ABSTRACTS ON THE EFFECT OF PASTEURIZATION ON THE NUTRITIONAL VALUE OF MILK

"... Pasteurization was also found to affect the hemagglutinogenic and growth-promoting properties of milk. (Cow milk from specially fed cows, whose milk did not produce nutritional anemia — whereas commercially pasteurized milk did.)"


The Lancet, page 1142, May 8, 1937 states that resistance to tuberculosis increased in children fed raw milk instead of pasteurized, to the point that in five years only one case of pulmonary TB had developed, whereas in the previous five years, when children had been given pasteurized milk, 14 cases of pulmonary TB had developed.

"Human or cow milk added to an equal volume of agar did not support the growth or allowed only slight growth of B. diphtheriae, Staph. aureus, B. prodigiosus, B. anthracis, streptococci, and unidentified wild yeast. The factors in human milk inhibiting bacterial growth ("inhibins") were inactivated by heating at 56 degrees C. after thirty minutes or by standing twelve to twenty-four days at 5 degrees C., but not by repeated freezing and thawing. The 'inhibins' in cow's milk were not inactivated by heating at 80 degrees C. for seven minutes but were destroyed by heating at 95 degrees C. for seven minutes. Attempts have not been made to identify the natural antiseptics."


"Some have questioned whether pasteurized milk is truly involved in the production of scurvy. The fact, however, that when one gives a group of infants this food for a period of about six months, instances of scurvy occur, and that a cure is brought about when raw milk is substituted, taken in conjunction with the fact that if we feed the same number of infants on raw milk, cases of scurvy will not develop — these results seem sufficient to warrant the deduction that pasteurized milk is a causative factor. The experience of Berlin, noted by Neumann (Neumann, H. Deutsch. Klin., 7.341, 1904) and others, is most illuminating and convincing in this connection. In 1901 a large dairy in that city established a pasteurizing plant in which all milk which was sold rose to a temperature of about 60 degrees C. After an interval of some months infantile scurvy was reported from various sources throughout the city. Neumann writes about the situation as follows:"

"Although pasteurized milk is to be recommended on account of the security which it affords against infection, we should realize that it is an incomplete food. Unless an anti-scrobutic is added, or orange juice, or potato water is added, infants will develop scurvy on this diet. This form of scurvy takes some months to develop and may be termed subacute. It must be considered not only the most common form of this disease, but the one which passes most often unrecognized. In order to guard against it, infants fed exclusively on a diet of pasteurized milk should be given antiscorbutics far earlier than is at present the custom, even as early as the end of the first month of life."


"... Recently, Minot and his colleagues came to the conclusion that adult scurvy can be precipitated by infectious processes; in other words, that latent scurvy can by this means be brought about when raw milk is given to an adult invalid who realizes that it is an incomplete food. Unless antiscorbutics are added to the food, the patient will develop scurvy in a few weeks."


This illustrates the futility of pasteurization of milk to prevent infection from diseases of alimentary tract, as they sometimes have such as undulant fever. The infant is then made subject to the common infectious diseases, and deaths from these common diseases are not attributed, as they should be, to the defective nature of milk. Therefore, investigations in the laboratory as well as clinical observations are in agreement in stressing the interrelationship of scurvy and bacterial infection."


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"One of the most striking clinical phenomenon of infantile scurvy is the marked susceptibility to infection which it entails — the frequent attacks of 'grippe,' the widespread occurrence of nasal diphtheria, the furunculosis of the skin, the danger of pneumonia in advanced cases."


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he milk being unheated, or possibly to some other quite different and so far unrecognized cause, we cannot yet say; but we may be sure of one thing, that the result is so striking and unusual that it will undoubtedly be made the subject of further inquiry."


EFFECT OF PASTEURIZATION ON MILK GROWTH

. . . Fisher and Bartlett "point out by statistical treatment that the response in height to raw milk was significantly greater than that to pasteurized milk. Their interpretation of the data led to the assertion that pasteurized milk was only 56.0 per cent as effective as the raw milk in the case of boys and 91.1 per cent as effective in the case of girls in inducing increases in weight, and 56.0 per cent as effective in boys and 70.0 per cent in girls in bringing about height increases."


". . . Daniels and Loughlin observed that young rats fed long heat-treated milks, evaporated, condensed, and pasteurized by the 'hold' method failed to grow normally. The precipitated calcium salts were incorporated into the various milk, growth was normal. . . ."


