



# CONSUMER ISSUES REGARDING BOVINE SOMATOTROPIN (BST)

**Deanne Morse**  
Extension Dairy Specialist

One of the most nutritious foods is milk. Milk provides proteins, carbohydrates, fats, vitamins and minerals. Milk has been advertised as a wholesome product, and dairy producers work very hard to have their cows produce this healthy product. Why, then, is there sudden concern about milk being tainted with hormones?

Industry members and researchers have developed and tested numerous feed enhancers. The purpose behind enhancers is economics. If a producer can deliver the same quantity of milk from fewer cows, efficiency of production is most probably improved.

One of the most recent technologies to improve efficiency of milk production is a protein hormone, bovine somatotropin (BST). BST can be a production enhancer.

Somatotropin is produced commercially via biotechnology. The gene responsible for production of BST in dairy cows was isolated, and the genetic material was transferred into bacterial cells. Private companies have utilized standard fermentation techniques to mass produce BST in bacteria. The somatotropin is harvested and prepared for use in animal injections.

## Activity

Somatotropins are species specific. Bovine somatotropin is active only in cattle, for example. For BST to be active in cattle, it must be injected. Oral doses of BST do not alter animal production. If given orally the protein is digested as any dietary protein is degraded.

Milk from non-supplemented cows can contain trace amounts of BST. When the milk is consumed the BST is digested just as proteins are digested.

## Milk composition

When cows are injected with BST they generally increase feed intake and milk production. The content of the milk is not altered. Milk fat, protein and solids-non-fat remain constant (Table 1).

**Table 1. Composition of milk from non-supplemented and BST supplemented cows.**

Component	BST supplement (mg/day)			
	0	12.5	25	50
Protein %	3.00	3.04	3.03	2.98
Fat %	3.65	4.00	3.65	4.00
Total solids %	12.31	12.99	12.55	12.78

Source: Bovine Somatotropin (BST) pamphlet produced by Animal Health Institute.

44.3  
9  
3  
187



**NDSU EXTENSION SERVICE**

North Dakota State University, Fargo, ND 58105

The protein content of milk ranges from 2.7 to 4.8 percent. The predominant protein component in milk is casein. All other proteins in milk comprise non-casein proteins designated as whey. Somatotropin in milk is located in the whey component. Casein represents 76 to 86 percent of milk protein. Lactalbumin and lactoglobulin represent most of the whey component. Less than 2 percent of milk protein represents other serum proteins.

Trace amounts of BST have been detected in cows' milk. Concentration of BST in milk from dairy bulk tanks was determined by analyzing samples from more than 120 farms in Missouri and Illinois for BST. BST was detected in 12 of the samples. When detected, the concentration of BST in milk ranged from .33 to .77 ng/ml. The test used could not detect levels lower than .3 ng/ml.

Milk samples from 40 individual cows were analyzed for BST. Half of the cows received no BST supplementation (control cows). The remaining 20 cows received the 14-day dose of prolonged release BST, which was implanted every two weeks for 14 weeks. Levels of BST in milk did not differ (Table 2). No differences in amount of BST in milk have been detected from cows supplemented with BST.

**Table 2. Detection of BST in milk.**

	Control	BST supplemented
Weeks sampled	14	14
Weeks BST < .3ng/ml	11	9
Range when detected (ng/ml)	.30 to .60	.33 to .51

Source: Torkelson and coworkers. J. Dairy Science 70:(1) 146.

Makers of BST have performed hundreds of tests, and the Food and Drug Administration (FDA) approved BST for use in dairy cattle under experimental circumstances. Before the FDA approves BST for use in commercial operations, long term studies must be completed. The purpose of the long term (one to two-year) studies is to document cows' responsiveness to BST. Human health concerns have already been addressed. The FDA acknowledges that milk and meat from BST supplemented cows are safe for human consumption. These facts will not change as long term studies are completed.

## Helping You Put Knowledge To Work