Adding fat to rations

Oil seeds and tallows pack big energy punch, but beware of over-feeding. Ration levels of fat above 6-7% (dry matter basis) do not necessarily raise production.

Because fats have roughly twice the energy density of grain, substituting fat for some grain in dairy rations can be an effective way of increasing energy density without compromising fiber content. For very high producing herds — above 80 lbs. of milk per cow per day or more, for instance — it is often essential to provide supplemental fat in order to meet cows' energy needs.

The amount of fat to include in rations for lactating cows varies greatly. Specific levels should be determined according to each herd's caloric needs for maintenance plus production, without compromising fiber concentrations. Data summarized by D.L. Palmquist suggests that lactating cows can digest and absorb about 2-3 lbs. per day of fat — equivalent to 6-7% of the ration. Of this, normal base feed ingredients will yield rations that are about 3% fat. To increase a ration to 7% fat, it is recommended that fat supplementation be done in two equal steps: first using oil seeds, and then fat that is ruminally inert.

Increasing ration energy density in this manner involves the use of commodity fats such as oil seeds and tallow, and speciality fats which are ruminally inert. Whole oil seeds are usually in abundant supply and incorporate readily into total mixed diets. Recommendations for the use of tallow are difficult to make because of a lack of research. Tallow may be substituted for fat in soybeans and cottonseed, but not for ruminally inert fat.

Commodity fats are less costly than specialty fats. They can be used to increase ration energy density, but they must be used with caution. Even moderate over-feeding of any commodity fat can have a negative effect on rumen fermentation and often reduces, rather than improves, production. This includes the best known supplemental fat source in dairy rations, whole cottonseed.

Whole cottonseed is a high-fat, high-energy feed ingredient that also provides fiber and protein. It has long been regarded as an essential part of milking cow rations, particularly by western dairymen. Even when spot prices for cottonseed soared to nearly $250/ton in the summer of 1990, most producers insisted on keeping at least a few pounds per cow per day in top strings' rations.

The price pendulum finally swung hard the other way last summer, bringing producers both joy and uncertainty. Joy because spot prices for cottonseed eventually dipped below $125/ton, and uncertainty because few people had any first-

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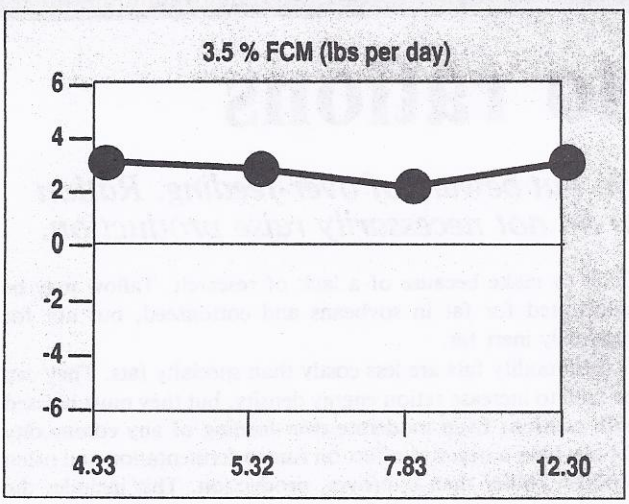

