EVALUATION OF ENHANCED COALESCING STRATEGIES FOR THE RECOVERY OF STABILIZED OIL DROPLETS IN THE PRODUCTION OF ADVANCED BIOFUELS

By

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Abstract

The increasing interest in renewable alternatives to the fossil fuels has allowed the development of production processes for the commercialization of microbial diesel and jetfuel based on fermentative route, however, the production costs are still high and need to be reduced in order to make the process economically feasible. One of the possibilities is the reduction of the downstream steps for the recovery of the product, and in this frame, one technique developed for the separation of the oil in-situ is gas sparging. It is known that this method induces the destabilization of the emulsion created between the oil and the fermentation broth by means of the contact between bubbles and oil droplets, however, the recovery that has been obtained experimentally is still low at the different conditions tested, and the path towards higher recoveries is not clear since the mechanisms by which the separation occur are not fully understood yet.

A review on former studies on the method for different emulsions evidenced that there are process conditions that have not been controlled, remaining out of the analysis, and indicated that there is a correlation between [redacted] and higher recoveries. Based on these observations, the present work is focused on the evaluation of different coalescing strategies from the perspective of process conditions [redacted] and process technologies [redacted]), with the objective of determining their impact in [redacted] and the oil recovery, finding suitable conditions to improve the process.

[redacted]

[redacted]

[redacted].

In summary, the [redacted] strategies studied were successful in improving the oil recovery in the synthetic emulsion with Tween 80, but were not successfully validated for the emulsion with casein. The differences observed between the two emulsions indicate the need to expand the study of the separation method to syntethic emulsions stabilized with proteins, which are considered to be more representative of the challenges encountered in fermentation broths.