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Production of exopolysaccharides through fermentation of secondary whey with kefir grains

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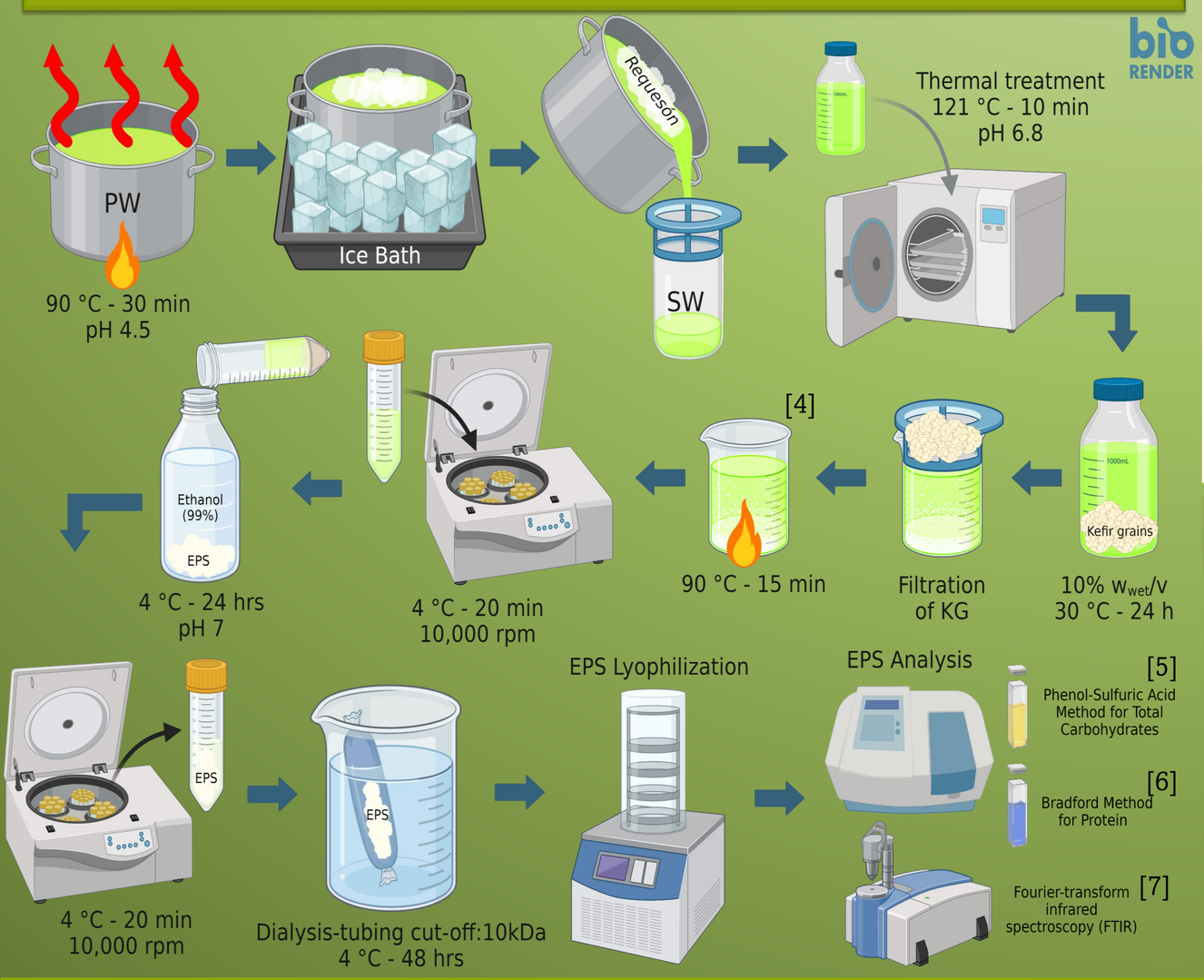
INTRODUCTION & AIM

The cheese industry produces millions of tons of primary whey (PW) each year, and due to its composition poses significant environmental challenges. Only 50% of PW is being repurposed for the preparation of added value products, while the rest is discharged into water and soil. [1] In Mexico, PW is used to produce *Requesón*, a whey cheese that generates another by-product rich in lactose, secondary whey (SW). This study proposes an alternative use for SW as a fermenting substrate for lactic acid bacteria (LAB) to produce functional bioproducts like exopolysaccharides (EPS). This approach not only reduces waste but also contributes to a more sustainable cheese and EPS production process.

EPS are biopolymers excreted by LAB that can be associated with proteins, lipids, ions, and other compounds. EPS have broad physicochemical and rheological properties and many applications in numerous industries, including their use as biodecontamination agents due to their capacity to adsorb toxic compounds like mycotoxins. [2,3]

Therefore, this work aimed to evaluate EPS production and extraction from SW (EPS-SW) and partially skimmed milk (EPS-M) fermentation with kefir grains (KG) and compare their production and composition.

