Japanese puffed food machinery and crafts

The puffing machine used in Japan now has an annual processing capacity of 50 to 100 kg, including puffed grains and then used as a pastry or other food material and two types of puffing machines for producing puffed food directly from puffed grains. The former representative machine has instant continuous expansion of Kekeman Soy Sauce Company and Minghe Industrial Company.

Machine, the latter is produced by Dashan Iron Works, which is the food extruder introduced in this article. The processing capacity of the raw material of the food extruder of Dashan Factory is 60 kg per hour, but it is often used in combination with two. However, the processing capacity of the extruder can also vary by 20% depending on the type of raw material, particle size, water content, nozzle area and form.

The structural principle of the Dachang Plant's extruder is: There is a raw material tank on the top of the extruder, a feeder in the raw material tank, 0.2 kW, and a vibrator, 0.75 kW. A screw barrel is connected under the raw material tank, and a feeding screw is arranged in the screw barrel. The screw rotation speed is 248 rpm and the power is 15 kW. The distance between the screw and the barrel is maintained between 0.8 and 1.0 mm, with equal pitch, high precision double thread, and the thread maintains a shallower bottom diameter. The material of the screw and the barrel, according to the Dashan factory, took three years to produce, is a patent, the service life can guarantee 40 continuous hours. It is said that the screw used by the factory to export to Southeast Asia has been used for 1, 000 consecutive hours, but after using this level, it is difficult to stabilize the shape and quality of the product. As for the nozzle of the extruder, it can be used for three years and the material is Japanese size S D steel. There are seven types of nozzles that can be replaced according to the requirements of the product form.

The puffing machine is characterized in that it does not use any heat source, and only the friction of the screw rubs the material to generate heat. After the raw material enters the barrel, it first passes through the feeding area of the screw, and then reaches the compression zone of the screw. The thread of the compression zone becomes shallower, so the raw material is compressed. The compressed raw material is then kneaded and sheared by the agitated mixing zone of the screw, and frictional compression heat occurs. At this time, the starch granules in the raw material gradually form a smear, which becomes a mushy, that is, has reached the a-chemical zone. However, there is no obvious division of the districts referred to here, and there are no templates or degassing devices, which are gradually divided by the depth of the threads. After the raw material reaches the a chemical zone, it has become liquid.

The fine body, and under high temperature and high pressure, is pushed by the screw, and is instantaneously sprayed from the small nozzles connected to the end of the barrel to the atmospheric pressure, due to the sudden exposure of the raw materials. At atmospheric pressure, the moisture contained in the raw material is instantaneously evaporating and expanding due to the pressure difference, so that numerous pores are formed in the viscous raw material, which is called a puffed food.

However, the puffed food at this time has not been tasted or scented, so it is generally only used as a material for puffed food. The material is about 5 to 8 times larger than the volume of the raw material, and some can be expanded to 30 times. Before the operation of the extruder, the barrel should be preheated with a belt heater. The temperature of the die should reach 1 °C, and the required time is about minutes. The heated mouth is such that the starting material

is able to obtain a uniform temperature. However, this heating must be stopped after the mechanical operation, and only the frictional heat of the screw itself can be used later. Of course, it can also be heated or cooled during operation when producing a special product.
When the extruder starts to operate, because the opening area of the nozzle is small, the moisture of the raw material should be raised to 30% up and down to prevent the nozzle from being clogged. The raw material at this time is called the starting material. The starting material is about one kilogram. After the starting material is squeezed and sprayed, it should not be interrupted. The raw material containing the specified water should be poured immediately. The specified raw materials do not have to be interrupted or flow unevenness after the investment. If the raw materials are not continuous, the shape of the puffed food will be uneven, and the nozzle will be blocked due to changes in the raw materials.
After the extruder is used, it is necessary to remove the charcoal remaining in the barrel and the screw, and in the operation, even if it is stopped, it must be executed, otherwise the carbon will be carried into the finished product. The cleaning of the screw and the barrel is very simple, but only the lower die, just take it out.
Third, applicable raw materials
Suitable materials for puffing are corn, sorghum, rice, wheat and buckwheat. The particle size should be broken down to 5 to 40 mesh. It is generally used for 1 and 30 days. As for the material size exceeding the above-mentioned specifications, the screw may be damaged, and it may not be puffed. If it is smaller than the specified one, it may slip in the barrel, causing the pressure to drop and the retention time to be long, resulting in carbonization of the raw material. When the raw materials are mixed with potato flour, fish meal or pigment, the ratio should be controlled to prevent the quality of the product from deteriorating. more
Raw materials containing too much grease should be avoided. The relationship between particle size and expansion is: in the same condition, if the raw material has small particle size, the expanded product has small pores, high density and low expansion rate; on the contrary, the particle size is large, the pores are large, the density is sparse, and the expansion rate is increased.
Although brown rice can be fully expanded, it has a lot of fiber, and is weaker than the refined rice. The palatability is also poor. When the whole rice is puffed, the puffing power is good, but from an economic point of view, it is better to use broken rice. And this is similar in taste.
The material after puffing is ground into powder, which can be used as a mixed powder for improving and improving the eating sensation. It can also be used as a binder for food, a tackifier, a binder for casting sand, and a dyeing and dyeing industry. The tackifier is also used as a raw material for floating bait, but it should be noted that other auxiliary materials are added after grinding, and then sprayed by extrusion, otherwise the secondary material will change during expansion.
quality
The moisture of the puffed food raw material is usually adjusted to 13 to 6 J % by a humidifier. When using a humidifier, it is important to note that the water content of the raw material is uniform and that mixing and mixing are sufficient. When the water content is uneven, the shape of the puff is not neat. The amount of water added is adjusted according to the particle size distribution, type, nozzle area, finished shape and characteristics of the barrel. If the water in the raw material is insufficient, the temperature of the barrel will rise, the expansion force will be weakened, and the pores of the material will be less and cause carbonization.
However, when the moisture of the raw material is too large, the expansion force may increase,

