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MS Thesis: Characterization of Lyophilized and Spray-Dried Platelet Lysate as XenoFree Serum Alternatives for Regenerative Medicine

Author: Holds a bachelor's degree in Biotechnology from Lodz University of Technology in Poland, specializing in technical microbiology and fermentation processes, spent semester in PXL Hogeschool (Belgium) to work on project from molecular biology. Moved to Iceland in 2021 for an internship at Omnom Chocolate, later working at Alvotech. Resigned to focus fully on a master's thesis project. The thesis aimed to develop pathogen-inactivated platelet lysate (PIPL) formulations as xeno-free alternatives for regenerative medicine. PIPL was produced from expired blood platelets and processed into liquid, lyophilized, and spray-dried forms. Stability and bioactivity were evaluated, showing that spray-dried PIPL maintained comparable stability to other formulations.



Short summary: BCA results showed that S-PIPL-H had the highest initial protein content and remained relatively stable over time. S-PIPL-L and S-PIPL-M showed increased protein levels at 40 °C, likely due to concentration from water loss. ELISA assays further confirmed the superior performance of S-PIPL-H, which maintained the highest levels of TGF- β and EGF in most cases. L-PIPL also performed well in terms of protein preservation and growth factor stability. While PIPL showed improved TGF- β levels over time, its EGF retention was lower and more variable. In summary, S-PIPL-M demonstrated the best balance of biological performance and S-PIPL-H demonstrated the best overall stability and bioactive protein retention across BCA, and ELISA assays, making these variants most promising formulations.