

Drying and quality characteristics of various fish in hot-air assisted continuous infrared dryer

Parameters	Shrimp	Anchovy	Clam	Marinated anchovy
Drying time (h)	3	2.5	3.5	3
Final moisture content (%)	14.42	11.61	14.80	13.51
Drying efficiency (%)	18.63	16.57	43.21	13.26
Total colour change (ΔE)	17.81	7.25	21.05	10.63
Shrinkage (%)	11.85	12.37	17.1	27.33
Rehydration ratio	2.42	2.38	1.55	1.60
Water activity	0.63	0.61	0.64	0.62

- » Economic analysis was carried out for the shrimp drying under pilot-scale hot air assisted continuous infrared dryer.
- » The benefit-cost ratio was found to be 3.50 which indicate that the developed dryer is economically viable to prepare 20 kg of dried shrimp/day.
- » Payback period of 0.52 years which indicates the cost-effectiveness of the dryer.
- » This dryer can be used for the production of high-quality dried fish and fishery products with economical viability and it is suitable for commercial scale continuous production.



(a) (b) (c)

Clam (a) Fresh (b) Dried in hot-air assisted IR dryer (c) Rehydrated

- » The dryer can also be used for drying of agricultural commodities requiring shorter drying time and maximum colour and nutrition retention.

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HOT AIR-ASSISTED CONTINUOUS INFRARED DRYER

For quick and quality drying



भाषेअनुप
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HOT AIR-ASSISTED CONTINUOUS INFRARED DRYER

Fish, a highly perishable commodity, is susceptible to spoilage soon after harvest. Drying of fish is an important strategy adopted towards reducing the post-harvest loss. However, the existing drying systems are having the following disadvantages:

- Non-uniformity in drying
- Inferior product quality
- Prolonged drying

Infrared drying is a new and advanced technique that increases the drying rate, reduces the drying time, and also enhances the product quality with minimum energy consumption and less nutrient losses than the conventional dryers.

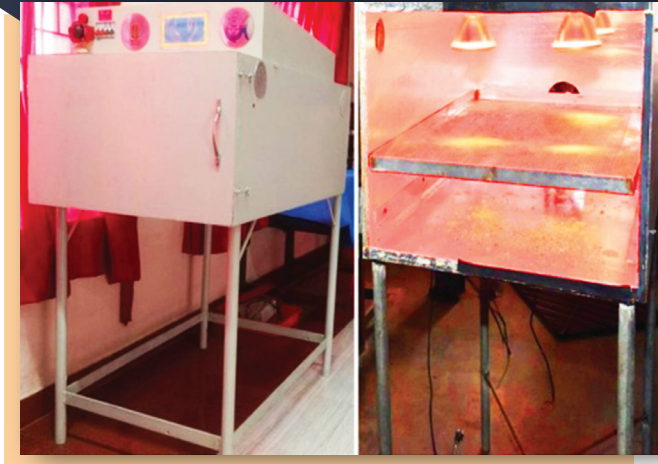
IR and hot-air drying combination is an innovative method which offers many benefits over the traditional drying methods such as:

- Reduced drying time
- Reduced energy usage
- Improved product quality

Thus, hot air-assisted continuous infrared dryers of batch type and pilot scale were fabricated which find multitude of applications in processing of fish and fishery products.

Hot-air assisted infrared dryer – batch type:

A batch type infrared dryer of 5 kg capacity has been designed and developed for efficient drying of fishes. This dryer contains a drying chamber, trays, infrared lamps, electrical control unit and axial flow fan.



Pilot scale hot-air assisted continuous infrared dryer:

The major components of the pilot scale IR dryer are belt conveyor, infrared heating source, hot air generation unit, power transmission unit, feed hopper, discharge chute, and control panel. The hot air-assisted continuous infrared dryer was found best for drying of shrimp, anchovy, clam and squid rings with substantial energy savings, shorter drying time and superior quality of product compared to commercially available convective dryers.



Dried shrimp



Dried anchovy