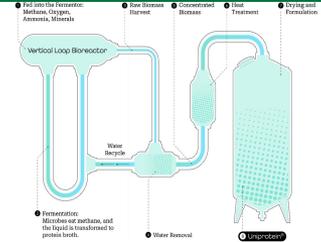


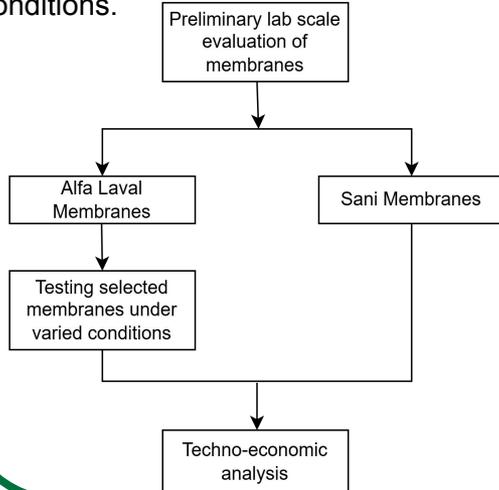
## Introduction

- Unibio produces microbial protein from biogas-fed methanotrophs and seeks more sustainable, efficient use of side-streams.
- This study focuses on valorizing a nutrient-rich side-stream using membrane filtration for potential feed and food applications.



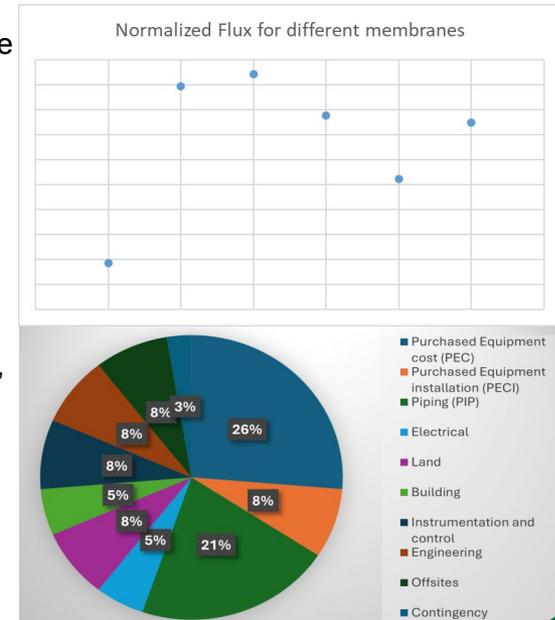
## Methods

This study investigated the use of polymeric flat sheet membranes under varying pore sizes, cross-flow velocities, and TMP conditions.



## Results

- Membranes suitable for MF, UF, and NF were selected along with corresponding optimal transmembrane pressures (TMPs).
- Further membrane testing included sample pre-treatment, maintaining cross-flow velocity, and temperature control.
- Three process flow designs were developed, with estimated CapEx and OpEx for each.
- Techno-economic analysis was used to assess and compare the economic feasibility at industrial scale using profitability and sensitivity analysis



## Conclusions

- Membrane configuration and operating parameters significantly influenced separation efficiency and product recovery.
- Techno-economic analysis identified the most cost-effective process configuration with the highest NPV.
- Integrating membrane filtration improved resource use, enhanced sustainability, and ensured economic feasibility.