

Unit –IV

EXTRUSION BASED SNACKS

Second generation and Third generation snacks

First Generation Snacks Food

The first generation snack is also called simply extruded snacks. In this category all the natural products used for snacking, such as nuts, *potato chips line*, and *popped popcorn* are included.

Second Generation Snacks Food

The second-generation snack is also called “**expanded snacks**” or “**collet**”. These products are similar to direct expanded cereals in that they are finished snacks which are shaped and expanded at the extrusion die at moisture levels between 7-12% and generally require no further processing except for some minimal drying. The majority of the snacks fall in this category. All the single ingredients snacks, simple shaped products like Corn Tortilla Chips and Corn Puff Snacks like puff corn curls, and all directly expanded snacks are included in this category.

Third Generation (Half-products or Pellets) Snacks Food

The third generation snacks food (i.e. indirect expanded or half products) are extrusion cooked, and formed snacks at low pressure to prevent expansion, and then dried to a final moisture content of about 10% to form a glassy pellet. These are non-expanded and semi-finished snack products that are converted into finished snacks after expansion, through exposure by

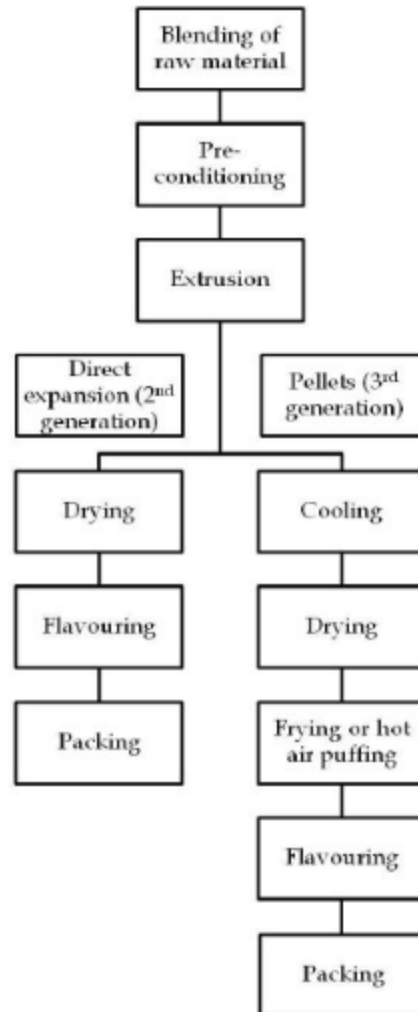
1. hot-air puffing,
2. deep fat frying,
3. baking, or microwave.

In developing third-generation snacks, “half” of the process is completed to prepare “pellets” such as pellets chips snack frying line or fully automatic pellet frying line which are shelf-stable for periods of up to a year without refrigeration, provided they are properly packed to retain their moisture. These snacks products are in high demand for marketing scope due to long shelf-life and high bulk density before frying or puffing. This third-generation snack food provides an alternative to fully prepared or finally expanded puffed snack foods. These products in the snack pellets market are available in various forms, shapes, textures, and flavors. The various types of snack pellets that are usually utilized by the extruded snack manufacturers are tapioca, potato pellet frying, mixed grains, and corn pellet frying. Potato snack pellets are the most widely produced and consumed snack pellets, followed by corn snack pellets. These pellets are manufactured by potato pellet frying machine, corn pellet frying machine, fully automatic pellet fryums frying line.

Food extrusion is a technological process in which food material is forced to flow under one or more varieties of conditions of mixing, heating, and shear through a die which is designed to form and/or puff-dry the ingredients. Extruders are used to cook, form, mix, texturize, and shape food products under conditions that favour quality retention, high productivity, and low cost.

The extrusion process with the help of technological innovations for the production of 3rd generation snacks food adds new dimensions to its marketing potential due to its long shelf

life, and high density that simplifies storage and economizes the cost of transportation. Thus, third-generation snack foods or snack **Pellet Frying Line** are semi-finished expandable snacks that are manufactured using the extrusion process.



Co extruded snacks

Coextruded Snacks

This is a relatively new technology introduced in 1984 for the snack food industry. In this process, two different materials are extruded from one die. The two materials can come from two extruders or from one extruder and one pump. This process can produce a snack with two different flavours or two textures or two colours. The most common snack produced by coextrusion is a cereal-based outer tube with a cheese filling inside. There are three basic types of coextruded snacks in the market: cereal based tubes with cereal-based fillings, cereal-based tubes with fat-based fillings, and cereal-based tubes with water-based filling. The shelf lives of

these snacks are limited, because of the migration of moisture and/or oil from the filling to the outer shell. In conclusion, snacks can be processed by a variety of different methods and techniques. Several new raw materials containing nutraceutical and functional properties are being introduced in the market every day for snack food products. Snacks can be made with a combination of different raw materials containing different properties. The role of snacks in a healthy lifestyle is only now being developed. The recognition of snacks as healthy foods will increase as industry changes the products from those having merely good tastes to nutritious ones.

The first type – cereal-based tube with cereal-based filler is obtained by using two extruders. In fact, each extruder is used to make an end product with optimal expansion. Subsequently, the products made by the extruders, join together when they enter a common die, thus forming a homogenous product. The difficulties, encountered in this operation are associated with the location of the extruders and the shape of the die. Products with a higher degree of expansion, are usually very viscous (dynamic viscosity around 10 000–100 000 Pa.s) which impede their pumping through dies with a complicated shape. This requires both the extruders to be located close to each other, usually at an angle of 90°. The composition of the co-extruded products may be identical to those of the products with optimal expansion. The main goal is to use different compounds for each of the two extruders, producing a product which is a combination of two different textures, two different colors and tastes. Most coextruded products fall into the second type – cereal-based tube with fat-based filler. The main reason for this is that cream fillings do not exude water to the pipe, which in turn has a very low humidity. Typically, the extruded products with a moisture content from 2 to 8 % have a water activity of 0,6 to 0,65. As a disadvantage may be noted that the fat and oil based products may leak out of the cereal based tube. That is why the choice of the most correct combination of

components is essential to avoid that negative phenomena. In cases where it is necessary to dry the tube and the filler, the latter should withstand higher temperatures. This can be achieved when using fats with a higher melting point, which, in most cases, leads to the appearance of an unpleasant taste of the final product. The third type of co-extruded products – cereal-based tube with water based filler, include products such as jellies, jams, pastes protein, caramel, etc. The problem compiling this type of fillers is the reduction of the moisture content in order to obtain water activity values equal or close to those of the cereal tube. Ingredients for moisture retention such as glycerin and propyleneglycol may be added, but their quantity should be in a smaller range, since they are easily detectable by the human senses.

