

Bioprocess Engineering

P-025 - OPTIMIZATION OF LINOLEIC ACID EMULSION PREPARATION TO REDUCE SUBSTRATE LOSSES AFTER FILTER-STERILIZATION

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Background

Conjugated linoleic acid (CLA) isomers are bioactive fatty acids that can be produced microbiologically from linoleic acid (LA). *In vitro* studies normally test CLA production using a solution of pure LA at a specific concentration and an emulsifier, usually Tween 80, upon which the mixture is filter-sterilized [1]. However, preparation leads to LA losses requiring higher amounts of LA to achieve the intended concentration. Thus, the aim of this work was to optimize the LA emulsification strategy in order to obtain a more efficient and cost-effective procedure.

Method

Four different treatments were applied to LA solutions at 15 mg/mL with 2% (w/v) Tween 80: i) Filtration (0.45 μ m-pore size membrane; F4); ii) Ultra-Turrax (90s [A] or 150s [B] at intervals of 30s) + Filtration (0.45 μ m); iii) Sonicator (90s at intervals of 30s; 1s pulses [C]) + Filtration (0.45 μ m). The application of a smaller pore sized membrane assuring microbiological sterility was further tested and two different treatments were applied: i) Filtration (0.20 μ m-pore size membrane; F2); ii) Ultra-Turrax (150s at intervals of 30s [D]) + Filtration (0.20 μ m). All experiments were carried out in duplicate. Aliquots of each solution were collected before and after treatment for LA concentration analysis by gas chromatography [2].

Results & Conclusions

Filtration of LA emulsion directly through a 0.45 μ m-pore size membrane (F4) led to a 17.09% LA loss whereas the introduction of a blending step, either using a sonicator (C) or an Ultra-Turrax (A and B) led to lower losses of 13.01% and 7.17% and 7.40% ($p > 0.05$), respectively. A smaller filter pore size membrane (0.20 μ m), also contributed to lower losses; LA reductions were from 10.07% (F2) to 3.71% (D). In conclusion, a previous dispersion with Ultra-Turrax, independent of the filter pore size, demonstrated to be the best method to reduce substrate losses in filter-sterilization of LA emulsions.

References & Acknowledgments

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