Cooking Extruders for Pregel/Modified Starches

We offer Cooking Extruders for cooking/modification of native starch obtained from maize (corn), cassava, potato, wheat, etc. Native starch is cold water insoluble. But cooking and modification of this starch makes it cold water soluble and also imparts many desirable properties to the native starch. E.g pregelatinised starch is used in food industry to thicken gravy, sauces. In the medium and long run starch will play an increasing role in the field of "renewable raw materials" for the production of biodegradable plastics, packaging material and moulds. Starch is used by pharmaceutical, food, textile and adhesive industry. All these applications demand precooked and chemically modified starch for desirable properties.

Modifications give starch its specific and desired properties. Derivatisation technologies aim for modifications of the natural starch properties or for the establishment of new ones for utilization of starch in different applications. Thus starch molecules are degraded, chemically modified by introduction of functional groups Chemical modifications (derivatisation) are carried out for enhancement of specific starch properties. For this purpose the starch molecules are modified using different techniques such as substitution reactions, cross linking reactions, degrading reactions and starch fractionation

Extruder Cooker is ideal for carrying out the cooking/modification of natural starch. The Extruder cooks the starch with added ingredients at elevated, controlled temperatures inside a screw/barrel unit. It discharges from the Extruder in form of short lengths- a cutter continuously cuts the cooked starch as it emerges from the extruder. The modified & cooked starch is dried in a dryer to remove excess moisture and ground to free flowing granules on suitable milling equipment.

Range offered for Starch Extruders: 100 Kg-500 Kg/Hr. Pilot model for research also available.

Extruders for Aquafeed production
(suitable for floating pellets)

Cooking Extruders are also used in Aquafeed production. The premixed raw-material ingredients are transferred to the cooker extruder, after mixing and steam injection in preconditioner to precook the ingredients. The extruder fully cooks the ingredients by means of a single screw rotating inside the barrel at high speed to generate the required mechanical shear and friction to cook the ingredients. The discharge of Extruder is provided with many circular holes through which the cooked product emerges and expand or "puffs" due to rapid expansion of steam from the product, and it is simultaneously cut into small lengths by the action of die face cutter.
The excess moisture, as usual, is removed in Dryer. Colours, fats, etc. are applied in a coating drum and the product is packaged and stored for dispatch. Floating feeds are characterised as low density products.

Range offered of Aquafeed Extruders: 300 Kg-700 Kg/Hr.

Food Extruders

Food Extruders employ single or twin screws to transport wet flour inside the Extruder and compact and cook the dough to required degree, and extrude out of suitably shaped die opening. Following categories of Extruders are used for Food processing:

1) **Direct Expanded Extruder**s: The Extruder consists of single screw & Barrel segments. The food materials are pre-mixed with water and Extruded out of die opening to produce directly expanded products from Corn Meal, Soy Meal and other flours. The process is generally adiabatic with the heat for cooking the products coming from friction and mechanical working of products by the rotating screw at high speed. The water converts to superheated steam due to high temperature in the product and is held at high pressure inside the machine. When the product emerges from the shaping die,   the products expand immediately and become light weight, because the steam escapes out of the product due to sudden drop in pressure at the die. The products needs to be dried to remove excess moisture.

   Typical products from such machines are: Corn Curls, Potato fingers, Cheese Balls, Rings, Soy Nuggets, Aqua Feeds, etc.

2) **High Shear Cooking Extruders**: Single screw type, Geletinisers, mainly used to cook food at high temperature & shear (HTST). They are provided with external heating & cooling system for proper temperature control. The Conical and tapered screw are responsible for high shear generated for cooking of ingredients.
   Used for pre-gel starch, pre-cooked flours, etc.

3) **Formers**: Formers are Low Shear Single or Twin screw Extruders. They are used to re-compress or densify the already cooked, hot and moist dough, while imparting very little mechanical shear. Former also serves to "relax" and cool the already cooked extrudate (from Cooker) to be propelled through the final die.

   Used for producing Snack Pellets, as final means for shaping and cutting, and in production of cold formed shapes from food materials, Extruding Pasta products from Durum Wheat into various shapes like noodles, tubes, wheels, etc.

   For all above processes, water is essential and important ingredient to raw-material. The product from the Extruder has excess moisture present, which needs to be evaporated in suitable Dryers followed by cooling, before final packing of products.

Agitator or Mixer: It is first step in Food processing plant, used to dry mix all the ingredients before feeding to Extruder. Water is usually, not added at this stage. Consists of 'a mixing shaft fixed with number of paddles or arms for thorough mixing of dry ingredients.
Conveyors: Elevating screws are used to transport the pre-mixed raw-materials to the Pre-conditioner Vessel via the Loading Bin/Hopper.
Pre-Conditioner: It has single or double agitating shafts fitted with several mixing arms or pedals working closely with "U" Shaped Vessel. It is used for mixing water with the dry ingredients for feeding to the Extruder.

