

Chair of Bioprocess Engineering

Natural colorants from *Basidiomycota* FungiColor

Dr. Marlen Zschätzsch

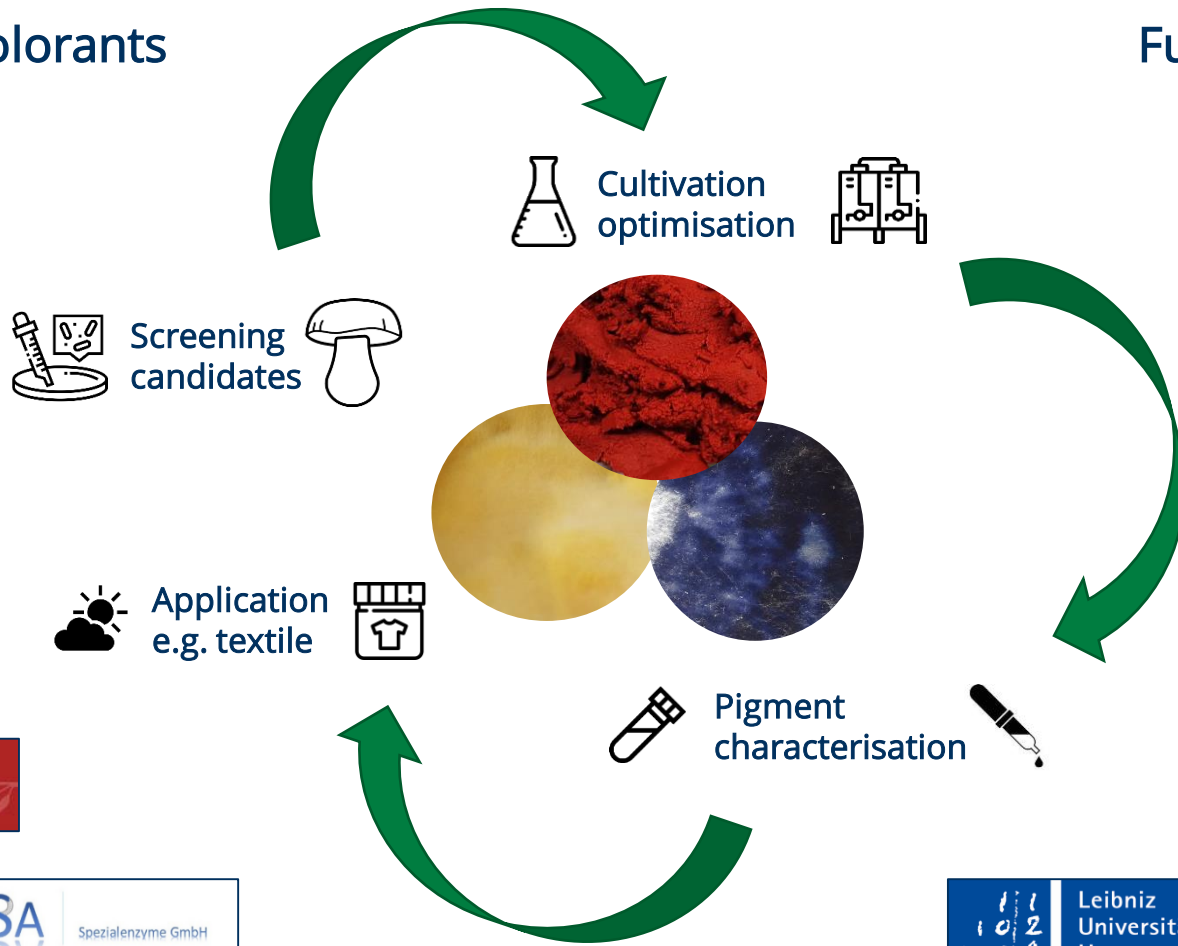
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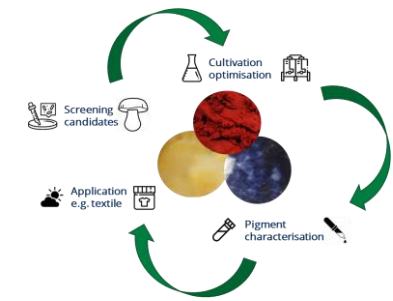
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Natural colorants

