

Engineering *Pseudomonas putida* biocatalysts for the production of antimicrobial biopolyesters

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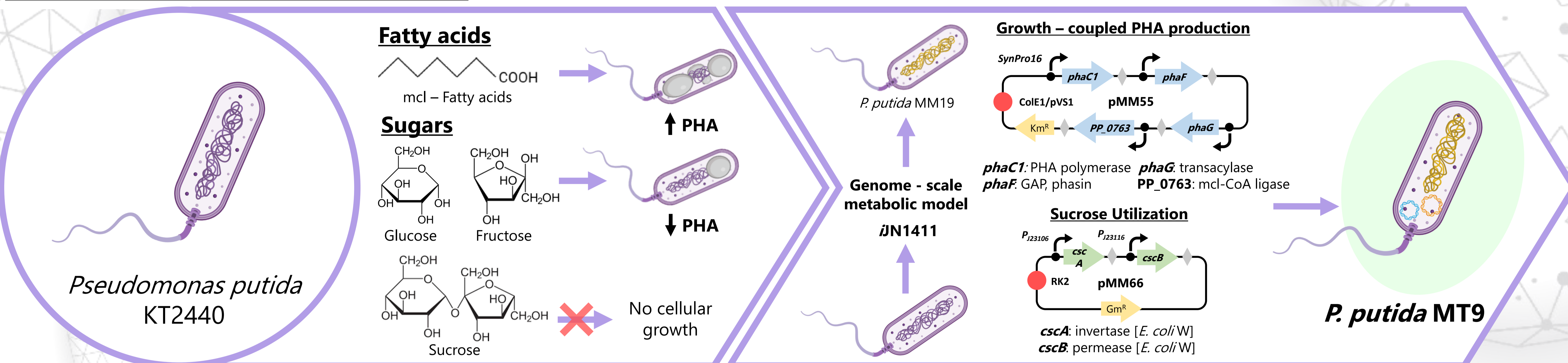
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Introduction

