

Preservation of Foods.

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Preservation of Foods.

The experiments, long ago, by Tyndall and Pasteur made it clear that fermentation and putrefaction are biological processes, the result of vital activities of living organisms, and not chemical action as hitherto been supposed. Like all living beings the micro-organisms of fermentation and putrefaction require conditions of temperature, moisture and food supply for the exercise of their vital activities. When we dry fruit by means of the evaporator, we simply prevent the action of ferment germs by cutting them off from needed moisture; in freezing meats the temperature is made too low for the existence of these agents of destruction; and in canning we by the aid of heat drive out the germs, and keep them out by hermetically sealing the cans.

Since putrefactive fermentation requires germs, moisture, and warmth for its progress, the decay of food substances may be pre-

vented —

- ① By subjecting them to extremes of temperature; to freezing, so that germs cannot grow; or, to heat equal or to above that of boiling water, so that the germs are killed.
- ② By the exclusion of germ-laden air as in canning or bottling, or by coating the sterile substances with an impervious layer. Cotton and paraffin are successfully used for the last.
- ③ By removal of moisture, as in drying meats and fruits; and also vegetables — so prepared for soups.
- ④ By cooking in concentrated sugar syrup, as in preserves. This combines the removal of moisture with an impervious coating.
- ⑤ By the application of antiseptics; such as salt and smoke for meats; brandy, vinegar, etc., for fruits; borax and salicylic acid for various substances. These

preparations cannot be as healthful, even if the antiseptic has no direct influence upon the digestive organs, and should be used sparingly.

Consequently as bacteria require for their growth, warmth, air and moisture by eliminating even only one of these conditions bacterial life can be destroyed.

We need to know how foods may be kept in store for it is impossible to always have foods in the fresh state the year round. The dietary would not only be monotonous but also deficient in value if the foods were only had in their proper seasons of growing. We can practically say meat may be had any time of the year but the animal foods causes the formation of uric acid in the blood and this is the basis of such diseases as gout, and rheumatism. By

the addition of fruits to the dietary the blood is reinforced to withstand attacks of acidity for the organic acids of fruits causes alkalinity of the blood; its normal chemical reaction. Fruits also stimulate the liver; are cooling, fruit juices extensively used for such in sickness. They aid in furnishing water to the body. Different fruits have different action so again the need of having a variety in the food supply. Fruits are antiscorbutic. Some, as pineapple, help in the digestion of proteids. Fruits are the purest of foods being the nearest free of adulteration.

Vegetables contain organic acids and like the fruits produce salts that causes alkalinity of the blood. A very important feature of vegetables in the diet is the bulky residue sent into the intestines, a fact well to know as such a condition is desired in case of constipation.

Vegetables also tend to prevent scurvy. And lastly are of such a variety that one need not tire of cooking, or of a sameness in the meals.

I will not speak of meats other than their requirements as assisting so largely in supplying the demand for proteid. Meat is one of the best sources of building material for the body, but it cannot be regarded as constituting in itself anything like a perfect food.

There are four means of preservation, -
by Drying.

Exclusion of air.

Cold.

Use of antiseptics.

In the case of peaches, apples and apricots, the fruit has a fresher and more appetizing appearance when dried in the evaporators; and its commercial value is, therefore, greater. When dry-

ing fruit it is important not only that it shall be sound and of good quality but also that it shall be quickly and thoroughly dried. When all moisture is expelled it will keep for years in a dry place.

Another method of drying is to cook the fruit a long time, reducing it as nearly as possible to a paste, spreading this in a thin sheet, and drying in the sun by evaporation. The most primitive method of preserving food was by drying the raw article in the sun and air, and is still practiced to a great extent.

Artificial methods are now used but the sun develops in some fruits a flavor which is lacking when artificial heat is used.

A third process of drying is to cook the fruit for a long time with sugar and water and then partially

dry it. In this case the sugar is largely the preservative agent. With close packing in boxes or jars the fruit will keep well in any climate.

