solar dried squid rings were within the acceptable limit of 2 mg malonaldehyde per kg of sample. Sensory score of the solar dried squid was higher than the sun dried squid samples especially for texture, colour and appearance. Values of other quality indicators such as shrinkage, colour, rehydration ratio etc. were also better for the solar dried squid samples. In the present study, rehydration capacity of solar dried sample was 6% more than sun dried squid rings which shows that squid rings dried using solar dryer were able to hold more water and rehydrated more rapidly compared to sun dried samples. So, drying in solar dryer not only reduced the time taken for drying the squid ring samples, but also improved the quality of the sample considerably.

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