

Intensification of the processes and improvement of equipment for yeast dough mixing and extruding

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On the basis of the research of mixing and extruding processes of the gas-filled dough we propose the design of mixing-fermentation-forming unit, which allows to combine the processes of continuous intensive dough mixing, aerated dough pieces fermentation and formation directly to the baking plate.

There are screw tools installed in the mixing zone, a design of which foresees the provision of three-phase dough mixing, namely: mixing of the components is done with the spiral tool, mixing occurs with the minimal use of energy due to the use of screw with the large pitch and at the stage of dough plastification – the intensive mechanical processing by the screw tools with variable pitch. The use of the screw with the decreasing pitch at the final stage of mixing provides the necessary pressure for feeding into the fermentation chamber. There is a technological screen with the variable cross-section installed at the exit of mixing chamber, which provides additional dough processing, promotes the formation of the whole gluten dough structure and stay in the mixing chamber during the time needed for intensive mixing process.

The unit operates as follows: the raw material is fed into the intake funnel of the mixing chamber, where three stages of dough mixing are performed and dough is fed, then to the fermentation chamber through the screen. Carbon dioxide is accumulated in the dough mass during the fermentation in the amount necessary for the aeration of the dough pieces during the extrusion through the moulding matrix directly to the baking plate in a kind of continuous twines or individual pieces in mass production.

The advantages of the proposed design are the combination of manufacturing operations of intensive mixing, fermentation, forming and aeration in a single unit of continuous operation that provides the reduction of PFD and PID (process flow diagram and piping and instrumentation diagram), working area, operation costs savings and allows to form yeast-fermented dough products without further processing directly on the baking plate.

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