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Application of Hydrodynamic Cavitation in Brewing

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Hydrodynamic cavitation (HC) in positive role is the object of study in the last decade. HC phenomena involves the generation (inception), growth, coalescence or fission, traveling and subsequent implosive collapse of bubbles or cavities within in a liquid, occurring in few microseconds and releasing large magnitude of power. Due to its very high oxidative capability in combination with mechanical shockwaves, HC process can disrupt the biological cells and destroy microorganisms, or neutralize bio-refractory and toxic chemicals (e.g. in wastewater treatment). In milk industry, HC treatment may decrease temperature of pasteurization of about 30–40 °C .

We have applied such advantages in the brewery industry. Venturi jet system is chosen as the HC technique due to energy saving and robust design. 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. All these experiments will be performed on the already constructed experimental brewery system.

The desired chemical changes in the treated matrixes depend on the HC parameters as velocity liquid flow, ambient pressure, liquid temperature and jet geometry. All of these parameters are included in cavitation number that reflects the cavitation regimes and hence the favourable state of chemical reaction. Optimisation of this method will intensify mass transfer process as extraction, bubble convection, adsorption, etc. without need of heating.