



Soy Best...Now it's Rumen-Protected with Lecithin

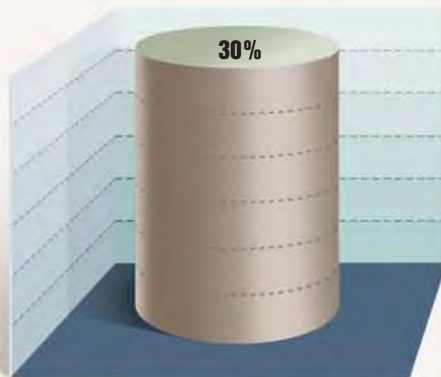
Venue: Rumen Profiling Laboratory, West Virginia University. January, 2004

Summary: The rumen-protected nature of lecithin is well known.^{1,2,4,5,7} Now lecithin is an important component of Soy Best. Its level is controlled by a proprietary manufacturing process. A primary component of lecithin is phosphatidyl-choline. This phospholipid plays a key role in methyl group metabolism and has an important methionine-sparing effect in dairy cattle.

This trial was designed to measure the rumen-bypass value of the protein, amino acids and phosphatidyl-choline in Soy Best which was manufactured by the new process. A sample of Soy Best was incubated in the rumen of a fistulated Holstein cow for 16 hours. The cow was in early lactation and producing 80 pounds of milk daily. Samples were run in triplicate.

Results: **CHOLINE BYPASS**
30% of the phosphatidyl-choline in Soy Best escaped rumen degradation after 16 hours of exposure in the rumen of a cow producing 80 lbs. of milk. This confirms the rumen-protected nature of this important methyl donor.

Phosphatidyl-Choline Bypass, %



Soy Best





More Bypass Protein

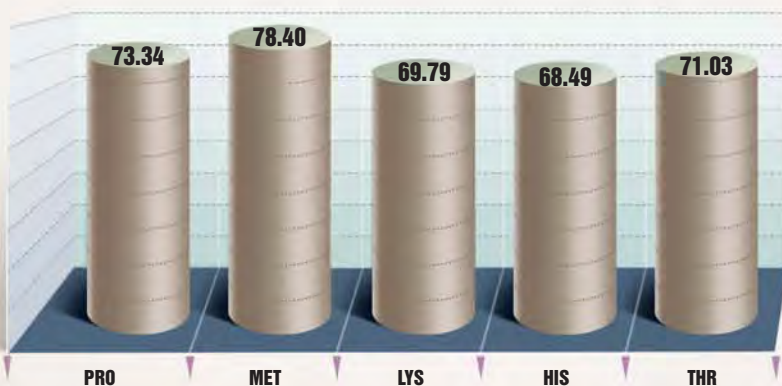
Application of lecithin to Soy Best is a new process. Prior to the development of this process, Soy Best protein had a measured rumen-bypass value of 60%. Now, with the advantage of lecithin and its rumen-protected nature, the bypass value has been measured at 73%.

More Bypass Methionine, Lysine, Histidine and Threonine

The rumen-bypass rates of methionine, lysine, histidine and threonine have been measured at the Rumen Profiling Laboratory, West Virginia University. Their rates are consistent with the increased protein bypass rate associated with the addition of lecithin in the new manufacturing process.

Protein Bypass, % of total:	73.34
Methionine Bypass, % of total:	78.40
Lysine Bypass, % of total:	69.79
Histidine Bypass, % of total:	68.49
Threonine Bypass, % of total:	71.03

% Rumen Bypass



Methionine-Sparing Effect

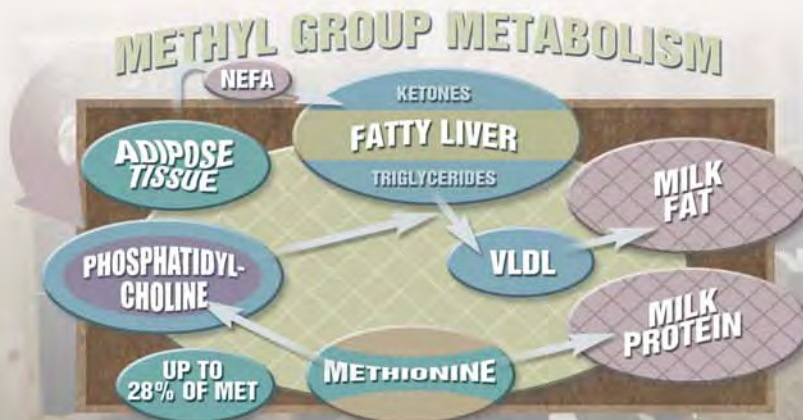
Phosphatidyl-choline is the secret weapon in Soy Best.

The mobilization of triglycerides from a cow's liver for the purpose of producing milk fat requires phosphatidyl-choline. (See figure below.) Insufficient dietary phosphatidyl-choline impedes this mobilization and causes a build-up of fat and ketone bodies in the liver. That, in turn, leads to reduced feed intake, reduced milk yield and difficulty breeding back.

When the supply of phosphatidyl-choline is inadequate to meet demand, the cow can use methionine to synthesize more phosphatidyl-choline (both are methyl donors). Research has shown that as much as 28% of metabolizable methionine can be shunted to synthesis of phosphatidyl-choline when phosphatidyl-choline is deficient.⁸ This can reduce milk protein production (methionine is an essential amino acid for milk production).

The lecithin (phosphatidyl-choline) in Soy Best has important benefits for the dairy cow.

- It has a rumen-protected characteristic.^{1,2,4,5,7} It enhances protein and amino acid bypass.
- It improves digestion of triglyceride fats and fatty acids in the small intestine.^{2,4,5}
- It facilitates mobilization of fat from the liver for production of milk fat.³
- It spares methionine for production of milk protein.^{6,8}
- It can help reverse fatty liver.⁷



1 Abel-Caines, et al., 1998. J. Dairy Sci., 81:462

2 Shain et al., 1993. J. Anim. Sci., 71:1266

3 Overton, 2001. Advances in Dairy Technology, Vol. 13, page 169

4 Jenkins and Fotouchi, 1990. J. Anim. Sci., 68:46

5 Grummer, 1991. J. Dairy Sci., 74:3244

6 Hutjens, Feed Additives in Dairy Nutrition and Management

7 Grummer, 1993. J. Dairy Sci., 76:3882

8 Miller, International Dairy Topics, Vol. 2, No. 6

What's Phosphatidyl-Choline Worth?

Commercial methionine supplements can retail for 12¢/12 grams/cow/day. Assuming the supplement is 65% methionine and 90% of that is rumen-bypass, the cost of metabolizable methionine is 1.7¢/gram.

Soy Best contains 0.61% phosphatidyl-choline which is 30% rumen-bypass.

Therefore, 2 pounds of Soy Best supplies 1.7 grams of bypass phosphatidyl-choline.

Phosphatidyl-choline is an orthophosphoric ester of choline with glycerol and two fatty acids (C16 – C20). The choline content of phosphatidyl-choline is typically 13%.

Therefore, 2 pounds of Soy Best supplies 0.22g of intestinally absorbable choline.

1 choline spares 4.4 metabolizable methionines.⁶

Therefore, 2 pounds of Soy Best can spare 1 gram of metabolizable methionine.

Relative to the methionine supplement mentioned above, the 1 gram of metabolizable methionine spared by the phosphatidyl-choline in Soy Best is worth 1.7¢, or \$17 of added value per ton of Soy Best. This is over and above the value that Soy Best brings to dairy rations as a palatable source of intestinally digestible bypass protein.

More bypass protein. More milk.

Naturally



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