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Improvement of immobilization of fat, oil and grease (FOG) by calcium alginate (Article)

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Abstract

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Current wastewater pre-treatment plant system handling FOG consumes high energy and time. This study aims to introduce a new FOG wastewater pre-treatment by immobilizing the FOG in a calcium alginate gel beads. Using Design-Expert software, Response surface methodology (RSM) based on face centred central composite design (FCCCD) was used to optimize two important variables; pH of FOG and concentration of sodium alginate whereas the oil entrapment efficiency (OEE) was used as a response. The mixtures of synthetic FOG wastewater and sodium alginate were dropped in calcium chloride solution in droplets form to produce gel beads. The optimum combination for having highest OEE percentage at 87.27% was found to be at pH 4.7 and 10000 ppm concentration of sodium alginate. Moreover, coating the gel beads with chitosan has reduced the FOG loss during mechanical expression from 23.73 % to 12.58 %. The gel beads were dissolved completely in phosphate buffer solution of pH 5, 8 and 9. This technique can be applied for easier FOG removal, for it has high OEE percentage and the final gel is also biodegradable. © 2017 PENERBIT AKADEMI BARU - All rights reserved.

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