

# Vitamin E May Be Key to Safer Fowl

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Supplementing the diet of turkeys with vitamin E boosts the immune response of T-cells in the birds and helps clear *Listeria monocytogenes*, a major human bacterial foodborne pathogen, from their gut.

**S**upplementing the diets of live turkeys with vitamin E may reduce the already small chance of transmission of a serious foodborne illness.

That's the finding of an ARS study conducted on the birds that was aimed at controlling *Listeria monocytogenes*, a major human bacterial foodborne pathogen found in poultry.

Microbiologist Irene Wesley of the ARS National Animal Disease Center (NADC) in Ames, Iowa, says dietary supplementation with vitamin E stimulates live turkeys' immune responses and enhances clearance of the microorganism from the gut.

"This can reduce contamination of carcasses at slaughter and during processing," says Wesley, who conducted the study at NADC's Pre-Harvest Food Safety and Enteric Diseases Research Unit, with help from collaborators from the University of Arkansas and Iowa State University.

Turkeys can be infected with *L. monocytogenes* through contaminated

feed or water and carry it in their intestines into packing plants, where it can spread. In a 1998 U.S. Department of Agriculture study, *L. monocytogenes* was found in nearly 6 percent of turkey carcass rinses and 31 percent of ground turkey meat examined.

The microorganism causes listeriosis, a disease that affects mainly pregnant women, newborns, and adults with weakened immune systems. It accounts for 2,500 cases annually of human meningitis, encephalitis, sepsis, fetal death, and premature births. Its mortality rate of 25 percent is the highest among foodborne illnesses.

Wesley says vitamin E "boosts the immune response, boosts T-cells," the white blood cells that activate when disease-causing organisms are detected. "Vitamin E gets those guys revved up. It's like putting high-octane gasoline in a motorcycle."

## Breaking New Ground

She says that in addition to examining how vitamin E affects fowl, the study

also marked the first attempt to correlate dietary vitamin E with changes in virulence of bacterial foodborne pathogens, the dynamics of lymphocyte subpopulation, and subsequent clearance of *L. monocytogenes* in any animal species, including turkeys.

The work—aided by graduate student Meijun Zhu and faculty members Aubrey Mendonca and Dong Ahn from Iowa State; and postdoctoral fellow Rama Nannapaneni, technician Mandy Cox, and professor Michael G. Johnson of the University of Arkansas—involved two sets of experiments in which day-old turkeys were fed varying doses of vitamin E and inoculated with *L. monocytogenes* 6 weeks later. A control group that was not fed the vitamin was also inoculated at 6 weeks old. These studies have been accepted for publication in the journal *Poultry Science*.

Poultry requires vitamin E for normal development and function of the immune system. Wesley used alpha-tocopherol—the most active form of vitamin E in humans and a powerful biological antioxidant—because it is readily available from commercial sources and can be used in animal feed preparations.

Earlier tests conducted by Ahn at Iowa State showed that dietary vitamin E also enhances poultry meat's quality and shelf life.

Wesley says that after further confirming these findings, she plans to test vitamin E against *Salmonella* and *Campylobacter*, two other important foodborne pathogens.—By **Luis Pons**, ARS.

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