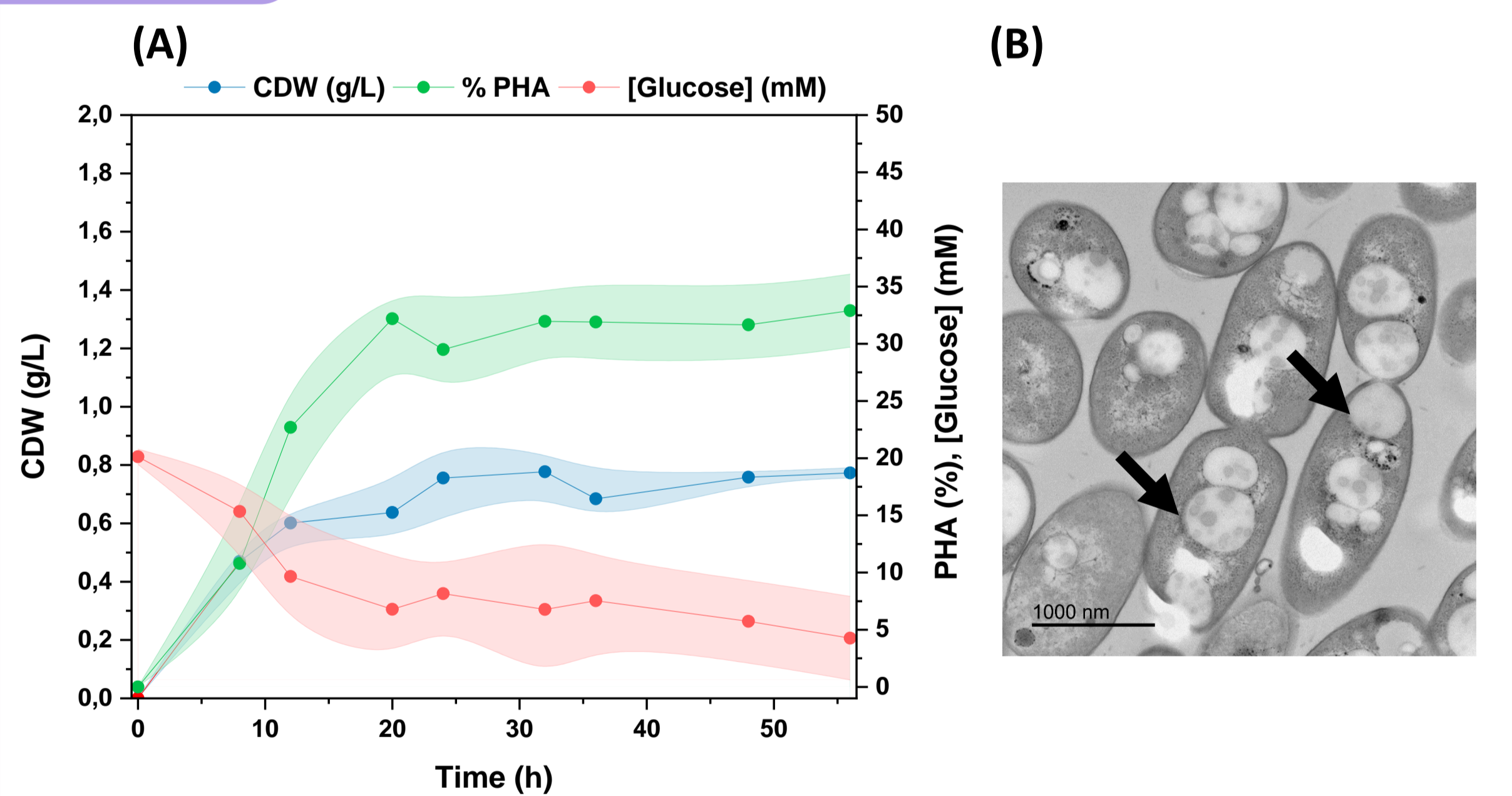
Biomaterial-associated infections (BAIs) are one of the main issues to overcome in regenerative medicine. A promising alternative is offered by PHACOS, a naturally functionalized bacterial polyhydroxyalkanoate (PHA) with thioester groups in the lateral chains that confer antimicrobial activity to this biopolymer. In this work, we studied the production of PHACOS by using an engineered *Pseudomonas putida* strain that utilizes sugars, e.g., monosaccharides and disaccharides, as an inexpensive and highly abundant feedstock.

