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Dry fish v/s smoked fish

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Abstract
Ancient methods of preserving fish included drying, salting, pickling and smoking. All of these techniques are still used today but the more modern techniques of freezing and canning have taken on a large importance.Fish curing includes and of curing fish by drying, salting, smoking, and pickling, or by combinations of these processes have been employed since ancient times. On sailing vessels fish were usually salted down immediately to prevent spoilage; the swifter boats of today commonly bring in unsalted fish. Modern freezing and canning methods have largely supplanted older methods of preservation. Fish to be cured are usually first cleaned, scaled, and eviscerated. Fish are salted by packing them between layers of salt or by immersion in brine. The fish most extensively salted are cod, herring, mackerel, and haddock. Smoking preserves fish by drying, by deposition of creosote ingredients, and, when the fish are near the source of heat, by heat penetration. Herring and haddock (finnanhaddie) are commonly smoked. Kippers are split herring, and bloaters are whole herring, salted and smoked. Sardines, pilchards, and anchovies are small fish of the herring family, often salted and smoked and then preserved in oil. Fish are dried under controlled conditions of temperature, humidity, and air velocity. Since the dried product is relatively unappetizing and rehydrating slow, other preservation methods are common.

Keywords: drying, smoking, preservation, temperature, curing

Introduction
Smoked fish is fish that has been cured by smoking. Foods have been smoked by humans throughout history. Originally this was done as a preservative (Mitto 2001) [9]. In more recent times ish is readily preserved by refrigeration and freezing and the smoking of fish is generally done for the unique taste and flavor imparted by the smoking process (Vainio *et al.*, 2001) [17].The process of smoking fish occurs through the use of fire. Wood contains three major components that are broken down in the burning process to form smoke (Gliick *et al.*, 2000) [6]. The burning process is called pyrolysis, which is simply defined as the chemical decomposition by heat. The major wood components are cellulose, hemicellulose and lignin. The major steps in the preparation of smoked fish are salting (bath or injection of liquid brine or dry salt mixture), cold smoking, cooling, packaging (air/vacuum or modified), and storage. Smoking, one of the oldest preservation methods, combines the effects of salting, drying, heating and smoking. Typical smoking of fish is either cold (28–32°C) or hots (70–80°C). Cold smoking does not cook the flesh, coagulate the proteins, inactivate food spoilage enzymes, or eliminate the food pathogens, and hence refrigerated storage is necessary until consumption although dry cured hams are cold smoked and requires no refrigeration (Gordts *et al.*, 2000) [5]. Fresh fish rapidly deteriorates unless some way can be found to preserve it. Drying is a method of food preservation that works by removing water from the food, which inhibits the growth of microorganisms (Garrett *et al.*, 2001) [4]. Open air drying using sun and wind has been practiced since ancient times to preserve food. Water is usually removed by evaporation (air drying, sun drying, smoking or wind drying) but, in the case of freeze-drying, food is first frozen and then the water is removed by sublimation. Bacteria, yeasts and molds need the water in the food to grow, and drying effectively prevents them from surviving in the food. Fish are preserved through such traditional methods as drying, smoking and salting (Richardson 1988) [12]. The oldest traditional way of preserving fish was to let the wind and sundry it. Drying food is the world's oldest known preservation method, and dried fish has a storage life of several years. The method is cheap and effective in suitable climates; the work can be done by the fisherman and family, and the resulting product is easily transported to market.

Commercially used fish varieties in India
This is a list of aquatic animals that are harvested commercially in the greatest amounts, listed in order of tonnage per year (2012) by the Food and Agriculture Organization. Species listed here have an annual tonnage in excess of 1,600,000 tonnes.
This table includes mainly fish, but also listed are crabs, shrimp, squid, bivalves, and a soft shell turtle.
Note that *Oreochromis niloticus* and *Penaeus monodon* appear twice, because substantial amounts are harvested from the wild as well as being extensively raised through aquaculture.

Method of drying
Drying Very small and thin fish can be dried straight away in the sun if they are brought in early enough in the morning (and if, of course, the sun is shining). If these conditions are

not fulfilled the fish must be put for one night in brine, or dry salted. They can then be dried the next morning. If it happens to be raining the next day, it is necessary to wait until the weather has cleared up, which could take from a few hours to a couple of days (Ylikoski *et al.,* 1989) [16]. In this latter case it will be necessary to wash the salt away from the fish by soaking it in fresh or sea water for a couple of hours before drying it; this depends again on the tastes of the consumers and on the purpose for which the fish is cured. Small fish are mostly sun dried on mats, or suspended. When it rains the fish must be kept dry by covering or transferring them under shelter (Usenius *et al.,* 1987) [13]. If fish are laid on mats or other material to dry, it is best to turn them over every two hours so that they will dry quickly and not become maggoty. In the case of large fish, hanging is better if they are merely split (Klossek *et al.,* 1996) [7]. Dry salted fish can also be dried, but they should first be cleaned in water. Normally the fish will be dried after three days. If a great quantity of fish has been dried and is to be kept for some time, the best way is to pile it up in a dark place, off the ground and preferably on wooden boards. It should then be covered with a sack or mat (Benningere *et al.,* 1999) [1]. After a fortnight the fish should again be laid in the sun for one or two hours and then put away as before. These are only indications of the main principles of fish drying; variations are possible.

Methods of Smoking

Any kind of fish can be smoked. There are three main methods of smoking:

a. Smoking and roasting
b. Hot smoking
c. Long smoking

Smoking and Roasting

This is a simple method of preservation, for consumption either directly after curing or within twelve hours. Re-smoking and roasting can keep the product in good condition for a further twelve hours. Fresh unsalted fish is put over a wood or coconut husk fire. This should be kept very small and the fish turned over every five minutes (Refi *et al.,* 1998) [11]. In about half an hour the fish is ready for consumption or, if it is the intention to keep it for a while, it should be put in an aerated container. Fish can be preserved in this way even in open fishing boats, but the smoking has to be done in a tin or a half-drum. Salted fish can also be smoked by this method, but this is used mostly for immediate consumption or in order to bring the produce in smoked form to a nearby market.

