Evaluation of Sour Buttermilk as potential source of biosurfactants

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Introduction

Butter made from a **fermented** cream is known as cultured butter and it presents various advantages in comparison with non-fermented butter. When butter is produced through a fermentation stage **lactic bacteria** convert sugars into lactic acid and other prebiotic substances as lactic acid bacteria are considered probiotic microorganisms. Moreover, the lactic acid fermentation process produces additional aroma compounds, including diacetyl, which give a more savoring product that it is very appreciated by consumers.

On the other hand, it is known that lactic acid bacteria produce **biosurfactants** [1; 2] and hence the buttermilk stream, obtained during the elaboration of culture butter involving a lactic acid bacterium, can be a **potential source** of biosurfactants.

Materials & Methods

Sour buttermilk provided by FEIRACO was **centrifuged** 5 min at 14,000 rpm, **filtered** with hydrophilic PTFE syringe filter and several dilutions in water were stablished.

Following the **surface tension (ST)** of these dilutions was measured, allowing the use of the Wilhelmy plate method. After that the **critical micellar concentration (CMC)** of this stream was calculated following the protocol stablished in previous works [3].

Then, the variation of ST with concentration was studied based on the isotherm model proposed by Li & Lu [4] that allows to predict the concentration of biosurfactant for a specific ST value.

Results

The ST of water was reduced in more than 20 units, with a CMC lower than 0.5 g/L, being more favorable than other CMC reported in the literature [5]. The coefficient of determination (r^2) obtained with the isotherm model proposed by Li & Lu was 0.93, and the fit parameters r_{max} (the maximum number of biding sites) and K (the adsorption equilibrium constant) were $1.42x10^{-6}$ (mol/m^2) and 2191.26 respectively.

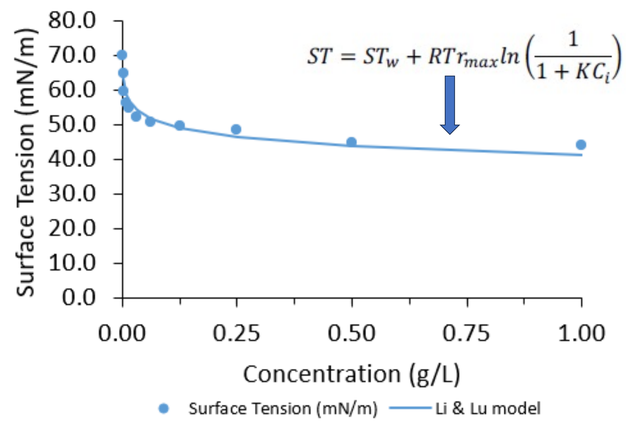

Figure 1: Variation of surface tension with the concentration that fits the isotherm model proposed by Li & Lu.

Conclusions

Based on these results it can be concluded that the secondary stream obtained during cultured butter production it is a **potential source for the extraction of biosurfactants** and open the door to the valorization of this stream promoting a **more sustainable environmental** by stimulating the production of more sustainable and biocompatible surface-active agents and also promoting industrial symbiosis.

Acknowledgements

This study was supported by the Project TED 2021-129650B-I00 funded by MCIN/AEI/ 10.13039/501100011033 and by European Union Next Generation EU/PRTR.

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Financiado por la Unión Europea NextGenerationEU

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