CALCIUM AVAILABILITY IN PASTEURIZED MILK

Kramer, Latzke and Shaw (Kramer, Martha M., Latzke, E. and Shaw, M. M., A Comparison of Raw, Pasteurized, Evaporated and Dried Milks as Sources of Calcium and Phosphorus for the Human Subject, Journal of Biological Chemistry, 79:283-295, 1928) obtained less favorable calcium balances in adults with pasteurized milk than with fresh milk and made the further observation that milk from cows kept in the barn for five months gave less favorable calcium balances than did 'fresh milk' (herd milk from a college dairy)."


In the Lancet, page 1142, May 8, 1937 it is shown that chilblains are practically eliminated (result of calcium values of raw milk or improved assimilation of calcium) when raw milk rather than pasteurized milk is used in the diet of children.

PASTEURIZATION DESTROYS VITAMIN A

. . . According to S. Schmidt-Nielsen and Schmidt-Nielsen (Kgl. Norske Videnskab. Sel. Forhandl., 1:126-129, abstracted in Biological Abstracts, 4:94, 1930), when milk pasteurized at 63 degrees C. (145 degrees F.) was fed to mature rats, early death or diminished vitality resulted in the offspring. This was attributed to the destruction of Vitamin A.


PASTEURIZATION DESTROYS VITAMIN B COMPLEX

". . . Pasteurization of milk destroys about 38% of the B complex according to Dutcher and his associates. . . ."


"Matlick and Golding (Relative Value of Raw and Heated Milk in Nutrition, Lancet 220:362-367) reported some preliminary experiments which indicated that pasteurization destroys some of the dietetic value of milk, including partial destruction of Vitamin B1. These same workers found the raw milk to be considerably superior to sterilized milk in nutritive value."


". . . On the 7.5 cc. level two rats on raw milk developed mild polyneuritis toward the end of the trial; whereas three rats on pasteurized milk developed polyneuritis early, which became severe as the trial drew to a close. On the 15.0 cc. level none of the rats on raw or pasteurized milk, but three on pasteurized milk were severely affected."

Ibid, page 22.

"Using standard methods for determining vitamins A, B, G and D, it was found that pasteurization destroyed at least 25% of the vitamin B in the original raw milk."


PASTEURIZATION DESTROYS VITAMIN C

". . . The pasteurization of milk has been found to destroy 20 to 30% of the vitamin C, the fraction that has undergone irreversible oxidation . . . ."


"Current objection to pasteurization is mainly on the ground of vitamin destruction: Vitamin A (fat-soluble) and B (water-soluble), both abundant in milk, are quite resistant to heat, but the antiscorbutic vitamin C is weakened or destroyed by pasteurizing temperatures. Infants fed exclusively on a diet of pasteurized milk will develop scurvy. Fortunately the addition to the diet of readily accessible antiscorbutics such as orange juice or tomato juice is tolerated by infants much more than was used to be supposed, even in the first month of life. The reasonable procedure, therefore, appears to be to use pasteurized milk to insure protection against disease germs of various kinds and to supply the vitamin deficiency through other foods. The success in infant feeding based on this principle is evinced especially in the amazing reduction in infant mortality in the summer months."


"Within the past few years an increasing number of patients affected with scurvy have been brought to the Oregon Children's Hospital. As the prophylactic amount of Vitamin C (15 mg. daily) is contained in 300 cc. of breast milk, scurvy is rarely found in breast-fed babies.

"The vitamin C of cow's milk is largely destroyed by pasteurization or evaporation."


"Samples of raw, certified, guaranteed Guernsey and certified vitamin D milks were collected at the different dairies throughout the city of Madison. These milks on the average are only a little below the fresh milks as recorded in Table I, indicating that commercial raw and certified milks as delivered to the consumer lose only a small amount of their antiscorbutic potency. Likewise, samples of commercial pasteurized milks were collected and analyzed. On an average they contained only about one-half as much fresh raw milk and significantly less ascorbic acid than the commercial unpasteurized milks.

". . . It was found that commercial raw milks contained an antiscorbutic potency which was only slightly less than fresh raw milks and that commercial pasteurized milks average含量 hol one-half the latter potency. Mineral modification and homogenization apparently have a destructive effect on ascorbic acid."