Coliform mastitis is the most prevalent form of clinical mastitis in the U.S. dairy industry, with *E. coli* being the main bacterium causing the infections. Producers use various treatment methods, products, and regimes to reduce the severity of infections and to cure clinical cases. However, to date no “guaranteed” preventative or cure method or product has been found to eliminate this type of mastitis. Help in reducing the impact of this type of mastitis may soon become available, though, from a plant-derived protein.

Researchers at the USDA Agricultural Research Service labs in Beltsville, MD have been investigating the effects of a protein called “CD14” on coliform mastitis in cows. CD14 is known to help the immune system fight infection by binding to a component on the outer membrane of *E. coli* bacteria. However, since CD14 is normally present at very low levels in mammary glands, it has limited impact on fighting coliform infections. What the researchers have been able to do through bioengineering techniques using tobacco plants is to produce a large enough quantity of the CD14 protein to be able to test its effects on coliform mastitis cases in cows.

Tobacco plants were inoculated with a modified virus that caused the plants to produce the CD14 protein in significant quantities that were then extracted from the leaves. The extracted protein was infused along with a known number of colony forming units of *E. coli* bacteria into quarters of lactating cows. Saline and bacteria were infused into other quarters to serve as controls. Somatic cell counts were then determined on milk samples taken at various time points after the infusions. Quarters that received the CD14 plant protein had higher somatic cell counts than did the control quarters, indicating that the immune system was stimulated to fight the infused bacteria.

The researchers also conducted studies to determine if the CD14 plant protein could enhance the clearance of the *E. coli* from the quarter. As with the measurements for somatic cells, milk samples taken at various times after infusion were evaluated for the number of *E. coli* colony forming units (CFU) present. Milk from the quarters that received the plant protein had a significantly fewer number of CFUs excreted in the milk than did milk from the control quarters.

The researchers have applied for patent protection on the CD14 plant-derived protein, and are seeking commercial partners to conduct further testing for safety, effectiveness, and proper dosage. If the product becomes commercially available in the next few years, it may first be used as a dry cow treatment. Infusing it at dry-off time along with a slow release carrier could possibly provide protection against *E. coli* caused mastitis throughout the dry period. It may also become a treatment method of choice for lactating cows since it is not an antibiotic. Since it could be produced rather easily in large quantities with a small number of plants, it should be a relatively low cost method of providing protection against one of the costliest health problems of dairy cows.