

*Questions and
Answers About*
**LEUKOCYTES
in Milk**



**A PACIFIC NORTHWEST
EXTENSION PUBLICATION**

PNW 70 • JUNE 1965

Questions and Answers About Leukocytes in Milk

- *Why the recent national emphasis on excessive leukocytes in milk?*

Delicious, high quality dairy products are the dairyman's most potent weapon against dairy substitutes. A high quality product contains few leukocytes. Excessive numbers of leukocytes in milk indicate mastitis—an inflammatory reaction within the cow's udder. Milk from mastitic cows is abnormal, of poor quality, and should be discarded.

- *What is the significance of 500,000 or more leukocytes per milliliter of bulk-tank milk?*

It means that a number of cows within the sampled herd have mastitis in one or more quarters. The mastitis may be chronic and the milk may or may not appear grossly abnormal; or, the mastitis may be acute with visible changes in mammary secretion. The latter form is often accompanied by definite signs of illness. In either case, leukocyte numbers increase greatly.

- *What are leukocytes and where do they come from?*

Leukocytes, commonly called white blood cells, are normally present in the tis-

sues and blood of cows and other animals. One of their important functions is to destroy invading microorganisms causing infection. Removal of dead bacteria, dead body cells, and other tissue debris from the inflammatory site is also accomplished by leukocytes. These body protectors migrate from the blood vessels and the tissues directly to an affected area. If, for example, infection develops within the udder, large numbers of leukocytes are soon present in this tissue and in the milk.

- *Will an infection somewhere other than in the cow's udder result in an increase of leukocytes in milk?*

No. Leukocytes migrate only to the site of infection. In pneumonia for example, leukocyte numbers will increase greatly in the infected lungs, but not in other noninfected body tissues. During such an infection, leukocyte numbers in the blood may increase markedly since they are being transported from other areas to the site of infection.

- *Since leukocytes are normally present in animal tissues including the blood, why don't we also worry about their presence in meat?*

Leukocytes are normal body cells and alone are not obnoxious. However, infected tissues contain many dead and dying leukocytes as well as other body cells, living and dead bacteria, and other inflammatory products. Meat showing evidence of such infection is condemned. Milk from infected quarters should be discarded.

- *What is the method of determining the number of leukocytes in a sample of milk?*

The leukocytes in milk, when stained and placed under a microscope, can be seen and counted. By proper calculations, the number per milliliter of milk can be determined.

Chemical tests such as the California mastitis test, the Milk Quality test, the Whiteside test, and the Catalase test are also used. Chemical reaction is dependent upon the number of leukocytes present. These tests are quite accurate and compare well with each other and with the direct microscopic count.

- *Is the Northwest the only area attempting to improve milk quality by this method?*

No. Many states are beginning programs to reduce the number of leukocytes in milk and thereby improve milk quality. Numerous cities have had programs of this type for a number of years. Because of the success of these programs, some states are now starting similar ones. Wisconsin and California are both beginning programs which require bulk milk to contain fewer leukocytes. Assistance will be given producers with milk having high leukocyte counts. Improvement must be made or the milk will not be accepted. Educational information pertaining to the prevention and control of mastitis has been presented to northwest dairymen for several years.

- *Does mastitis affect milk composition and product quality?*

Yes. Mastitis milk is lower in "solids-not-fat" than normal milk. There are significant decreases in the lactose (milk

sugar) and milk protein content. The decrease in solids-not-fat may on occasion approach one percent. Mastitis milk possesses properties that tend more toward those of blood, than does milk with leukocyte counts of less than 500,000 per milliliter. Salt compounds, such as the chlorides, increase; and there is a raise in pH (abnormal change in degree of acidity).

- *Does the dairy plant experience difficulty in processing milk with high leukocyte content?*

Yes. When cows are affected with an udder disturbance, such as mastitis, the resultant abnormal milk composition will tend to adversely influence the flavor. An undesirable salty taste frequently results. Sometimes dairy plants experience complete or partial vat failures when making cultured dairy products (cheese, cottage cheese, sour cream, buttermilk, etc.) from milk that has high leukocyte content. Decreased milk protein content or the presence of antibiotics is usually responsible. Special manufacturing problems are posed by the lowered curd tension of this defective milk.

- *What marketing problems are posed in the utilization of milk from mastitic cows?*

Consumers of dairy foods demand and deserve top quality products. Much can be said about the aesthetic value and the confidence expressed by consumers for wholesome, normal, nutritious milk and products manufactured from milk. Finally, mastitis milk violates the United States Public Health Service definition: "Milk is the lacteal secretion of *HEALTHY* cows."



This circular was prepared by K. J. Peterson, associate veterinarian, and Floyd Bodyfelt, Extension dairy processing specialist, Oregon State University, in cooperation with Extension dairy specialists at the University of Idaho and Washington State University. It is published and distributed cooperatively by the Extension Services at the three universities.

Pacific Northwest Cooperative Extension Publication

Cooperative Extension work in Agriculture and Home Economics, F. E. Price, director, Oregon State University and the United States Department of Agriculture cooperating. Printed and distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914. 15M565

Published and distributed in furtherance of the Acts of May 8 and June 30, 1914, by the University of Idaho Extension Service, J. E. Kraus, Director, and the U. S. Department of Agriculture, cooperating. 10M565

Published and distributed in furtherance of the Acts of May 8 and June 30, 1914, by the Washington State University Extension Service, C. A. Svinth, Director, and the U. S. Department of Agriculture, cooperating. 15M565