12-1-1968

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Center Study Paper
68-6
December 1968

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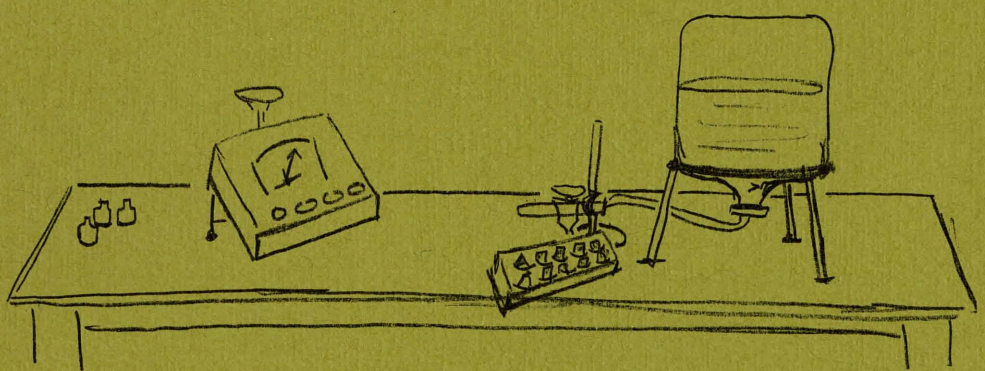

Economic Research Center

Utah State University Logan, Utah

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PROTEIN PAYMENTS NOW?

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Early in 1967 a dye technique for measuring the amount of protein in fluid milk was granted "official, first action" approval by the Association of Analytical Chemists. Since the fluid milk conversion factor also gives excellent results in tests on finished products, manufacturers can now account for all protein purchased. The dye technique thus removes the main technical barriers to widespread adoption of systems of direct protein payments to dairy farmers.

The notion of protein payments is not new. Golden Guernsey Dairy Cooperative of Milwaukee has paid premiums to high protein producers since 1962. This coop, however, may or may not use the new dye technique to reconcile the protein content of finished products with the protein purchased in bulk milk. The manager of one small Idaho cheese plant, the Snake River Valley Cheese Co., has presented a protein payment scheme to area producers as a way to get access to more milk. His plan includes help to producers in animal selection and relies upon the protein-test as a manufacturing accounting device.

Despite the lack of large scale adoption of protein payments in the year since test approval, very real pressures are building for such action. At least 14 Federal marketing areas have already purchased dye-test equipment. These areas will use the approved test to check handler milk-use reports that are made to producer payment pools. Federal Order Administrators are confident that the test is accurate enough to detect any inconsistencies in handler reconciliation of skim solids purchases with final

uses. Manufacturers will have to adopt exactly the same system to avoid difficult squabbles with Federal authorities over use reports. Once the dye-test is common as an in-plant accounting tool, it is a minor technical step to producer payments for protein.

Dairy farmers might do well to prepare for the probable changes in pricing procedures. Herds and individual animals should be evaluated on the basis of their relative protein outputs now, even though protein payment systems are not yet in effect.

Of course milk fat will continue to have substantial value, though recent research suggests that price per pound will probably fall when a protein system becomes widespread. The lessened value of milk fat will be compensated for by the protein payments. Farm herds producing relatively greater protein, however, will tend to reap special benefit. At present, many pricing formulas are linked to total milk weight. Future payments may simply be for actual pounds of fat and protein delivered to processors.

Breeding programs are likely to shift emphasis to protein production. This will probably be general for all breeds because apparently there is no difference in the protein molecules secreted by different breeds. Test results are not affected by breed.

Research programs directed to defining the effects of dairy cattle feeding formulas on efficiency of grain and fodder conversion will have to be intensified. Farmers will need much more information about the costs and practicality of altering milk component relationships by adjusting rations.

At least some of the "DHIA" computer systems that forecast milk production over the life of an individual animal will have to be revised.

In fact, if total milk weight ceases to be a pricing factor, many commonly held opinions about the relative worth of different dairy breeds may be open to question.

It is possible to link levels of producer payments directly to the costs of producing such high protein commodities as cheese and nonfat powdered milk. When this is a widespread practice it may be found that an item like nonfat powder is worth more than currently assumed. In that case, the cost of producing "filled" milks and certain other imitations would increase. This might reduce considerably the threat of intensified competition from dairy substitutes.

These are just some of the possibilities. But after all, the imminence of a protein payment system has been predicted numerous times since the late 1950's. Such pricing has never materialized before, why get excited now?

Obviously it took time to perfect a dye that possessed all the technical attributes necessary for test purposes. But this is only part of the explanation.

Following development of protein-binding techniques using colored dyes a decade ago, descriptive notes and articles appeared in both popular and specialized dairy publications to alert dairy producers of impending pricing changes. In essence their authors suggested that payments for protein might be a step in the direction of rewarding individual producers for varying amounts of solids-not-fat. This argument was fairly attractive to dairy farmers because, even in cases where some allowance is made for SNF, it is usually an average percentage regardless of variations in individual shipments.

But handlers were not convinced. In their view protein payments would have had the same consequences as all systems concerned with pricing total SNF. These latter plans held (and still hold) little appeal because it is too difficult to make estimates of solids in finished products. There is not much incentive to make payments for components that cannot be accurately accounted for in manufacturing processes.

Certain early dye experiments were traditional in that the goal was to establish the dye-binding capacities of particular product classes as well as of fluid milk. This would have led to one kind of computation for homogenized milk, cottage cheese would require another, and so forth. Manufacturers or regulatory agencies needed to know what was "in" the end product before tests were begun, otherwise the wrong conversion tables would be chosen. But knowledge of content was just what the test was supposed to facilitate! In-plant accounting on this basis was impractical.

Under the new system all finished products are assumed to have the same dye binding capacity as fluid milk. As a result, protein is slightly over estimated in some products and under estimated in others. But such errors cancel each other when reconciliation is made with the protein quantities manufacturers purchase from producers.

Recent experiments at Utah State University suggest that a one-conversion-factor accounting system should be accurate within 2 percent. Thus, if the Babcock test is used to account for the cream portion throughout manufacturing processes, and the approved dye-test is used to account for SNF, the movement of all milk purchases into final products can be monitored. It is true that only fat and protein are actually monitored, but they are good indexes to presence of all components.

The dye that has been approved is known as acid orange 12. It binds protein molecules very well and the dye solution can be stored for long periods with little effect on accuracy. A measured amount of dye re-agent is mixed with a small sample of milk. The protein molecules bind with the dye, become enlarged, and can be filtered out of the colored mixture. The quantity of unbound or left over dye is determined by calculating electronically the amount of light it blocks out when viewed through a colorimeter (spectrophotometer). Since the amount of light the initial dye quantity can block is already known, the difference in instrument readings or light intensity must be proportional to the percentage of protein in the milk sample.

Most manufacturing processes have little effect upon milk protein and therefore do not modify the binding powers of the dye. The main exceptions are milk that has been sterilized or cheese that has been aged. In each of these cases, the protein molecules change by various degrees and this affects the accuracy of the test. However, sterilized milk forms a very small portion of total product output, and tests on fresh cheese are quite precise. In general the error in the dye test is about one-fourth as great as the traditional method for measuring protein (Kjeldahl), which is also slow and expensive. The new dye test for protein is more accurate than the Babcock test for fat. Some laboratories have reported as many as 70 tests per hour at a cost of less than $.15 each.