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Application of hydrodynamic cavitation in brewing

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The positive role of hydrodynamic cavitation (HC) is the object of study in the last two decades. HC phenomena involves the generation, growth, coalescence and subsequent implosive collapse of bubbles or cavities, occurring in few microseconds and releasing large magnitude of local pressure and temperature. Due to its very high oxidative capability in combination with mechanical shockwaves, HC process can disrupt the biological cells, destroy microorganisms, neutralize toxic chemicals or change molecule structures.

The aim of this work is to apply these advantages in the brewery industry. In the field of beer brewing, we would like to investigate several phenomena, such as the isomerization of bitter hop acids, the reduction of gluten concentration or the cell-walls breakdown.

The first step in the field of cavitation have been the construction of the experimental setup formed by the special jet and the pump control. Venturi jet system with special inclined tube have been chosen as the HC technique due to energy savings and robust design. The process of cavitation has been occurred and examined in more details. Hence the Venturi tube was installed in real scale brewery system.

Several experiments have been performed to confirm the positive effect of hydrodynamic cavitation on the isomerization of the hop bitter substances, and significant influence in gluten removal due to the cavitation. Furthermore, several parts of experimental brewery have been improved. The regulation of individual parameters affecting the performance of HK have been achieved due to equipment improvements.

Hydrodynamic cavitation is a very interesting phenomenon, which can find application not only in the process of beer brewing, but also in the entire food industry. It is important to investigate this phenomenon, to find the mechanism and to expand into new application.

