

ABSTRACT

In bread making industry, the kneading process is one key point which determine dough's working performances. Because dough's physio-chemical and rheological characteristics are defining for the quality of the finished product, it is necessary to optimize the kneading process for bread dough.

This paper followed to obtain through researches and experiments, the control and optimization of the kneading process in the industrial field, using a system for monitoring and controlling the dough consistency, applicable on any kneader.

For the validation and implementation of this system, experiments were performed in laboratory and industrial environment, using multiple types of kneaders. The results obtained from the experiments, were processed using numerical programs like Solid Works, Microsoft Office, Excel and Ansys.

Using a tridimensional model it was highlighted the influence of the kneading arms geometries over the kneading process, which underscores the high importance of understanding how dough is formed. Researches on dough rheological modifications were performed by adding the salt ingredient later into the kneading process.

One of the results of this PhD thesis was the development of, with the help of Biotehlogicreativ Company, a system for dough control and optimization, generically called, SOPF. Using SOPF, mounted on any industrial kneader, every dough batch is obtained with constant properties, because SOPF corrects dough consistency during kneading, by automatically adding water for consistency correction and by establishing the correct kneading time, using the specific energy consumption. In this way, the decisions based only on experience or intuition can be greatly reduced or eliminated.

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