Pricing Milk on Solids Content

different prices paid to producers for milk are based on percentage of fat and nonfat solids

D. A. Clarke, Jr. and J. B. Hassler

The following article is the first of a two-part report on a study of the pricing of milk on the basis of fat and skim milk.

Most pricing schedules followed in the dairy industry are established according to the fat content of the milk bought by the processors.

Milk with high solids content—both fat and nonfat—has a greater value because it will produce a larger quantity of butter, cheese, or other manufactured dairy products. Furthermore, high fat milk entering a fluid processing plant will yield a higher proportion of cream to fluid milk which will provide higher returns from consumers.

A comparatively simple and accurate test for fat solids exists but there is no economically feasible method for the direct determination of nonfat solids under plant operating conditions. However, dairy chemists have established the existence of a reasonably reliable relationship between the amounts of fat and nonfat solids content of normal whole milk received from producing dairies. This relationship can be used, therefore, to estimate the nonfat solids content of whole milk on the basis of the known fat content.

Whole milk received from producers may be considered as a combination of milk fat and skim milk. In some cases—particularly those involving milk for manufacturing uses—it is necessary to further consider that skim milk consists of the nonfat solids and moisture. The yield of manufactured dairy products is directly related to the quantities of nonfat solids present in the skim element of milk, so it seems reasonable to relate the value of the skim constituents of manufacturing grade milk directly to the amounts of nonfat solids.

In California—in common with most other milk markets—the differences between prices paid to producers for milk of varying fat and skim milk content are determined by the butterfat differential—the amount of money which is added to, or subtracted from, the base price per hundredweight of milk of a specified fat content for each 0.1% difference in fat content. This butterfat differential, therefore, measures the price of the amount of fat and skim elements associated with each 0.1% change in fat test.

Any price schedule for milk of different fat tests—such as provided by a base price and a butterfat differential—automatically generates a set of consistent prices for the fat and skim components of the whole milk. This consistency can be demonstrated through the following relationships which express the conditions: *1*, the price—or value—of whole milk is the sum of the value of the fat and skim components; and *2*, the price—or value—of amount of fat and skim elements associated with each 0.1% change in the fat test of a hundredweight of milk is the butterfat differential.

Under conditions where the base price of milk of 3.8% fat content is established for fluid purposes at $5.80 per hundredweight with a butterfat differential of 10¢, the consistent price for fat is automatically established by equation at $1.02 per pound and that for skim milk at $2.00 per hundredweight.

Whether or not these consistent prices for fat and skim milk are realistic—either in absolute terms or relative to each other—they represent the way producers are being paid and the way processors are being charged for the fat and skim elements of the whole milk delivered to plants.

It is argued that to be realistic, these consistent prices for the separate components—those determined as indicated by the foregoing example of the pricing schedule for whole milk—must reflect as closely as possible the values placed on the fat and skim constituents by the market. Certain guides are available in the form of market prices which, directly or indirectly, may be used to approximate the market evaluation of these components.

Manufacturing Milk Prices

These separate values for the fat and skim elements—and the differential values of whole milk of different constituency—can be determined directly and objectively for milk entering a given plant for processing into specified manufactured dairy products. For example, under typical overrun and processing loss experience, one pound of milk fat will produce approximately 1.23 pounds of butter. In addition, a pound of nonfat solids can be converted into about one pound of dried nonfat powder. Product prices are currently available which, by deducting appropriate processing and marketing costs, may be converted to net prices to reflect the value—or paying ability—of the amount of milk constituents required to produce a unit of the appropriate product. By applying the product yield relationships to these net prices, the net value of the milk components can be determined.

Fluid Milk Prices

Pricing the fat and skim components in milk used for Class I—or fluid—purposes is quite different from that for manufactured dairy products. Class I prices are usually established—in California, by the Bureau of Milk Control—at levels higher than for similar milk utilized for non-Class I, or manufacturing, purposes.

The difference between the Class I and manufacturing grade milk prices may be referred to as the Class I premium. In this sense, the value of Class I milk can be considered to be the value of the fat, the value of the skim element, and the Class I premium. Therefore, the problem of the separate values of Class I fat and Class I skim includes the second problem

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Leafminer on Tomato

control by dieldrin studied for northern California conditions

A. E. Michelbacher, O. G. Bacon, and John Underhill

The agromyzid leafminer—*Liriomyza subpusilla* Frost—was more abundant on tomato during the 1952 season than in any other recent year.

In some fields considerable fruit was lost through sunburn due in part to serious defoliation caused by the miner. In a number of cases where there was a light to moderate infestation of the pest, a dieback of the small shoots in the center of the vines caused by a fungus—probably verticillium—was attributed to the leafminer.

