

The Modification of Cow's Milk

Can cow's milk be fed to infants without any changes?

No; for although it contains similar elements to those in mother's milk, they are not identical, and they are not present in the same proportions.

Is this a matter of much importance? It is of the greatest importance. There are few infants who can digest cow's milk unless it is changed. To change cow's milk so as to make it more nearly resemble mother's milk is called modifying cow's milk.

How is this milk whose proportions have been changed distinguished from the original unchanged milk?

The changed milk is usually called "modified milk"; the original unchanged milk is known as "plain milk," "whole milk," "straight milk," or is referred to simply as "milk."

What are the principal differences between cow's milk and mother's milk?

Cow's milk has a little more than half as much sugar; it has nearly three times as much proteids and salts; its proteids are different and much more difficult of digestion; its reaction is decidedly acid, that of mother's milk is faintly acid or neutral.

Are there any other important things to be considered?

Yes; mother's milk is always fed fresh and is practically sterile. Cow's milk is generally kept twenty-four hours and sometimes much longer. It is always to a greater or less degree contaminated by dirt and germs, the number of which increases rapidly (1) with the age of the milk; (2) in proportion to amount of the dust or dirt which enters it; (3) with any increase in the temperature at which the milk is kept.

It is just as important for success in infant feeding that these conditions receive attention as that the proportions of the different elements of the milk are right.

How is the acidity of cow's milk overcome?

By the addition of lime-water or bicarbonate of soda. If lime-water is used, one ounce to twenty ounces of food is generally required; if soda is used, twenty grains to twenty ounces of food.

If there is a tendency to constipation the milk of magnesia (Phillips') may be used; from one half to one teaspoonful being added to each twenty ounces of food.

How is the sugar best increased?

By adding milk sugar to the food; one ounce to each twenty ounces of food will give the proper quantity for the first three or four months. This will make the proportion about the same (between 6 and 7 per cent) as in mother's milk.

How should the sugar be prepared?

Simply dissolved in boiled water; if the solution is not clear, or if there is a deposit after standing, it should be filtered by pouring through a layer of absorbent cotton, half an inch thick; which is placed in an ordinary funnel.

Will not cane (granulated) sugar answer as well?

Not as a rule; however, there are many infants who get on very well when cane sugar is used. It has the advantage of being much cheaper. A good grade of milk sugar is somewhat expensive, costing from twenty-five to sixty cents a pound,

and cheap samples are apt to contain impurities.

If cane sugar is used, what amount should be added?

Considerably less than of the milk sugar. Usually about half the quantity (half an ounce to twenty ounces of food) is as much as most infants can digest. If the same quantity is used as of the milk sugar, the food is made unduly sweet, and the sugar is likely to ferment in the stomach and cause colic.

Is not the purpose of the sugar to sweeten the food in order to make it palatable?

Not at all; although it does that, its real use is to furnish one of the essential elements needed for the growth of the body, and the one that is required by young infants in the largest quantity.

How do we know that this is so? By the fact that in good breast milk the amount of sugar is greater than that of the fat, proteids, and salts combined.

We have seen that cow's milk has nearly three times as much proteids (curds) and salts as mother's milk. How are these to be diminished?

By diluting the milk. Will it be sufficient to dilute the milk twice (i.e., add two parts of water to one part of milk)?

Not for a very young infant. Although this will give about the quantity of proteids present in mother's milk, the proteids of cow's milk are so much more difficult for the infant to digest, that in the beginning it should be diluted five or six times for most infants.

If cow's milk is properly diluted and lime-water and sugar added does it then resemble mother's milk?

No; the mixture contains too little fat.

What is the easiest way of overcoming this?

By increasing the fat in the milk before dilution. It may be done by using top-milk or a mixture of milk and cream.

What is top-milk?

It is the upper layer of milk removed after standing a certain number of hours in a milk bottle, glass jar, or any tall vessel with straight sides. It contains most of the cream and some of the milk just below.

The strength of the top-milk is measured by the fat it contains—e.g., a 10-per-cent milk contains 10 per cent fat; 7-per-cent milk contains 7 per cent fat, etc. These are the two strengths of top milk most used in infant feeding.

On what does the percentage of fat in top-milk depend?

1. On the length of time the milk has stood.

2. On the manner in which the top-milk is removed.

3. On the number of ounces removed.

4. On the richness of the milk used.

Unless these are known it is impossible to say even approximately how strong in fat the top-milk is.

When and how should top-milk be removed?

If milk fresh from the cow, or before the cream has risen, is put into bottles and rapidly cooled, the top-milk may be removed in as short a time as four hours. In the case of bottled milk it makes little difference if it stands a longer time, even until the next day. The best means of removing it is by a small cream-dipper*

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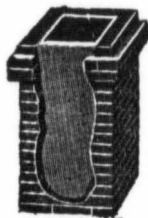
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