

Thesis.

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Milk, Butter and Cheese.

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1. Food principle.

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Milk Butter and Cheese.

The animal kingdom, class Mammalia, is the source of milk, which is a special fluid secreted by the females of the class for the nourishment of their young.

Milk is an opaque yellowish white liquid which, when fresh possesses a slightly acid reaction and faintly sweetish taste. It consists of an emulsion of fats in a watery solution of salts, casein and sugar.

The constituents of milk are numerous and of a diverse character; but is easily clarified with a few well-marked substances: water, fats, casein, albumin, sugar and ash.

The solids exist partly in emulsion or rather partly in suspension, semi-solution and solution in water. These constituents may vary considerably in quantity.

Babcock gave the average composition as follows:- Water 87.17%, Fat 3.69, Casein 3.02, Albumin .53, Sugar 4.88, Ash .71%.

The nutritive value is high as it contains all the essential elements of a perfect food: that is, supplies material for growth, development and repair to all portions of the body.

In its use for a food for the human race, we know it is the only food an infant requires for a long time; and until the period of adolescence is passed, forms a no inconsiderable part of the daily nourishment.

In some of the larger cities they ^{have} milk laboratories which have been established for the purpose of the modification of cows milk as a food for children and invalids.

In general the outline of work in these laboratories is first the cows supplying the milk given the best of care and known to be free from disease, second cleanliness in milking-operations and in all handling of the milk until it reaches the milk laboratories, third Excess of fat removed from milk, certain per cent of lime water; for those infants above a year old cereal jellies and the whole sterilized. fourth, the milk is put together in exact percentage, fifth, the milk thus prepared is purchased daily, sixth. All utensils and materials are kept spotlessly clean.

Dr. Roach and his four hundred assistant Doctors all agree after long experimenting that this is the best method to use in Infant and Invalid feeding where milk is ^{the} used food.

As a food for invalids whose digestive powers are in a weakened conditions the use of milk has no equal, providing it agrees with the patient. Usually it is more or less modified to suit the needs of the individual, the modification being prescribed by a physician.

Probably the most general use of milk is in combination with other food materials.

With it most of our substantial foods as bread and vegetables, and more fancy dishes, as custards, cake etc. are often made. In this way it helps to add to the nutritive value of the dish, and to many it is a pleasanter form of using it.

The food principles in the cookery of milk are fats and casein and albumin, two very closely allied substances of the albumen type. The cookery of albumin should be at a low temperature, from one hundred sixty to one hundred eighty degrees Fahrenheit.

Milk is sometimes heated to two hundred and twelve degrees Fahrenheit, but this is usually done when it is to be kept and carried some little distance as for the food for a child when on a journey: or it may not agree with a person as a food in some diseases, unless

given the higher temperature for a few moments. When heated to the boiling point it is less digestible than at the lower temperatures as the high heat hardens the albuminous substances.

Milk may be cooked by heating in a double boiler, or a substitute for it; one pan set in a larger one containing hot water, and is sometimes set on the back of the stove in a saucepan and stirred not allowing it to burn. The first method is the best.

The reasons for cooking milk are: first, to kill germs or micro organisms, some of which may be disease producing. Second, some using it as a food do not like the taste of raw milk. Third, to cook other food materials.

While the value of cooking it may be simply a matter of health as it renders us less liable to many diseases, in its use with other food materials it helps the nutritive value of the dish by adding more life giving, life sustaining properties of our food.

In the care of milk intended for food purposes the one crying need is that the house keepers of our land be taught how to care for it. Knowing that milk is one of the best foods for the many micro organisms that are ever

likely to fall into it, it behooves us to know what to do in order to keep out as many as possible. Again when it comes to the house to be used for food purposes it should not be placed where it can absorb all the odors of vegetables in all conditions, or in a mouldy, ill-ventilated, sour, cellar, pantry or ice-chest. Milk is a great absorbent of all such odors. Again it should not be set away in a dirty dish, one perhaps not thoroughly purified by thorough cleaning from sour milk; or placed in a temperature favorable for the rapid development of the Lactic Acid germs. A little use of our common sense will show how to care for it when once it is understood what happens under the above conditions.

Briefly:- keep milk covered; cool it and hold at as low a temperature between fifty and sixty degrees Fahrenheit as possible so as to keep in check the action of the lactic acid germs.