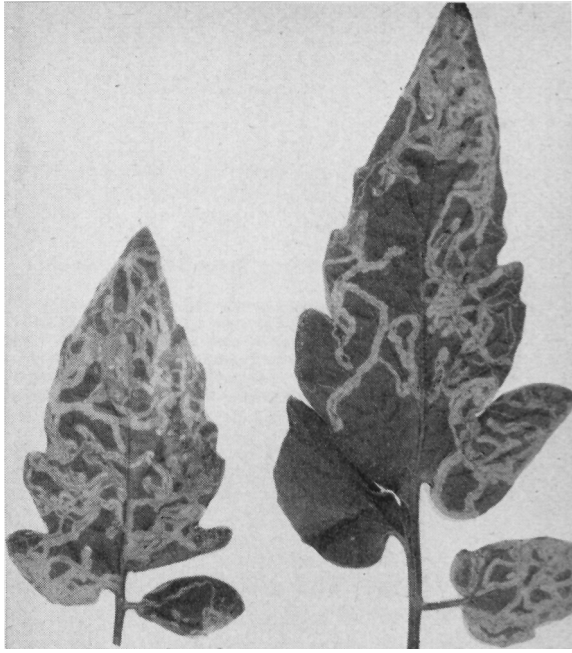
Experiments to control the pest were not undertaken until damage had progressed beyond a point that would be considered proper timing. When the treatments were applied, serious defoliation of the center of the vines had occurred, and most of the damage had already been done. The fields were swarming with adult flies, but an examination of the leaves did not reveal a great deal of maggot activity. The apical portions of the leaflets in particular were well covered with oviposition punctures. However, apparently eggs were not laid, or they failed to hatch or the maggots were unable to develop. It is possible that high temperatures along with the defoliation of the center of the vines created conditions unfavorable for the development of the pest. If this is the case, then the miner is limited largely by its own activity.

Portions of two fields near Linden, San Joaquin County, were treated by airplane with a 1½% dieldrin dust applied at the rate of approximately 30 pounds to the acre. The treatments resulted in excellent control of adults, and a marked reduction of maggots when compared with the checks. A portion of a third field in the same area was sprayed by airplane with a dieldrin emulsion used at the rate of ½ pound of dieldrin in 10 gallons of water per acre. Control of the leafminer was unsatisfactory which was surprising because on melons dieldrin applied as a spray was usually more effective than a dust against this same pest. It is possible that the dieldrin preparation used may have been faulty, but until additional information is obtained dusts are preferable to control the pest on tomato.

The leafminer larvae under some conditions are heavily parasitized, and parasites along with other natural agencies exert a strong influence in holding the pest in check.

Under conditions of serious infestation, control with insecticides may be necessary. Timing of application is important. Based upon present knowledge, treatment can be delayed until the center leaves of the vines show considerable mining, but before any defoliation has occurred. To secure satisfactory control, two treatments may be necessary applied at a two to three week interval.

Because dieldrin has not as yet been released for use on tomato, no definite recommendation can be made. Taste and residue studies indicate that no serious hazard is involved.



Tomato leaflets seriously mined by maggots of *Liriomyza subpusilla* Frost. Mining may occur to the point where the entire leaf is destroyed exposing the fruit to serious sunburn.

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of the allocation of the Class I premium between the two components.

The market does provide, indirectly, an opportunity to price the fat and skim components of Class I milk independently of direct consideration of the Class I premium. These values might be determined by use of an alternative value concept which would involve the acceptance of the relative values of fat and skim established by the butter and nonfat solids markets. From an operational standpoint, the net value of milk would be determined from the yields of butter and powder valued at net prices. The relative proportion—or percentage—of contribution of the butter—or fat—to the total value of the whole milk could be calculated. This percentage, applied to the Class I price for whole milk—determined independently—would provide an estimate of the value of the fat content of the whole milk. The whole milk price less the fat value would represent the skim milk value.

Alternatively, it is possible to estimate these values when the prices for any two fat and skim containing products are known—or given—provided the respective proportions of fat and skim in these products are also known. Grade A jobbing cream price quotations exist in the two major milk markets in California which relate to values of 40% cream—a product containing 0.4 pound of fat and 0.6 pound of skim milk per pound. On the other hand, the Bureau of Milk Control establishes Class I prices for whole milk of 3.8% fat content—a product which contains 3.8 pounds of fat and 96.2 pounds of skim milk per hundredweight. If it can be assumed that the Grade A jobbing cream markets which are open markets—where prices are not fixed by public agency—tend to value the difference in the composition of these two products, the two prices can be used as indicators of the way the market is currently valuing the Class I fat and the Class I skim components of whole milk. This involves an adjustment of the Grade A jobbing cream prices downward to a comparable level in the marketing process to that specified by the whole milk price—f.o.b. receiving platform—by deducting appropriate receiving and separating costs, marketing and transportation costs of the cream, and allowances for processing losses.

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The second report on pricing milk on the basis of fat and skim milk will appear next month and will be on the subject of physical yield relationships and the way these relationships may be used to formulate net values and so provide a basis for pricing.