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Czech J. Food Sci.

Herceg I.L., Jambrak A.R., Šubarić D.,

Brncic M., Brncic S.R., Badanjak M., Tripalo B., Ježek D., Novotni D., Herceg Z.: . Texture and pasting properties of ultrasonically treated corn starch

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The effects of high power ultrasound of 24 kHz and ultrasound bath of 24 kHz frequency on the textural and pasting properties of corn starch suspensions was examined. Suspensions were treated with different intensities and treatment times (15 min and 30 min) using an ultrasound probe set and bath. The treatments with high power ultrasound probes caused a significant lowering of the starting gelatinisation temperatures of corn starch. The ultrasound treatment caused disruption of starch granules by cavitational forces and made the granules more permeable to water. The highest viscosity was observed for the treatment with 300 W probe. Also, a statistically significant increase in solubility in water (20°C) was observed, being caused by the disruption of starch granules and molecules by ultrasound treatment. When applying more powerful ultrasound, starch granules, specifically in the amorphous region, are much more mechanically damaged. The texture profile analyses of the starch gel prepared from the suspensions that had been treated with ultrasound probe presented higher hardness and higher values of adhesiveness and cohesiveness when compared with untreated suspensions or those treated with ultrasound bath. Micrography showed an obvious impact of ultrasound on the structure of starch granules. Ultrasound treatment ruptures and mechanically damages the starch granules causing collapse of cavitation bubbles which induces high pressure gradients and high local velocities of the liquid layers in their vicinity.

Keywords:
corn starch; ultrasound; texture; solubility; pasting

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