The more modern process for preserving and by far the most healthful is that of canning. The destruction of germs and the exclusion of air are the principles upon which canning is based. The article to be preserved is cooked for a short time, and is then put in jars from which the air has been expelled by heating them to the boiling-point. They are then sealed, and when cold, set in a cool, dark place. Some fruits can be canned without heat or sugar. The jar should be packed full of fruit and submerged in a bucket of water or placed under a faucet having the water run in rapidly for a minute, that all the air may

be displaced; then seal and put away in a cool, dark place. Rhubarb, goose-berries and some kinds of plums keep well in this manner. To be successful in the canning process certain things are essential. First, the fruit must be sound. It is false economy to purchase fruits on the verge of decay, even at very reduced rates, as they quickly ferment after canning and not only fruit lost but labor and often jars as well. Next, every utensil used must be absolutely clean; again the cans must be air-tight; finally the cans and fruit must be made free from germs and air before sealing, and the canned fruit must be kept in a dark, cool, dry place. All fruits may be canned with or without sugar as the sugar takes no part in the preservation. For flavoring

ice-creams and water-ices it is desirable to can the fruit without sugar. Some of the small fruits retain their shape more perfectly if sugared an hour or so before cooking.

Fresh fruits have been kept nicely by the following process. - Fill tin canisters that have been carefully and tightly made. Best size 7-5 inches and all uniform cylinders. Place tin lids on and solder down very carefully. Leave a small hole about size of a pin in top of lid to let out all of the air which is accomplished by setting these canisters in a basin of water, let heated till water comes to a temperature of 200° Fahr..

To know if all air has been expelled test by putting a drop or two of water on small hole and as soon as bubbles cease rising through these

drops you may be assured the air is entirely out. Wipe, and seal hole with solder. Have fruit either peaches, plums, straw-berries, etc., just ripe but not past the mature stage. They are not injured in the least by the heating, and will keep two years.

Driving out the air prevents decay. The season of fresh fruits may be greatly lengthened by taking a number of precautions of which I mention careful handling when picking; wrapping each fruit in paper to keep out sunlight and air to a great extent; again, keep in a cool and dry place. The numerous cares and anxieties of the cultivator do not cease until the fruit is gathered and stored in the manner most suitable to bring out its best qualities and render it fit for use.

The conditions for keeping fruit

well are a dry atmosphere, a cool, steady temperature, and darkness. To insure these as far as possible, the house should be placed in a dry, airy situation, and its outer walls contrived so that the air freely circulates around them - this will render temperature cool and equable. A free circulation of air is also indispensable under the floor; or the floor should be made impervious to moisture. While ventilation is attended to the doors and windows should fit closely so as to exclude frost; double doors are a great advantage in preventing a too great ingress of air. The light should be excluded by means of blinds or shutters, as it is an established fact that fruit keeps better in darkness. Various methods have been recommended to absorb the superfluous moisture generated in fruit

rooms. The following is considered good: -

Place a layer of gypsum in a wooden trough lined with lead. This substance will absorb a vast amount of moisture from the atmosphere, and as it liquifies may be received in a jar placed below the trough, then removed, water evaporated and gypsum left again fit for use. It is a non-effluent agent so fruit will not acquire an unpleasant taste as for instance from chloride of lime.

To preserve, use equal quantities of fruit and sugar, and cook sufficiently long to keep fruit without being hermetically sealed, or cook a shorter length of time and seal in jars as in canning. The fruit would not taste so strong by the latter method. Most any of the fruits in this part

of the country can be preserved if not kept in fresh state. Along with this subject the rind of a ripe water-melon is splendid either in preserves or pickles. Another means of saving some of the fruit is in making jelly. Use equal quantities of sugar and fairly rich juice, boil rapidly till starts to thread. Can be kept nicely without sealing other than putting paper or paraffin wax on as a covering.

Meat is a form of food which requires very little expenditure of force for its assimilation, since that work was done by the animal when living, and man avails himself of it. Rightly used, it forms a valuable addition to man's diet.

In order to kill all parasites, meat should be thoroughly cooked, and for this boiling is safer than

roasting. It is of course the most desirable to import meat in its fresh state, both that its nutritive qualities may be retained, and that its flavor and appearance may compare favorably with those of the meat produced at home.

