Food Processing Machine Using Shock Waves and Verification of Processing Effects by Experiments

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Abstract:

We have developed a food processing device that uses underwater shock waves. Shock waves destroy the internal structure of the food, improving its extractability, softening it, and turning it into powder. This processing is non-heating because the phenomenon is high speed. The prototype device using shock waves consists of a processing unit and a power supply unit. The power supply unit is equipped with a capacitor and switch and can generate high DC voltage. The processing unit is equipped with a pressure vessel and water circulation filtration system for processing food. The inside of the pressure vessel is filled with water, and there is an electrode in the center, which generates shock waves as electricity collapses by high voltage. Food is sealed in silicone containers and processed under atmosphere. We have used this equipment to process various foods and verify the processing effects. The effects of high-quality flour milling without heating, improved oil extraction, and softening have been experimentally verified. This report introduces the following: An overview of the general-purpose processing machine and its operating principle, some results obtained from experiments using a prototype processing machine, and the design, operating principle, and processing performance of a fully automatic continuous processing machine.