

Extrusion of a Meat-Based Bread Snack

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The extrusion cooking process is widely used for the production of many food products including breakfast cereals, snacks, breadings, pastas, confectioneries and pet foods. When compared to a single screw extruder, a twin screw, co-rotating extruder has more flexibility, allowing inclusion of a broad range of raw materials (including fresh meat) into various cereal grains. These can be combined with other ingredients to produce an assortment of shelf-stable final products.

A Wenger TX-52 twin screw extruder housed at The Food Processing Center, University of Nebraska, Lincoln was demonstrated. This model is a small size that is truly scalable. Prior to our demonstration, a "conditioning" product, consisting of a basic flour mix, was run through the extruder to allow for initial calibration and settings. For this demonstration, a finely comminuted meat "batter" (40%) was mixed with whole ground wheat flour (59%) and seasonings (1%) in a ribbon blender. Once mixed, the raw ingredients were placed in the extruder bin/feeder and fed into the conditioning cylinder where water and other ingredients can be added to equilibrate the mixture. In this case, however, a relatively large amount of water was already present in the mix, due to the meat component. Therefore, no additional steam or water was added. The mix then moved into the main screw chamber where high pres-

ures, high temperatures and shearing action can be applied. In this case, relatively high pressures and temperatures were applied along with shearing action. This was necessary to achieve the desired effects on a mix with this formulation. One should note that the main barrel of the Wenger TX-52 twin screw extruder is divided into sections to which different parameters can be applied. The barrel is heated by circulating hot oil.

As the product approached the end of the main screw chamber, it was forced through a die (consisting of two holes) and cut with a knife to form "pellets." These pellets were transferred away from the extruder via a conveyor belt and pneumatically transferred into a two-pass dryer. Product was dried for approximately 10 minutes at 300+°F. After a brief cooling period, the product was ready for sampling.

The finished product consisted of a crunchy snack-like product with a zesty flavor. Texture could be altered, within limits, by adjusting the formulation and/or changing extrusion parameters (i.e., temperature, pressure, degree of shearing). Flavor, obviously, could be altered by changing the seasoning blend. This is only one of many products or product ideas that are made possible with the use of extrusion technology.

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