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Starch aerogels, cryogels and xerogels for biomedical applications

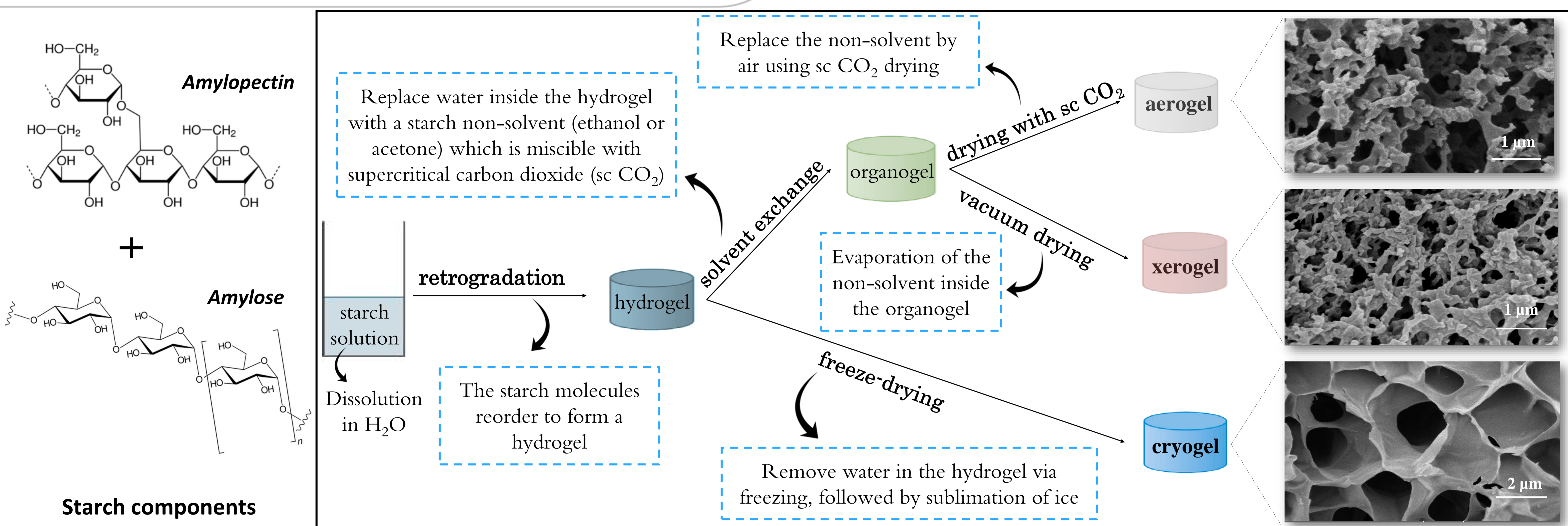
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Context

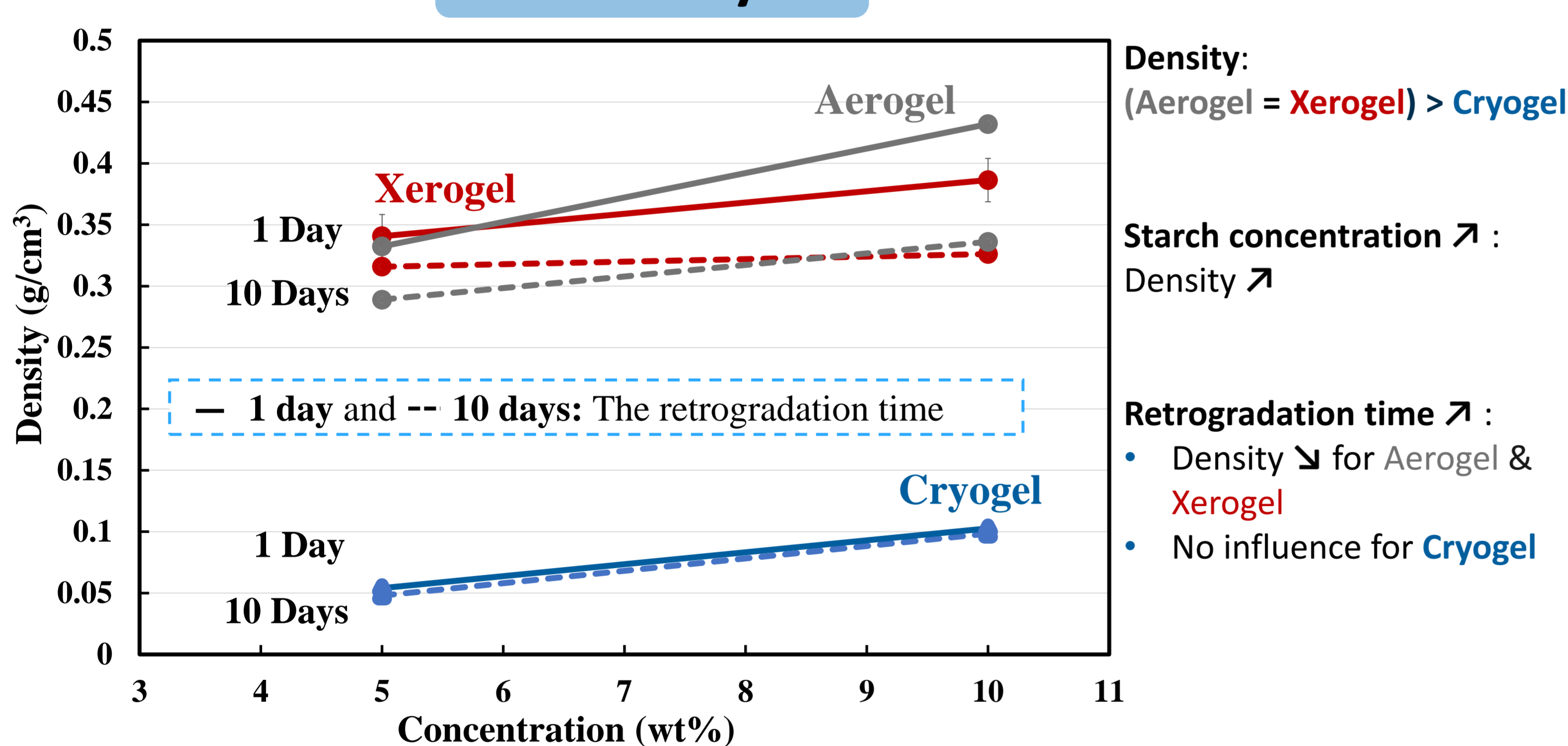
- Lightweight and porous materials are essential for progress in different fields. Starch-based porous materials have great potential for various biomedical applications, from scaffolds to drug carriers.¹
- Each application requires specific structural and physico-chemical properties. It is thus important to understand e.g. morphology development during processing and to correlate it with final material properties.
- We investigated the influence of preparation conditions on the properties of porous starch materials.

