

# Boosting Protein With Hydrolyzed Whey

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**H**ealth-and-wellness trends are driving food formulators to increase the amount of protein in beverages, soups, sauces, bars and other applications. Whey protein hydrolysates (WPH) can be used to increase protein levels in food formulations.

WPH are produced from whey by using heat and/or enzymes in the presence of an acid or a base. Enzymatic hydrolysis is usually the method of choice, as it can mini-

mize the impact of extreme pH and temperature on the protein. When whey protein is hydrolyzed, the protein chains are broken down into smaller segments called peptides. Based on the process and types of enzymes used, these peptides can be of different lengths and may have different functionalities.

WPH can also provide a good source of bioactive peptides, specific protein fragments that can positively





influence health. Some bioactive properties of whey proteins include protection against cardiovascular disease, ion binding, antioxidant activities, immunomodulatory effects, satiety effect and anti-allergenicity (*The Journal of Clinical Hypertension*, 2006; 8(11):775-782.).

According to MaryAnne Drake, Ph.D., professor, Department of Food, Bioprocessing & Nutrition Sciences, and director, sensory applications lab, Southeast Dairy Foods Research Center (administered by the Dairy Research Institute™), North Carolina State University, Raleigh, WPH also have many formulation advantages.

Hydrolyzed whey protein is less likely to cause an allergic reaction than nonhydrolyzed whey protein, making it desirable for use in infant formulas and functional food and beverages (*Journal of Pediatrics*, 1992; 121:S47-S50).

Hydrolyzed whey protein is increasingly being used in high-protein bars to increase shelf life. Hydrolyzed whey protein does not bind as much water from other ingredients, so adding a small amount (between 1% and 2%) helps prevent bar hardening over time. Also, WPH tend to be clear, heat-stable and have lower viscosity than other proteins, making them desirable for use in isotonic beverages where high protein levels are often desired.


Product and nutrition research is ongoing to determine the benefits of WPH. The Dairy Research Institute (DRI), Rosemont, IL, is currently exploring production of WPH with improved functionality and flavor and diminished bitter notes.

Generally, the manufacturing process for WPH is to create a slurry, adjust pH, add hydrolyzing enzymes, monitor

the process until the desired degree of hydrolysis occurs, and then inactivate the enzyme with heat to spray-dry.

“Process optimization will help minimize undesirable flavors, such as brothy and cheesy flavors and bitter taste,” Drake says. The Southeast Dairy Research Institute is looking at ways to resolve these issues, including length of time for enzyme hydrolysis, time/temperature profiles in the enzyme deactivation and cool-down, and spray-drying. Other considerations involve the enzyme cocktail itself, which suppliers consider proprietary.

DRI also funded research to evaluate masking agents. “Some suppliers sell masking components with WPH, but they work best with specific applications,” Drake says. One should also look at the masking ability of other components in the entire food or beverage matrix.

Formulators should shop around for WPH, Drake suggests. Variability in aromatic notes has occurred among samples studied, and two WPH ingredients with the same degree of hydrolysis and from the same supplier can have different aromas. 

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