Snack Pellet Production Line:

Snack Pellet are termed as 3-G Snacks or In-direct expanded products- so called because they are fully expanded after Extrusion, by frying in hot oil or heated in hot air.
Variety of shapes are commonly produced as 2D figures. Recently 3D Pellets have been in great demand and remain hollow after expansion by frying, e.g Pillow, Grain shape, Triangular, etc. 3D shapes call for special dies and Cutter, different from Conventional die face cutters used for 2D shapes.

Snack Pellet line consists of following components:

1) Flour Mixer. 2) Elevating screws 3) Loading Bin/Hopper 4) Pre-conditioner 5) Geletiniser (Cooker) 6) Cooler Mixer 7) Former 8) Cutter 9) Pre-Dryer 10) Main Dryer 11) Cooling Belt.

Pasta Extrusion:

Pasta products includes Macaroni, Spaghetti, Noodle production and other shapes. They are produced using Former or Low Shear Extruder for Cold processing of Milled Durum Wheat or Semolina premixed with water. The homogenized dough extrudes out of a shaping die and cut into small lengths to get pasta. As before, the wet product is transferred to The Pre-Dryer and Main Dryer and finally to the Cooling Belt before being finally packaged.

Pasta Line comprises: 1) Flour Mixer 2) Elevating screws 3) Pre-mixer 4) Vacuum Capsulism 5) Extruder 6) Shaping Die 7) Cutter 8) Pre-Dryer 9) Main Dryer 10) Cooling Belt.

Vacuum Capsulism ensures removal of any air bubbles from the hydrated flour before feeding in the Extruder, as any entrapped air in the dough will result in "chalky" appearance and weak product.

Examples of Extruders being offered by us:

MEFEBG series Twin Screw Extruder for Bubble Gum

Double Blade Sigma Mixer for Sugar & Gum Base Mixing for Bubble Gum

MEFE-300 Single screw Cooker Extruder for pre-cooked flours (Geletaniser in Snack Pellet Plant). Capacity 300 K/Hr. Also in MEFEMS series of variety applications`
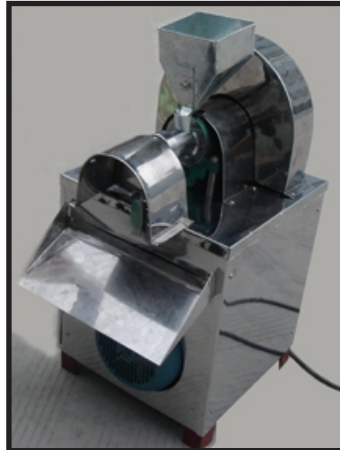

MEGA-FETS-1000 1 TPH Twin screw for producing Pet Food, Instant food, Soy products,Expanded Snack,Pasta, 3G Snack Pellets, Etc.

Continous Belt Dryer used to dry wet food products (1,3,5,7 decks)

Extrusion line for PET food (Fish, Cat,Dog,Rabbit,Horse Bird, etc. 200 Kg/Hr capacity

Snacks Puff Food Extruder
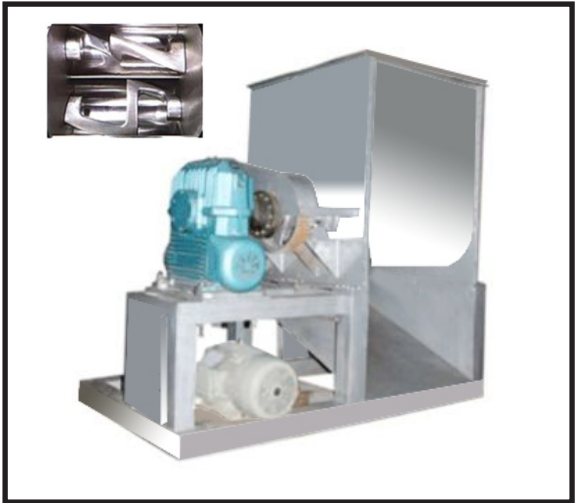

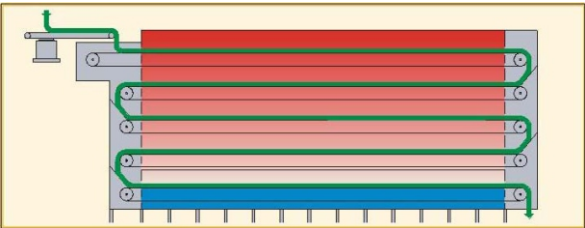Extruder for Expanded Soy Chunks from Defatted Soybean grits. Can do full fat Soy too.

Mini Extruder 50 Kg/Hr for expanded product from corn meal

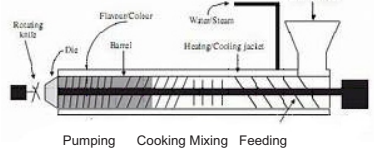Fortified Rice Kernel (FRK)

Soya Daal Analogue (DAP)

Animal pet food for Fish, Cat Dog,Rabbit, Horse, Bird, etc.

Low Shear Extrusion or Pasta

Sugar Bubble Gum from Chewable Rubber

Extrusion for Advancement

Manufacturers:

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