



## Nutrition and Health

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# Optimizing use of heat to minimize food safety risks, maximize food quality

Using heat is essential for reducing the risk of foodborne illnesses in fresh products like eggs and milk and dry goods like spices, flour and powdered milk. In addition, a number of commodities require use of heat for processing. Finding the right balance of heat to ensure food quality and safety is an ongoing process, and one that researchers at land-grant universities across the country are studying.

### Here are a few examples of that work:

- Focusing on low-moisture food products like powdered milk, researchers in **Arkansas** developed a method for choosing a heat level for pasteurization and sanitation that guarantees food safety while retaining the most vitamins, minerals and flavor. *Arkansas Agricultural Experiment Station; AFRI, Private Grants & Contracts. See [full statement](#).*
- In an additional study in **Arkansas**, researchers tested one-way valve steam technology, like that used in microwavable vegetables, to pasteurize dry foods, which can harbor bacteria in dormant form. The process adequately removed harmful pathogens, while improving heating uniformity for these low-moisture foods and preserving quality. The ability to sanitize products within their packaging and avoid overheating the outer edges of food products, an issue with conventional heating methods, could work well for dry goods like cereal, spices and flour. *Arkansas Agricultural Experiment Station; AFRI, Private Grants & Contracts. See [full statement](#).*
- Improper pasteurization methods on eggshells may unintentionally enhance pathogen resistance and virulence, increasing the risk of illness in consumers. Studies by **Ohio** researchers revealed that slow heating during pasteurization increased *Salmonella enteritidis* resistance to subsequent thermal and ozone treatments and enhanced its virulence; however, heat-ozone combinations reduced

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The National Land-grant Impacts Database (NIDB) documents the individual and collective impacts of the national Land-grant University System of joint research, education and Extension. Much of this work is supported by capacity and competitive funds through the USDA's National Institute of Food and Agriculture.

This document was prepared by the NIDB communications team. The Association of Public and Land-grant Universities' Board on Agriculture Assembly manages the NIDB.

virulence compared to heat-only treatments, suggesting a potential mitigation strategy. *Ohio Agricultural Research and Development Center; Other USDA Competitive. See [full statement](#).*

- Although it is widely believed that when foods are processed their health benefits are reduced, researchers in **Pennsylvania** have found that this does not hold true for cocoa. In fact, they have shown that cocoa supplementation helps reduce body weight and gut permeability (a contributor to development of fatty liver disease) in mice, regardless of fermentation and roasting protocol – including making it into chocolate. *Pennsylvania Agricultural Experiment Station; Hatch, AFRI. See [full statement](#).*