METHODOLOGY



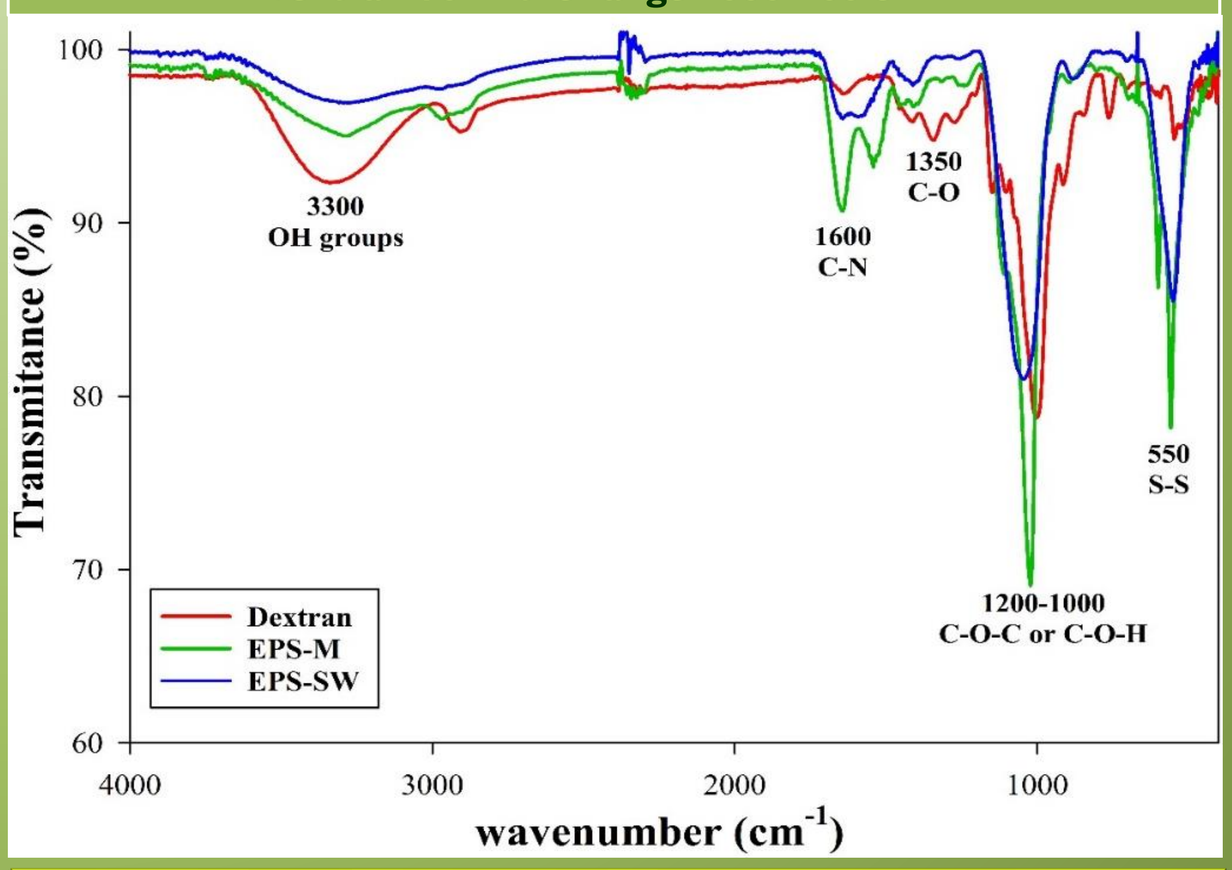
RESULTS & DISCUSSION

Table 1. Comparison of EPS characterization

	EPS-SW	EPS-M
Lyophilized EPS (mg/L)	632.6 ± 30.8	6138.1 ± 493.2
Protein[6] (μg_{eq} BSA/mg of EPS)	26.04 ± 2.63	86.18 ± 3.27
Carbohydrates[5] (μg_{eq} glucose/mg of EPS)	75.33 ± 0.38	73.66 ± 1.68

- ✓ SW can be fermented with KG to produce EPS.
- ✓ EPS production in SW is significantly lower compared to using milk as fermenting substrate. However, the carbohydrate-to-protein ratio improves when using SW.
- ✓ The need for fat in the fermentation medium should be analyzed to optimize EPS production in SW.[8]

Figure 1. FTIR spectra of lyophilized EPS-SW, EPS-S, and Dextran 70 in the range 4000-400 cm-1



CONCLUSIONS/FUTURE WORK

- Secondary whey is a suitable fermenting substrate for kefir grains to produce functional bioproducts like exopolysaccharides.
- The obtained EPS from SW fermentation with KG showed FTIR spectra similar to Dextran 70 and EPS-M.
- EPS-SW use for mycotoxin decontamination of food matrices will be tested.

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