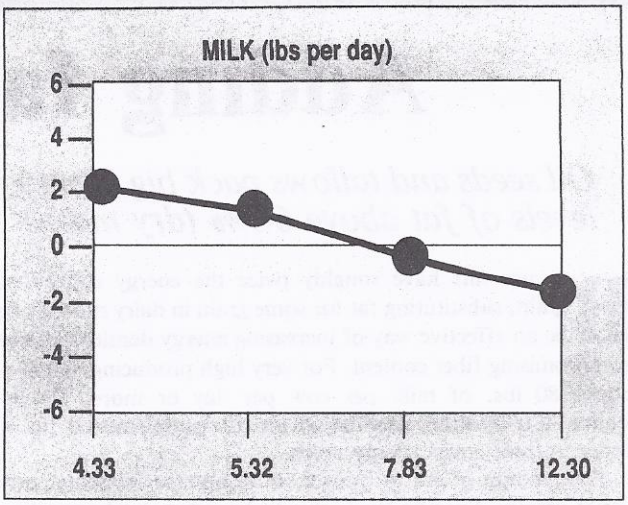

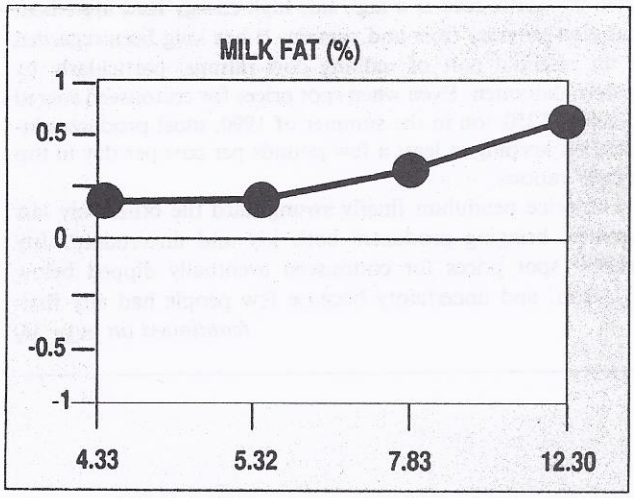

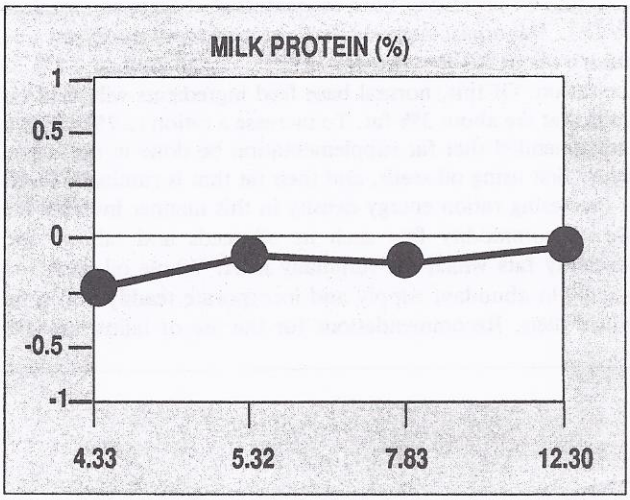

RESPONSES BY COWS TO WHOLE COTTONSEED (lbs per day)

Adding fat to rations. . .

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hand experience that would permit them to respond to the most asked nutrition question of the year: "How much cottonseed can you feed milking cows?"

Milk production performance data collected from dozens of feeding trials across the U.S. are summarized in the accompanying charts. The amount of cottonseed fed ranged from 4.33 lbs. per head per day to 12.3 lbs. As the charts show, there were several clear response trends observed:

- Protein test was slightly worse at all cottonseed feeding levels.
- Fat test was better at all feeding levels, particularly above 7 lbs. per day.
- Fat-corrected milk yields (3.5% basis) rose approximately 2.2 lbs. per day no matter how much cottonseed was fed.
- It took only a few pounds of cottonseed to improve total milk production per day, but these gains were lost as more cottonseed was fed. Beyond approximately 7.5 lbs. per day cottonseed actually reduced milk production.

The increase in fat test that followed increasing levels of cottonseed shows that the fat in cottonseed, even at high levels of feeding, does not interfere with ruminal fermentation. And regardless of the amount of cottonseed fed, protein test in milk decreased about .10%. Neither dry matter intake nor feed efficiency was affected greatly by feeding cottonseed, however.

Because cottonseed protein is highly degradable in the rumen, production responses are mainly the result of increased ration energy density. Lack of milk yield responses at high levels of feeding probably reflect imbalanced ratios of protein and energy. In limited research, ruminal escape of whole cottonseed protein was increased by roasting, but not by extrusion. Roasting whole cottonseed should be investigated as a method for improving its nutritional value.

The research data base used for this article indicates that feeding about 5-6 lbs./day/head maximizes production of milk and 3.5% fat-corrected milk. Higher levels might be recommended if whole cottonseed is an economical source of fiber and protein, but negative impacts on milk yield also need to be considered.

William Chalupa, Ph.D., is Professor of Nutrition, Center for Animal Health and Productivity, University of Pennsylvania, Kennett Square, Pennsylvania.