

Extruded Snacks

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When we have family get-togethers, invariably there are several bowls of snacks on the table, just tempting our grandchildren to dig in. One of their favourites is puffed cheese snacks, which our three-year-old grand-daughter wears well – usually, all around her mouth. There's never any mistake about what she's been eating.

On a more serious side, have you ever wondered how these puffed snack foods are made? There is actually a lot of technology that goes into them. Of course, it all begins with the development of a recipe to incorporate the ingredients that provide structure and those that contribute to the taste.

Once the dry ingredients are thoroughly blended to give a uniform mixture, processing can begin. To do this, an extruder is used. There are many different designs, but they all tend to embody the same fundamental concepts.

The main part of the extruder consists of a barrel, down the centre of which is a close-fitting screw-like device. The screw's function is to rotate and convey the ingredients through the barrel of the extruder. As the ingredients are compressed in the barrel of the extruder, they are subjected to very high pressures. Mechanical shearing action creates heat which cooks the product. If insufficient heat is generated, heating elements mounted on the outside of the extruder barrel can be used.

The dry ingredients are metered into the feed end of the extruder barrel, along with any water or other liquid ingredients that are required. Frequently, steam is injected as a source of both heat and moisture. Initial mixing by the rotating screw creates a dough, which is usually starch-based. As the mixture heats up, the starches gelatinize and form a plastic-like substance which continues to be pushed, or pumped, by the rotating screw towards the other end of the extruder.

The rotational speed of the screw and the length of the barrel determine how long the mixture is in the extruder.

Once the hot, pressurized mixture reaches the end of the extruder barrel, it is forced through small openings in a die plate. These openings can have different shapes, but in the case of the puffed cheese snacks, they tend to simply be round holes.

As the hot mixture passes through the openings in the die plate, it goes from an area of extremely high pressure inside the extruder barrel to the much lower atmospheric pressure in the production facility room. This large differential pressure causes the water which is inside the mixture to expand almost instantaneously as it goes from its liquid form when under pressure to steam at atmospheric pressure. The sudden

expansion in volume makes the plastic-like dough puff up with tiny air pockets. Not only that, the change in temperature from the extremely hot area inside the extruder barrel to the much cooler temperature in the production room causes the puffed-up structure of the snack food to cool rapidly and become rigid.

The length of the extruded snacks is controlled by a set of rotating knife blades which sweep past the openings on the outside of the die plate. If the blades are moving rapidly, the extruded pieces will be short. If they are moving more slowly, the pieces will be longer.

After leaving the extruder, the puffed snacks can then be covered with a flavoured coating and packaged ready for you to enjoy.

Extrusion technology is used in many other food applications as well, including breakfast cereals, pasta noodles, and pet foods, just to name a few.



Extruded snacks come in a variety of forms and flavours