



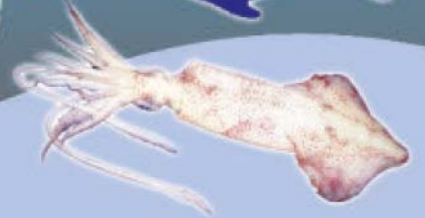
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CIFT Dryer JSDE - 6 SM - A Hybrid Solar Dryer with Alternate Electrical Back-up for Hygienic Preservation of Fish and Agro-products

The fisheries field has emerged as a promising sector which provides food, employment and economic benefits for large sections of the society. It is a source of livelihood for about 15 million people engaged fully, partially or in subsidiary activities pertaining to the sector. Besides an equal number are engaged in ancillary activities in fisheries and aquaculture.

Total fish production in India in 2009-2010 was 7.85 million tonnes comprising of 4.87 million tonnes from inland and 2.98 million tonnes from marine sector. The exports of fish and fish products have also shown steady growth during 2009-10. About 15% of the marine catch is processed and exported to nearly 100 countries as per reports from MPEDA, Cochin. The remaining 85%



CIFT DRYER JSDE - 6 SM



of the fish is available for domestic consumption along the coastal states. The contribution of fisheries to the GDP during 2009-10 was 0.8%.

Due to lack of infrastructure for storage of raw fish and modern transport facilities to different destinations, huge quantity of fish is not properly treated resulting in huge loss. Moreover due to the lack of appropriate facilities to handle the low value fish on land, it is understood that more than 10% of the total landings valued at about ₹ 600 crores worth is thrown back into the sea by fishermen before landing. Out of the landed fish about 50,000 tons of wet fish is dried by various methods in different locations.

India has been exporting about 9690 tons of dried fish every year taking the advantage of the tropical temperature throughout the country for most of the seasons. If the moisture content of fresh fish is reduced during drying to around 25%, bacteria cannot survive and autolytic activity will be greatly reduced. But to prevent mould growth, the moisture content must be reduced to 15%. At present, dried fish available for export and at domestic market is dried mostly on the sandy beaches in the most unhygienic conditions.

Traditional methods of drying fish in the open sun is hazardous as the product is vulnerable to contamination by sand, bacteria and fungus. Often, spoilage of fish takes place due to rain, moisture and dust, insect infestation and damage is caused by intruding birds and animals. Further, the process is labour intensive and time consuming and requires large areas for spreading the fish. In situations, where relative humidity is high, it is often difficult to dry the fish adequately.

When fish is not dried in the most appropriate manner, there will be good number of associated quality problems like high sand content, formation of chalky external coat, high moisture content, microbial contamination, growth of moulds and fungus etc. Simple sun drying is the oldest method of sea food preservation and it works well with small types of fishes. But sun drying is not effective in the case of medium and large sized fishes like mackerel, seer, shark, ray, tuna etc. since the flesh is thick and it takes longer time to get dried up to the required level of moisture content and at the same time with no control over weather. The open sun drying being followed leads to uncontrolled drying with many disadvantages such as loss of nutritional value, colour and quality. Further, rain, insects and enzymatic reaction may cause problems. Non-uniformity or insufficient drying lead to deterioration of the fish during storage.

Sun drying on platforms and rack drying are practiced to reduce contamination by sand but the major disadvantage in these type of drying techniques is that proper drying is not possible in adverse weather conditions, leading to spoilage of fish. Mechanical dryers were used to overcome

these issues. Mechanical dryers using electricity or fossil fuels such as diesel oil and furnace oil, as the energy sources are available, but they are very energy intensive and also produce CO₂ emission.

Alternative energy sources are coming into sharp focus in an era of escalating fuel prices. It is against this background that solar energy is gaining attention as a potential source for drying. Different types of solar dryers have been designed and developed in various parts of the world, yielding varying degrees of technical performance.

When the sun shines so brightly for a good part of the year in a tropical country like India, tapping this energy is the best option man has for conserving conventional sources of energy. Solar heating system is the most viable option as it is cost effective and eco-friendly. Different types of solar dryers have been designed and developed by CIFT for hygienic drying of fish. Designs of solar dryer vary from very simple direct dryers to more complex hybrid ones.

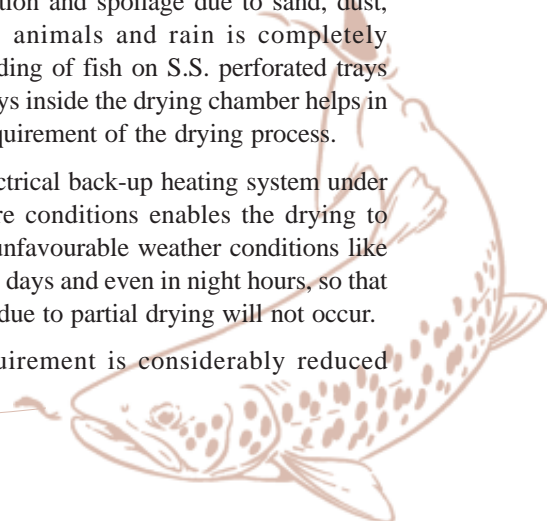
The newly developed hybrid solar dryer is having LPG, biogas, biomass or electricity as alternate back up heating source for continuous hygienic drying of fish even under unfavourable weather conditions. The capacity of the hybrid solar dryer varies from 6 sq. m to 110 sq. m tray spreading area for drying fish.

The hybrid Solar Dryer "CIFT DRYER JSDE-6 SM" is having a Stainless Steel (SS) tray drying area of 6 sq. m with an alternate electrical back up heating system. Effective harnessing of solar energy using specially designed solar air heating panels and proper circulation of the hot air across the SS trays loaded with fish with the help of blowers makes the drying process faster.

The drying chamber is made of stainless sheets on both sides with PUF insulation in between to reduce the wastage of thermal energy during the drying process. Food grade stainless steel perforated trays provided inside the S.S. drying chamber enables drying of fish in a very hygienic manner. Since all the food contact parts are made of S.S. 304 stainless steel, harmful effect of corrosion is considerably reduced. The complete fish drying process is taking place inside a closed S.S. drying chamber and the chances of contamination and spoilage due to sand, dust, flies, insects, birds, animals and rain is completely eliminated. The spreading of fish on S.S. perforated trays and stacking of the trays inside the drying chamber helps in reducing the space requirement of the drying process.

The alternate electrical back-up heating system under controlled temperature conditions enables the drying to continue even under unfavourable weather conditions like rain, cloud, non-sunny days and even in night hours, so that the bacterial spoilage due to partial drying will not occur.

The labour requirement is considerably reduced





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compared to open sun drying in beaches/coir mats because of the elimination of cleaning process due to sand and dust contamination. Re-handling process like spreading, sorting and storing because of non-drying or partial drying due to unfavourable weather conditions and spoilage due to rain is

also not required. The drying time is reduced considerably with improved product quality. This will ensure quality products eliminating the disadvantages of open sun drying followed in coastal villages. Improved shelf life and value addition of the product fetches higher income for the fisher folk. The eco-friendly solar drying system reduces fuel consumption and can have a significant impact on energy conservation.

Recently Shri Tony Chammany, Honourable Mayor of Cochin Corporation inaugurated a unit of the Hybrid Solar Dryer with alternate electrical back-up heating system installed at Matsyasree Fish Processing Centre, Fishermen Colony, West Kochi under the CDS and SJSRY programmes with the technical support from CIFT, Cochin on 9 July 2011.



Shri Tony Chammany inaugurating the Hybrid Solar Dryer

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