Hot Smoking

The hot smoking system can be used for immediate consumption or to keep the fish for a maximum of 48 hours. Small fish can be salted first for half an hour (see wet salting). After salting they are put on iron spits and dried in a windy place or in the sun for another half hour. It is necessary to have an oil drum to make the smoking stove (Durmaz *et al.,* 2001) [3]. The top of the drum is cut out and holes are made 8 inches below the rim to place spits. Near the bottom a rectangular opening is made to control the fire. This opening should be closed with a small door or piece of steel plate. A fire of hardwood or coconut husks is made in the stove, and once it is well started it is regulated so as to give no flames. The fish are then placed over the spits. During the smoking operations the top of the drum must be covered with a sack or with palm fronds laid as close together as possible; the fire control opening should also be closed. The fire must be watched from time to time. The fish will be ready in about one hour. An indication that they are done will be found in the golden yellow colour of the skin. For big fish, l to 2 feet long, the best method is to split them in halves, to the right and left of the backbone. Each half fish is fixed between two flat bamboo slats or sticks. These halves are then rested head down on racks built four feet above ground (Christen 1992)[2]. A number of split fish can be lined up next to each other. A fire of hardwood or coconut husks, or several separate fires, is then lit under the rack. The number of fires depends on the quantity of fish one has to smoke. There should be a slow fire for about half an hour followed by a brisk one for one hour. A small fire is then kept going for six hours (just smoking). After this treatment the fish is ready for transport and will keep in good condition for two to three days under tropical conditions (Wilson *et al.,* 1990) [15]. This method is used in particular in the Celebes for skipjack and other tunas.

Long Smoking

If fish must be kept in good condition for a long time, for instance, two or three months or even longer, it can be done by smoking, provided the fish is not oily. For this purpose, a small closed shed made of palm leaves or other local material can be used. The dimensions of the shed depend, of course, on the quantities of fish to be smoked, but the height should in no case be less than six feet. In this shed, racks are built to hang the fish from or to lay them upon. Hanging the fish on spits is the best method, but they can also be laid on loosely-woven matting. One can start hanging fish three feet from the bottom up to the roof (Nicotra *et al.,* 1991) [10]. The preservation of fish is effected by smoke only in this method, and it is best to use coconut husks which should burn very slowly so that the fish is drysmoked after 48 hours. After such a treatment the flesh is dried throughout. If it is necessary to transport these fish to other islands, they should be packed in small packages wrapped in dry leaves and reinforced with bamboo or sticks (Manninen *et al.,* 1991) [8]. In Eastern Indonesia, packages of smoked fish are sent over great distances; these are mainly garfish.

Benefits of dry fish

Asthma: it is observed that those children who eat fish regularly are less likely to develop asthma.

Brain and eyes: Omega-3 fish oil found in the body of the fish can contribute to the health of the developing brain tissue in the pre-natal and post-natal periods, among babies.

Omega-3 also contributes to the health of the retina, the light sensitive lining on the inner surface of the back of the eye.

Cancer: Omega-3 fish oil may reduce the risk of many types of cancers, especially oral, esophageal, and breast, ovarian and prostate cancers.

Dementia: It is observed that when old people eat more fish, their chances of getting depression and dementia, including Alzheimer's disease are much less, including cognitive decline. In one study it was found that suicidal risk and

aggression was much less when fish was fed to prison inmates.

Diabetes: Fish may help people with diabetes to reduce blood sugar levels. It is a good substitute to eat as a full meal without adding high GI foods like rice and bread.

Inflammatory conditions: Regular fish eating is supposed to bring down the symptoms of inflammatory diseases in the body, such as rheumatic arthritis, psoriasis and autoimmune diseases. This is mainly due to the anti-inflammatory benefits of omega-3 fish oil.

Heart disease and stroke: It is found that eating fish or seafood at least twice a week may lower the risk of heart disease and stroke by reducing blood clots and inflammation, improving blood vessel elasticity and lowering blood pressure, lowering blood fats and increasing 'good' cholesterol.

Dry fish hazardous of health

Though dry fish is a popular delicacy across the country, its consumption is hazardous to human health as the preservative used to keep the fish dry is highly toxic. Dry fish traders at Kharinasi, Ramnagar and Paradip at the Bay of Bengal widely use the preservative to keep the fish dry for longer for export to states like West Bengal, Assam and Chattishgarh. Test of samples of a particular class of preservative used in processing dry fish in a Bhubaneswar-based regional research laboratory found substances of Formalin De-Hyde which is often used to preserve the human body.

Benefits of smoked fish

The United States Department of Agriculture classifies peanut butter as part of the oil food group, due to the nuts' high fat content, as well as the protein food group. Women should consume 5 to 6 teaspoons of oils daily and 5 to 5.5 ounce equivalents of protein, while men need 6 to 7 teaspoons of oil and 5.5 to 6.5 ounce equivalents of protein. Each 2-tablespoon serving of peanut butter counts as 4 teaspoons of oil and 2 ounce equivalents of protein, contributing significantly to your fat and protein for the day. Peanut butter also contains essential nutrients, which can benefit your health.

Smoked fish hazardous of health

Smoking your meat gives it a mouthwatering flavor. The smoke behind this flavor, however, comes with its own health risks, and over-indulging in smoked meat can cause unwanted effects on your health. It is possible to avoid these hazards by reducing the amount of smoked meat you consume.

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