

Enhancement of high pressure homogenization pretreatment on biogas production from sewage sludge: a review

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ABSTRACT

Different kinds of pretreatments have been practiced to disrupt sewage sludge and release extracellular polymeric substances of sludge flocs and inner constituents of bacteria cells for efficient biochemical conversion and biogas production. Among them high pressure homogenization (HPH) is a promising unconventional mechanical pretreatment method. HPH pretreatment works on the principles of turbulence, cavitation and shearing, solubilizing the sludge or enlarging its surface area for enzymatic attack, so that enzymatic hydrolysis can be efficiently enhanced and subsequently biogas production can be significantly improved. HPH pretreatment of sewage sludge is not only investigated in research work (theoretically), but also it has been integrated into sewage sludge treatment in wastewater treatment plants, presenting positive results. However, there is still research gaps in terms of efficiency improvement and cost minimization. This review paper outlines promising aspects of sludge HPH pretreatment for biogas production enhancement and presents directions for future researches to fulfill the research gaps.

Keywords: High pressure homogenization; Pretreatment; Sewage sludge; Disintegration; Enzymatic hydrolysis; Biogas production

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