but the pores may be too large, which may cause roughness in the quality, which may cause excessive breakage in the drying and odor process. The temperature of the barrel is also related to the moisture content of the material. If the temperature of the butterfly tube is too low, the expansion rate is unstable, and the aization is not sufficient. However, there is also a conscious intention to make the raw material not in a state of being ablated, and after being squeezed and ejected, it is completely changed by frying. Special practice.

Five, extrusion molding

The shape of the puffed food is determined by the form of the nozzle provided on the die, but it is also possible to change the shape of the material by using different cutting speeds under the same nozzle condition. Various types of nozzles can be used to create materials such as triangles, squares, flats, stars, I-shaped, circular and hollow. In the middle of the air, it is also possible to make high-quality pastry snacks by filling fillers such as chocolate, cream or poplar. Therefore, the puffed food in Japan is both popular food and high-grade food.

The extrusion speed of the screw in the nozzle and the barrel is generally "one" 5" turn per minute, and the screw temperature should be maintained between 1"o-1"°C, and the residence time is about 10~20 seconds. The nozzle area is often in the range of 50 to 300 mm. By changing the above complex conditions, various empirical methods can be obtained. The material is cut off by a wheel that is placed in front of the die and has a slight contact with the nozzle of the die. The knife is cut, the blade has several pieces, stepless speed change, 40~6 60 revolutions per minute, 1.5 kW. In order to maintain a stable cut length, there should be a connection with the extrusion speed. The device is moved so that the puffed material is cut off after being sprayed to a certain length.

Fifth, the first dry

The material after puffing usually contains 8 ~ 10% of the upper and lower water, so in order to improve the palatability, it is better to dry the water to 2 to 3%. The drying method in Japan is to use a rotary drying device with a power of 0.4 kW and a heat source of propane gas, which consumes seven kilograms per hour. The ratio of the diameter to the length of the drying device body is 1 : 5 s, that is, when the diameter is 600 mm, the length is 3, 0 0 0 ~ 4, 800 mm. The number of revolutions of the rotating device is kept at 6 per minute.

~ 1 2 times

. The heating method includes two methods of heating the indirect metal wall and direct heating of the metal mesh. The former heating can make the material temperature constant, and can also reduce the dust scattering in the convection. The tilt angle of the rotating device is 1 to 4", and the passing speed of the material is 1 to 1.5 meters per minute, thereby maintaining the continuous material. Exercise to improve drying efficiency.

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Six, coloring and fragrance

After the grain has been puffed and dried, it becomes a material. However, the material only has the flavor of roasting, so it is necessary to carry out a taste or aroma after the puffing. For example, add liquid sauce or powdered icing, salt, pepper or coffee. The taste and fragrance, generally using a rotary cylinder machine, power of 0.9 kW. However, because the nature of the seasoning liquid is different,

This method of taste and fragrance is different. When adding seasoning liquid, the two-fluid spray method is used. Spray 3~5kg/cm 2 at the same time, and then press out the clean

compressed air to make the flavoring liquid form a mist. In order to prevent the seasoning liquid from thickening due to the temperature drop, a steam jacket or heater should be installed on the pipeline and a gas burner or heater should be installed on the cylinder to protect it. temperature

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If this is ignored, the seasoning will solidify in the pipe or at night. The inner wall of the cylinder of the cylinder scenting machine is provided with various types of multi-edge material lifters. As a measure to avoid unevenness and aroma, it should be determined based on the weight of various materials and empirical data. For the taste and flavor of the puffed food, it is also possible to add the seasoning or the like to the raw material first, but this is only used when there is a certain requirement, which can change the chewing feeling of the finished product. When using the taste of powder or granules, that is, using crepe, coffee, beef powder, cocoa, groundnut, etc., it should be carried out with a spiral belt or vibrator to avoid unnecessary stirring and reduce the breakage rate. .

17. Drying for the second time. When the puffed material is dry, if the coloring and fragrance are oily and the moisture has reached 3% or less, it does not need to be dried for the second time, and can be directly packaged. However, in the case of water-soluble taste and aroma, it should be dried to less than 3 %. The drying method at this time is called the second drying or the last drying. The final dryer is a horizontal airflow multi-layer conveyor with a stirring airflow device with a power of 5.3 kW.

In general, the drying characteristic curve of the finished product after coating is a constant drying time and a long drying time. In order to prevent the quality of the finished product from being lowered, it is necessary to limit the use of the hot air temperature, and the conveyor belt should be lengthened as a multilayer. The hot steam is supplied by a heater of an axial fan mounted below the side of the dryer's mouth and above the side of the outlet, and is circulated in the multi-layer conveyor. A fan is also provided on both sides of the conveyor belt in the dryer to stir the hot air so that the finished product can be evenly dried. At this time, the finished product carried on the conveyor belt should be evenly distributed to a certain thickness, so that in order to avoid the breakage of the finished product, the conveyor belt is vibrated and can be produced.