Preparation of porous starch materials

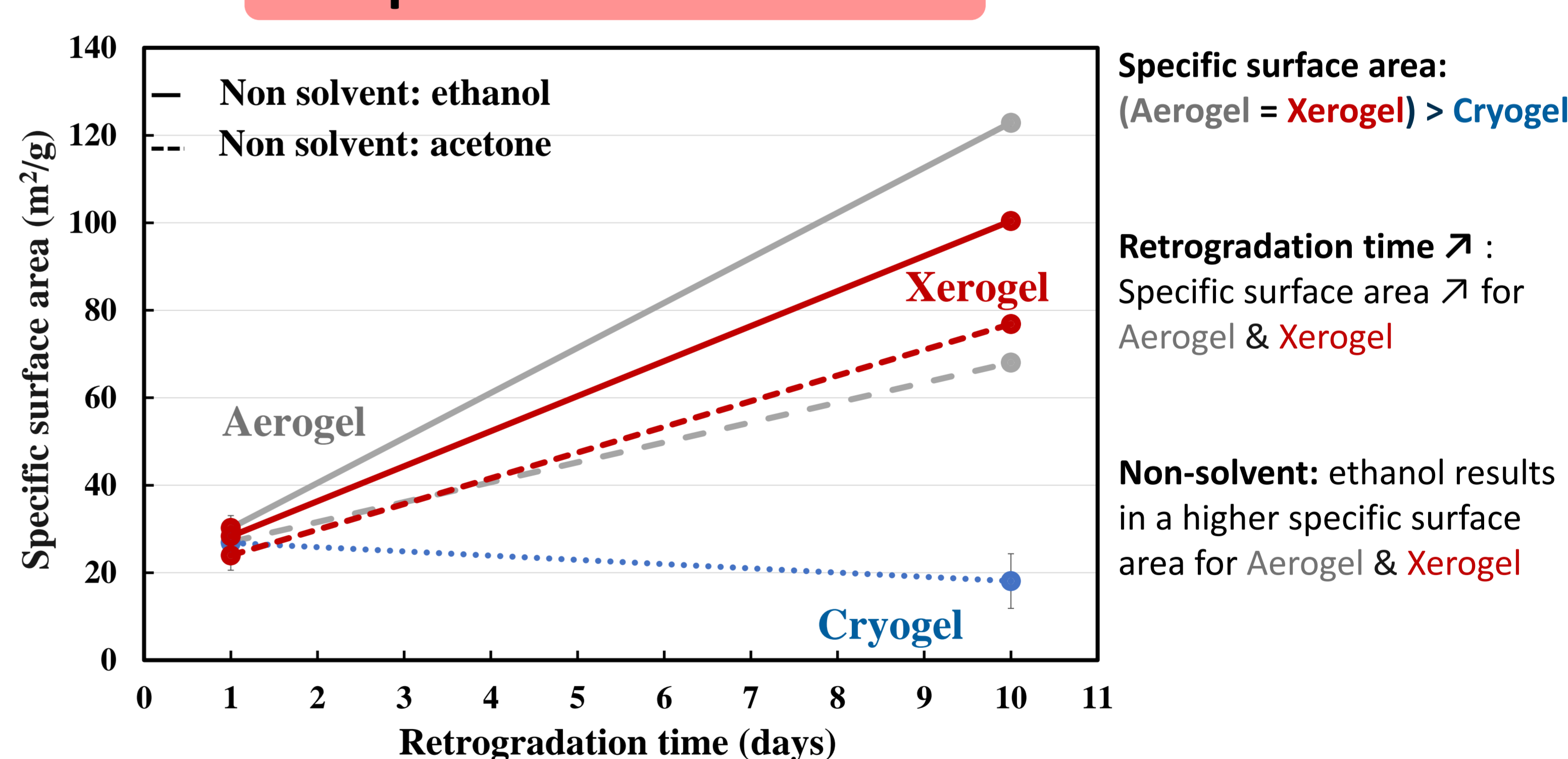


Results

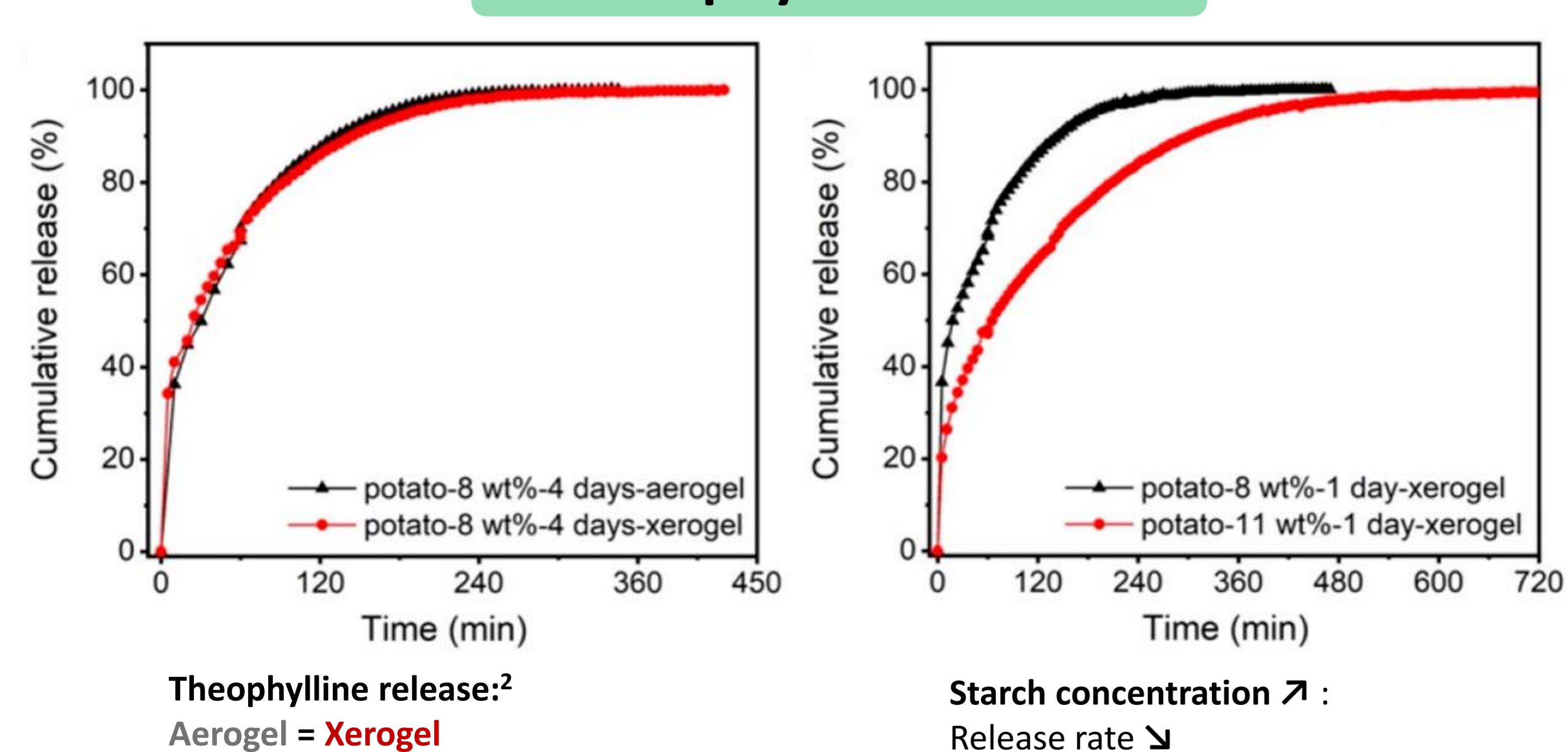
Density



Specific surface area



Theophylline release



Conclusions

Porous starch materials have:

- Density:** from 0.05 g/cm³ for Cryogels to 0.4 g/cm³ for Aerogels and Xerogels
- Specific surface area:** from 20 m²/g for Cryogels to 120 m²/g for Aerogels and Xerogels
- Young's modulus:** up to 20 MPa
- Mesopores and macropores**

Aerogels and Xerogels have:

- Higher density and specific surface area than Cryogels
- Similar properties → Vacuum drying (Xerogels) is a cost-effective alternative to the expensive sc CO₂ drying method (Aerogels)

Acknowledgements

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