But not being possible to get a sufficient supply from countries so near as to be brought in sound state without some process of preservation, and hence problem to be solved is what is the best method of preserving. There are several ways, i. e.,

Smoking,

Salting,

By Pressure,

And use of Antiseptics.

Bacteria cannot exist in a salty media and meat keeps well that way. Salt is an antiseptic, that is why we

use it. Smoking meat is also the use of antiseptic, i. e., creosote. The flavor of meat is fine. Would not withstand excess of moisture.

The process by pressure is not commonly practiced. Idea is to expel the moisture and meats thus are only good in making a body for soups. Meat keeps quite well cooked and canned, and other than use of animals in poor conditions, we need not object to its quality.

Now if all the fermentations are due to the growth of bacteria we have only to keep them out of the milk to prevent it. Sterilizing by boiling is not complete sterilization but milk can be kept many hours longer. Pasteurization consists in heating the milk for a few minutes to a temperature of about 155° Fahr.

then rapidly cooling it. It is found that nearly all, if not quite all, of the pathogenic disease germs which are likely to occur in milk, are killed by pasteurization.

A cooling of milk immediately after it is drawn from the cow is of the greatest assistance in delaying the fermentation; and is probably the most practical method which can be recommended according to the present state of our knowledge. The rapid cooling would leave a limited time when milk would be warm enough to allow the growth and multiplication of bacteria, therefore their work would be greatly retarded. Preservatives such as formalin are used and cause milk to keep a long time but are prohibited by law in many places.

Condensed milk keeps because it is evaporated until thick and then canned. At the present time the canning principle is applied to most every article of food of a perishable nature and takes in vegetables on an extensive scale. Baked beans, shelled beans and string beans, peas, corn, tomatoes, sweet-potatoes and beets. This is a good method to preserve vegetables if long distance transportation is necessary, and the only way peas can be kept for future use.

Corn and beans are reserved in the dry state. The class of vegetables under the head of tubers may be kept throughout ordinary winters by storing, in natural state, in cellars or caves, or by burying in the ground. Vegetable caves are most desirable and successful but rather expensive for ordinary purposes.

The principles of cold storage depends upon the circulation of dry, cold, fresh air at a uniform temperature. The heated or warm air rises; the cold being heavier falls. For these reasons it is necessary to have the source of cold above as is done in all cases of cold storage from the great plants of our large cities down to the simplest refrigerator in our kitchen.

Tomatoes have been kept fresh till late in the winter by carefully wrapping each in paper and further aided in keeping away from the sunlight by placing in a dark place. Tomatoes canned in glass jars should be kept dark by wrapping paper around them.

General Remarks.

"Swells" in canned goods is caused by the presence of bacteria.

that are capable of fermenting sugar solutions with production of considerable quantities of gas. This gas accumulation causes a bulging of the cans. This is most common among vegetables. As vegetables will not retain solid, firm form when cooked exceedingly long, they need only be cooked or heated in cans the ordinary time but make the change in raising the temperature higher. This insures destruction of germs in vegetables with no injury to appearance or taste.

Quoted from Mrs. Ellen H. Richards -
"In my opinion given after well weighing all evidences hitherto forthcoming, the public have not the faintest cause for alarm respecting the occurrence of tin, lead, or any other metal, in canned goods. An enormous quantity would have to be

eaten at one time to get enough of the metal to induce poisoning. If persons are unwise enough to let the food remain long in an opened tin can, they almost deserve to be punished by the metallic flavor which may be imparted to the food."

Vapor of alcohol in a closed space will prevent, more or less, the growth of fungi and bacteria which hasten decay. In several thorough experiments it has been found that grapes will keep thus for several weeks. Straw-berries for three or four days but the fleshier fruits absorb enough alcohol to make them disagreeable to the taste.

Many people have experimented with tying cotton over the boiled fruit while still hot and having splendid success with it. Paper placed between the fruit and the

cotton will keep moisture from coming up to the cotton.

Mrs. Nellie S. Kedzie of K. A. C. found this process a success.

In the present state of civilization if people do not lay by a supply for a rainy day it is from a lack of thrift on their part.

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