LITCHFIELD ANALYTICAL SERVICES

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Feeds Forages Mycotoxins Soils Plant Tissues Manure Fertilizers Lime Water

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Interpreting Protein Dispersibility Index (PDI)

Roasting soybeans reduces the protein solubility in the rumen and breaks down the enzyme urease. Over-heating soybeans can reduce the protein solubility to the point that it cannot be broken down in the digestive tract at all. Wisconsin workers have determined that soybeans need to reach 290 degrees F and be steeped (held at elevated temperatures) for 30 to 45 minutes for optimum roasting. Optimally heat-treated soybeans will have a brown color and taste like roasted peanuts.

The United States Dairy Forage Research Center in Madison, Wisconsin has established the following table for evaluating optimally heat-processed soybeans for lactating dairy cattle:

Interpretative Data:	Protein Dispersibility Index	Comments
	> 14.00	Under-Heated
	11.01 to 14.00	Slightly Under-Heated
	9.00 to 11.00	Optimum
	< 9.00	Over-Heated

Urease is an enzyme that hydrolyzes urea ($CO(NH_2)_2$) to produce carbon dioxide (CO_2) and ammonia (NH_4). The production of ammonia causes the pH of a solution to increase. Urease is destroyed by heating. The destruction of urease is highly correlated with the destruction of trypsin inhibitors and other anti-nutritional factors. The urease activity assay is based on the pH increase from ammonia released from urea by residual urease enzyme. Properly heat-processed soybeans will have an urease activity (pH unit rise) of less than 0.02.