Always keep milk in a thoroughly cleaned, aired and sterilized vessels; keep in as pure atmosphere as possible, and in a clean, sweet smelling cellar, ice-chest or milk house.

Butter is made from the butter fat particles that collect as cream, when milk

is allowed to stand for some time. Cream rises to the top of milk because the butter-fat globules have a specific gravity less than water and the other solids. The food value of cream is high as it contains a large per cent of fat, and as fat is necessary to our bodies, cream is one of the best ways to supply it.

In preparing cream for butter, it may be separated from milk by any process, as, shallow pan, deep setting or use of a centrifugal machine. The use of the machine is the best method as you separate more of the butter fat globules from the milk. The cream, after gathering or separating, is set aside and allowed to ripen. Ripening is the process by which the Lactic acid germ converts it into a condition from which butter-fat is easily separated. Cream may be ripened by the use of a starter which is usually made from sour milk, butter milk or from a commercial starter. Or if left under proper conditions and long enough, will ripen of its own accord.

In use of a starter, especially those made by using sour milk or buttermilk, a great risk is taken as it may not contain enough germs of the lactic acid type to overcome

any other undesirable ones that may be present.

When cream is granular in appearance, and foamy and light texture, of a sharp acid taste it is usually ready to churn. Of late years there has been some discussion as to what is the best method for making butter; a slow ripening process or a rapid one.

Many experimenters have carried out and used the milk under almost any condition and results do not differ enough to say which method is best. In use of a starter the cream is ripened a little quicker than if not used.

Temperature is important; at a low temperature the acid germs are held in check while at higher temperatures they work rapidly.

The object of churning is to collect the butter fat in such masses as to separate it from the milk. When separated we can handle it and make a commercial article.

In the experiment on the time it takes to churn it has been found the best product comes when not less than thirty minutes and nearer forty minutes are used. It depends some on the amount churned and on the temperature when churned. To obtain the

best general results the churning temperature should be between sixty and sixty-five degrees Fahrenheit.

When butter is in the granular condition the buttermilk should be removed, and the butter washed in pure cold water; then salted in the churn allowing it to stand twenty minutes so as to allow the salt to penetrate the butter globules. In some makes of churn it can be worked in the churn, or use the butter-bowl and laddle, working just enough to evenly distribute the salt and remove the excess of water.

If it is to be prepared for market, whatever you use, have it thoroughly clean and sweet, and put up in a neat shape. Even for home use these same things apply, and keep where it will have a nearly uniform temperature and in a clean well ventilated cellar or store-room. If these few precautions are followed you ought not to have trouble in preserving its sweet flavor.

Butter is another food substance that enters very largely into our daily consumption of food. What is bread without butter? The same can be said of

of many dishes without the butter as it adds to the nutritive value especially when not rich or lacking in fat. The principle of cookery is fat. Butter melts at a little higher temperature than when it is finely divided into fat globules as in milk.

Cheese is the coagulation of casein in milk by the use of rennet which has a peculiar process of fermentation. As any milk contains casein, so any milk can be used to make cheese; but they do not make cheese of the same taste, kind, quality or quantity, and by use of different methods the same kind of milk will make a different cheese. The composition of full cream cheese varies somewhat; but the average is as follows:- Casein 31.23%, fats 34.39%, Water 30.17%, Mineral matter 4.13%. The authority for this is Pratts Food Chart. Its nutriment value it is about 99.

The cream cheese is more nutritive than the skim milk, containing more fat. The digestibility of cheese is said to vary with the temperature at which it is cooked, method by which it is made, condition or kind of milk used, and age of cheese.

Cheese is rich in proteins and fats and the principle of cookery is albumin; that is, casein. So to be thoroughly digestible, when cooked, cheese should be cooked at the low temperature one hundred sixty to one hundred eighty degrees Fahrenheit. At the higher temperature the heat hardens the casein and renders it almost indigestible.

Since cheese is so rich in protein and fats it should be used in combination with the carbohydrates; and almost any starchy material will enter into combination with it.

In summing up the general principals of milk, butter and cheese, the food principles are fats and albumen. In milk and cheese we pay attention to the albumin principles, in butter, the fat.

In use of these articles when their food value and principles of cookery, and their composition are known, no cook should make the mistake of preparing them in any but the proper way.