Background and Procedure

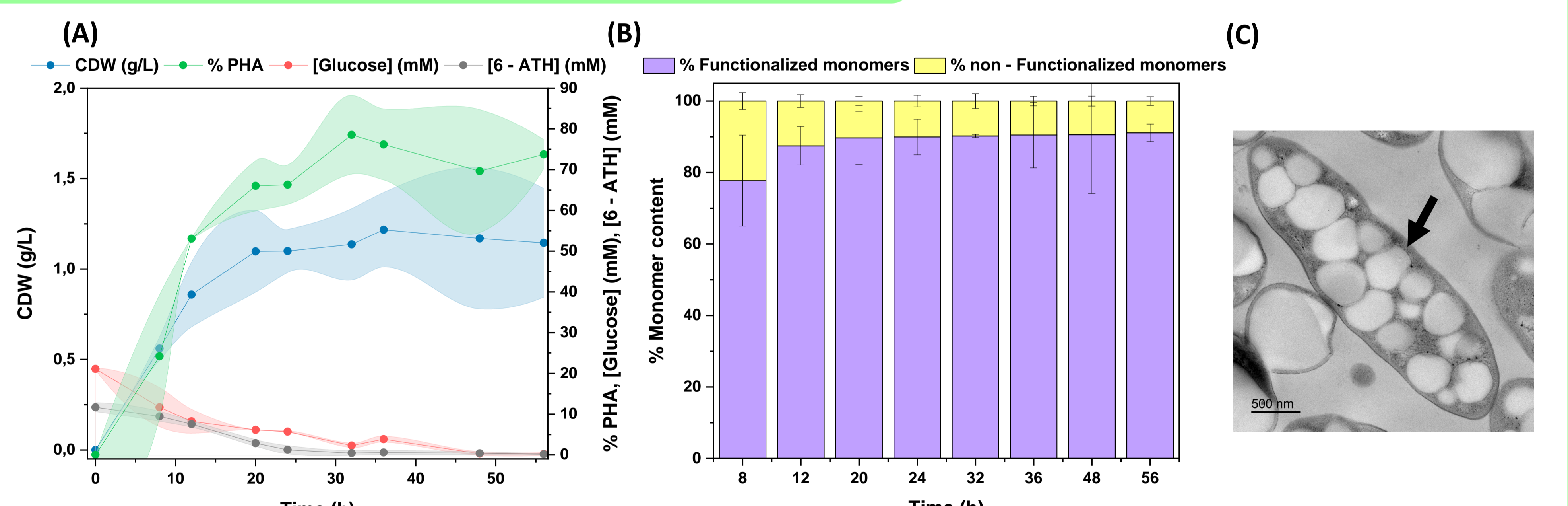


Results

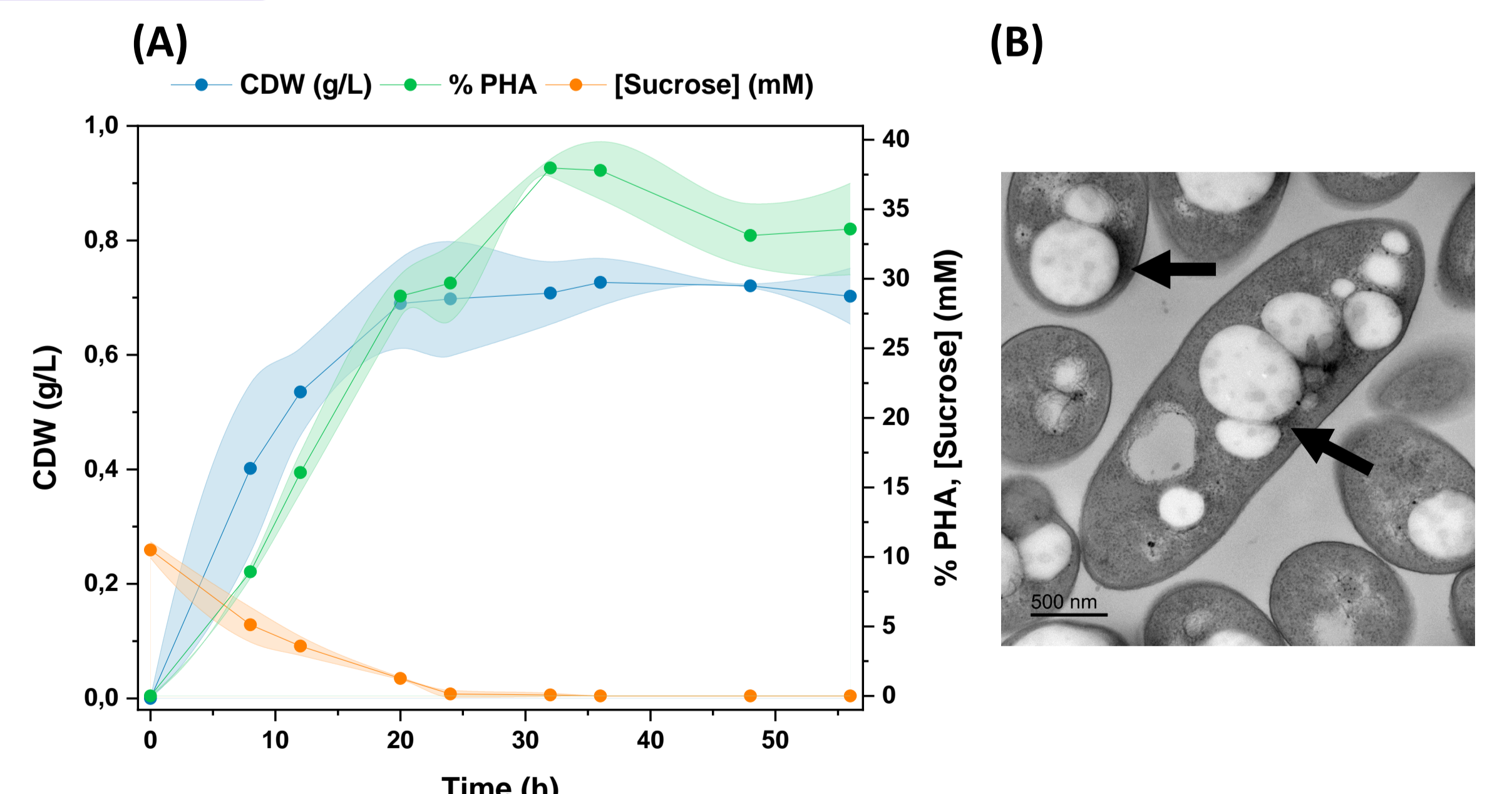
Glucose



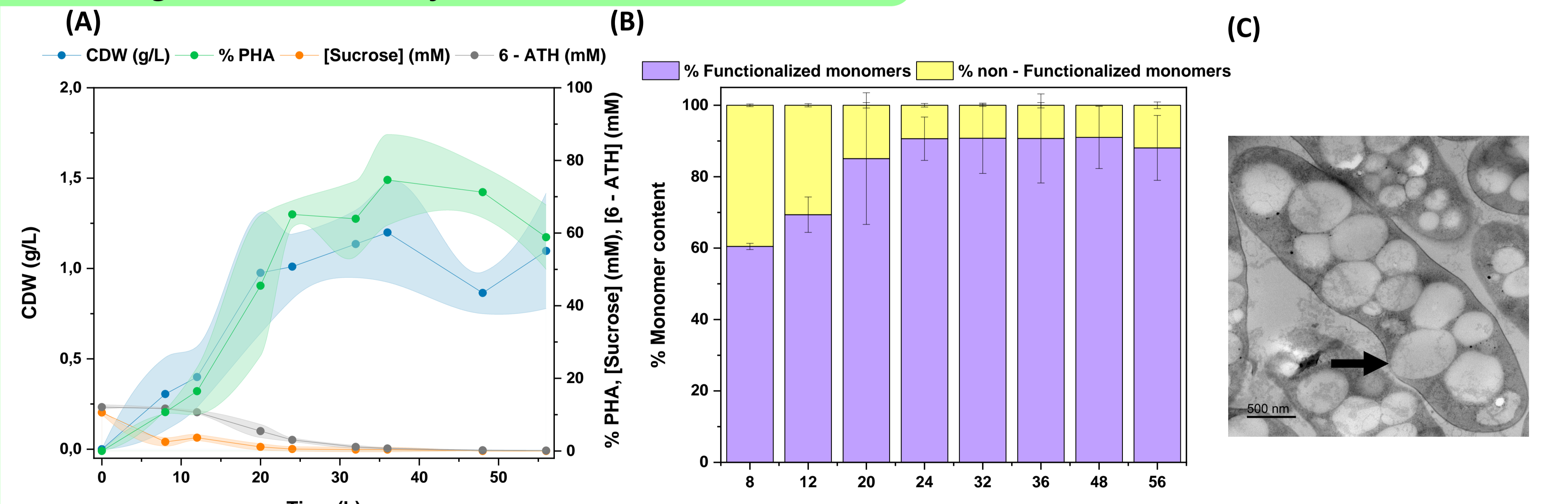
Co-feeding Glucose + 6 - acetylthiohexanoic acid (6-ATH)



Sucrose



Co-feeding Sucrose + 6 - acetylthiohexanoic acid (6-ATH)



Conclusions

- A model-driven recombinant *P. putida* KT2440 strain able to metabolize sucrose (pMM66) and to produce PHA coupled to cellular growth (pMM55) (*P. putida* MT9) accumulates around 35% CDW PHA when cultivated in glucose and sucrose as sole carbon sources.
- Co-feeding of glucose/sucrose and 6-ATH increases up to 70% CDW PHA accumulation using recombinant strain MT9.
- Functionalized monomers are predominant in the PHA produced when 6-ATH is present, revealing for the first time the biological production of PHACOS from sugars.

