Manufacturing Process of Extruded Snacks

Extruded snacks were among the most commercially successful extruded foods. According to an industry report, the global extruded snacks market is projected to grow from $53.20 billion in 2022 to $77.72 billion by 2029, at a CAGR of 5.57% in forecast period, 2022-2029[6]. Extrusion cooking is the process extensively used to produce snacks which are mainly produced from cereal flour or starches. Extruded snacks are normally high in calories and fat with low protein and fibre content and perceived as unhealthy food to many consumers[2,5].

Type of Extruded Snacks[3]

1. ***First-generation snacks:***
   - Simply extruded snacks
   - In this category all the natural products used for snacking, nuts, potato chips and popped popcorn are included.
   - Some examples are three-dimensional snacks, a variety of animals, cartoon, and alphabets shapes etc.

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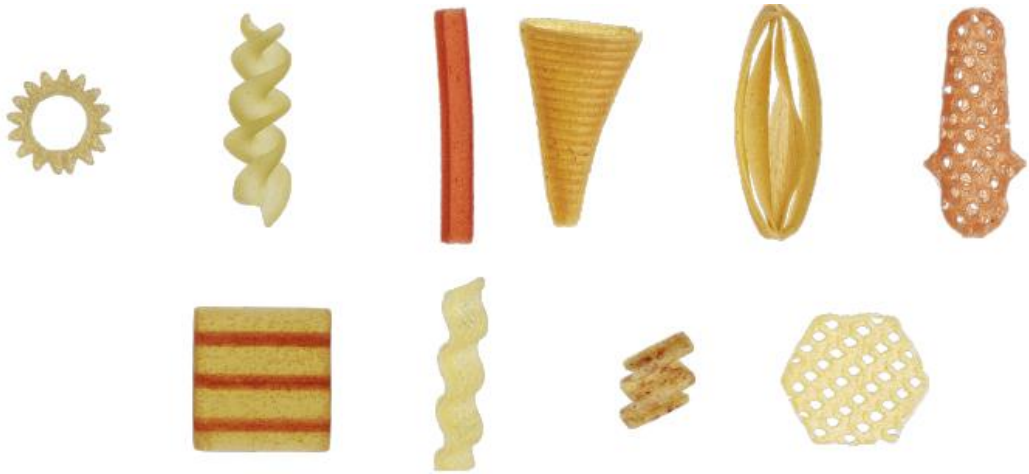
2. ***Second-generation snacks:***
   - Expanded snacks or also called as 'collet'.
   - The majority of the snacks fall in this category.
   - All the single-ingredient snacks, simple-shaped products like corn tortilla chips and puffed corn curls, and all directly expanded snacks are included in this category.
   - Some examples also include corn curls, onion rings, three-dimensional snacks and potato sticks

3. ***Third-generation snacks***
   - Semi or half products or pellets
   - Produced almost the same way as second-generation snacks, however, when the product exits the extruder, it has the form of the die, that is, it is not expanded, being dried in this form.
   - In this category, multi-ingredient formed snacks and pellets, made by extrusion cooking are included. Snack manufacturers throughout the world greatly appreciate pellets because of their long shelf life and their high-density features, simplifying storage and making them convenient and economical to transport.



Principle of Extrusion Process

Extrusion is a food processing technique used to create 'puffed' or 'expanded' snacks that are ready to eat. Specialized equipment, heat, pressure, and shear forces are used to mix substances to produce fascinating forms, textures, and flavours[1]. Food ingredients of various types which are processed by extrusion are referred to as extrudate[5].

Extrusion process also forms and shapes a dough-like material by forcing it through a restriction called the die[4]. In other words, it refers to a process by which dry or semi-moist ingredients with varying in-barrel moisture are forced through varying barrel temperature, screw speed and screw configuration through a die opening of the desired cross-section[5]. The puffing of the extrudate is due to the sudden evaporation of the pressurized steam at the die exit[2].

Its advantages include[3]:

- Energy efficient
- Lack of process effluents
- Versatility with respect to ingredient selection
- Different shapes and textures of products can be produced

Factors influencing the degree of puffing of snacks during extrusion[3]:

- Particle size
- Raw materials
- Fibre or lipids
- Temperature
- Pressure
- Dough residence time
- Feed material moisture

Conclusion,

Extrusion technology provides several advantages over the traditional methods of food and feed processing like improving digestibility, quicker processing, lesser water usage, instantizing product, higher production rate and negligible effluents.

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When compared with many traditional processes, extrusion also is more efficient, economical, and requires fewer resources (energy, water) at less cost. These factors support a bright future for extrusion in the years ahead.

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