FungiColor



Natural colorants - FungiColor



Motivation

Circular bioeconomy

- Valuable products from agricultural waste streams by lignocellulose degrading fungi
- Natural alternatives for synthetic (sometimes harmful) colorants
- Environmental friendly production of dyed materials

Applied techniques

Fermentation

- Submerge fermentation (shake flasks, 7 L – 70 L bioreactor) → media optimization
- Emerse fermentation (agar plate to rotating drum reactor, various solid substrates)
- Process analytics (online: pH, DO, T; offline: biomass, sugar composition/concentration, TN, TOC, pigment extraction, UV-Vis)

Enzymatic assays (cellulase, xylanase, laccase)

Microscopy

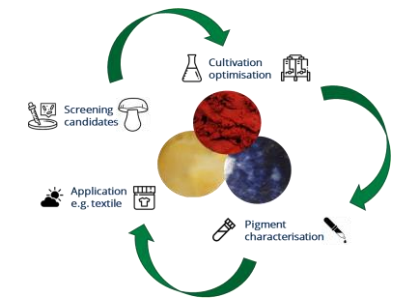
Pigment application

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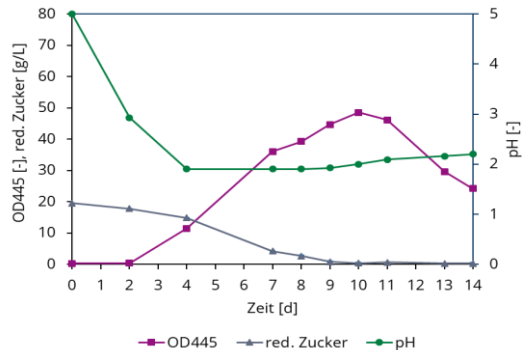
State of the project

Laetiporic acids from *Laetiporus sulphureus* (Zschätzsch et al., 2021)

- Growth on agricultural waste substrates
- Submerge cultivation up to 70 L
- Pigment extraction + stability
- Pigment application (textile dyeing)



70 L upscale cultivation parameters



70 L bioreactor at harvest

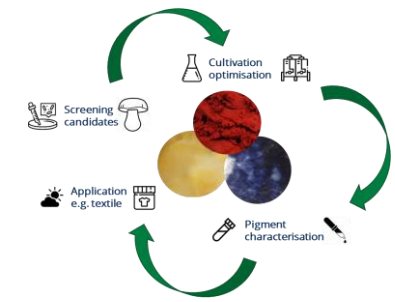


application of the pigment



Zschätzsch, M., Steudler, S., Reinhardt, O., Bergmann, P., Ersoy, F., Stange, S., Wagenfuhr, A., Walther, T., Berger, R.G., Werner, A. (2021) Production of natural colorants by liquid fermentation with *Chlorociboria aeruginascens* and *Laetiporus sulphureus* and prospective applications. *Eng Life Sci* 21: 270-282

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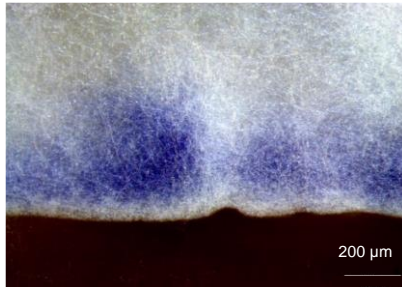


State of the project

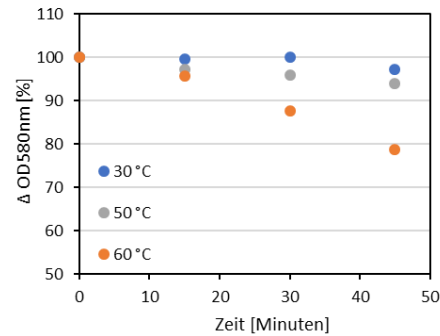
Telephoric acid from *Terana caerulea*

- Only emerge cultivation with successful pigment induction
- Biomass processing, first results on pigment extraction and stability

Pigment induction during mycelium growth



Pigment temperature stability



Application of the pigment



Further candidates of the terphenylchinone family

- Forschungspraktikum Martin Schuster (till June 2022)

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Open topics

Terana caerulea

- Identification of pigment-producing submerge cultivation conditions
- Detailed analysis of pigment extraction/stability and application

other candidates

- Media optimisation to increase pigment production
- Upscale: 70 L submerge cultivation
- Analysis of pigment extraction/stability and application

