AGRICULTURE

Devices Alter Dairying

Two new instruments that automatically analyze milk in one minute may soon replace chemical laboratory analyses, an event expected to affect dairying from cow to consumer.

➤ TWO NEW INSTRUMENTS are expected to affect people who drink milk, dairies that process it, farmers who sell it and even the cows that provide it.

The devices could influence the health of both the consumer and the economy of milk-producing lands.

The instruments—one American and one British—have a single basic function: to analyze the nutrients in milk. This may sound like a simple task in this complex age.

But for the past 75 years, dairies, farmers and governments all over the world have had to rely on painstaking, time-consuming, laboratory tests performed by trained chemists.

If these instruments are officially accepted by the world's dairy industry, they will change the system of analysis so that a sample of milk will be automatically and accurately analyzed in one minute instead of the 15 or 30 minutes now required.

The British instrument is called Irma. It analyzes milk by sending infrared rays through a sample of milk and another sample of water and measuring the amount of radiation absorbed.

The American machine, known as the Darison, analyzes milk by measuring the speed with which ultrasonic waves pass through two different samples at two different temperatures.

If approved, it will mean that milk can be analyzed on the basis of protein and other non-fat solids instead of just butterfat. Recent medical and nutritional attention has focused on excessive fat in the diet since it is suspected of causing artery hardening.

Milk drinkers who wish to reduce or are worried about the amount of fat they consume may be able to obtain milk containing higher quantities of protein. Milk is composed of about 87% water, 4% butterfat and 9% non-fat solids such as protein and milk sugar (lactose).

The two instruments could cause a major change in the dairy process itself. Milk has to be analyzed when it is bought from the farmer, who is paid for the quantity of milk and concentration of butterfat. The devices would remove the human element of variation present in the two accepted laboratory methods, called the Babcock and Mojonnier tests.

In addition to results of analyses by dairies, the U.S. Government has to know how much milk and butterfat comes into the dairy and how much leaves the dairy in a processed form. Thus it also has to rely on the two laboratory tests for its role in pricing what is called class one milk.

The instruments could also one day provide still another link in a mechanized dairy system. Milk could be analyzed automatically as it flows through the lines and its butterfat content automatically adjusted in order to meet requirements.

The dairy farmer has a vital interest in the success of these machines. At present the whole industry, which in the United States involves 126 billion pounds of milk a year, bases its prices on the percentage of butterfat in milk. Since these machines provide a basis other than butterfat for analysis, they provide an opportunity for changing the basis of payment.

In Holland, farmers are already paid high premiums for milk that is rich in protein, and California has introduced the amount of non-fat solids in milk into its pricing element.

If standards shifted from butterfat to protein, farmers would begin giving their cows feed that would produce milk richer in protein.

In Irma, the British machine, a lab technician pours a sample of milk into a funnel. In the amount of time it takes for him to write down the percentage of butterfat, protein, milk sugar and total non-fat solids, Irma has heated, homogenized and analyzed the sample of milk.

Developed by Dr. J. D. S. Goulden of the National Institute for Research in Dairying, Reading, England, Irma is currently being tested by the Milk Marketing Board, which buys and sells all milk in Great Britain.

Manufactured by Grubb Parsons Company of Newcastle-upon-Tyne, Irma has to be put together and calibrated by hand. She is expected to make her American debut in June, when Dr. Goulden brings his instrument to the U.S. for demonstrations to the dairy industry.

The American Darison was developed at the University of Wisconsin, Madison, under the direction of Dr. William Winder. It differs from Irma in that it registers only the amount of butterfat and total non-fat solids. It does not break the solids down into protein and milk sugar.

Manufactured by the Chesapeake Instrument Corporation of Shadyside, Md., the Darison is closer than Irma to winning official acceptance in the United States, dairy officials say.

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DIAMOND BY-PRODUCT — The machine, built by a British affiliate of the International Telephone and Telegraph Corporation, which can apply pressures of more than 1.5 million pounds per square inch makes diamonds before starting its real task of studying ultra-high pressures and their effects on materials.

AGRICULTURE

Exploded Foods Cook Fast, Save Time

➤ CARROTS AND OTHER foods are now being exploded from a special gun to make them light for shipping, as tasty as the fresh food, and much faster to cook.

Developed by U.S. Department of Agriculture scientists, the explosion process dehydrates the pieces of food and creates a porous structure within the morsels, but does not alter their texture, size or shape when cooked.

Explosion-puffed diced carrots are now being produced commercially on a limited scale.

Scientists are using this new process on other vegetables and fruits to produce tasty products such as apple slices, blueberries, and pieces of beets, turnips, potatoes and sweet potatoes.

There are many advantages to this new process developed by engineers R. K. Eskew and James Cording Jr. at the USDA's eastern utilization research laboratory in Wyndmoor, Pa.

Explosion-puffed foods are cheaper to ship and store than fresh products, save time for the housewife, and take a shorter time for cooking than the conventionally dehydrated foods—five or six minutes of cooking rather than 20 to 60 minutes.

The engineers sought a dehydrating process that would create air spaces within the vegetables and fruits, thus permitting water to be removed readily during drying—and to be replaced rapidly during cooking.

They exploded partially dehydrated pieces of fruits and vegetables from a low-pressure puffing gun.

A closed loader cylinder is revolved as it is being heated by gas jets. When the required temperature and pressure are built up, the lid is suddenly opened and the contents are ejected.

When the pieces are exploded, some of the water within them is instantly vaporized and escapes. This forms tiny pores and cavities in the food pieces.

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