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Exploiting fungal cell factories for pigment production

Gerit Nymschefsky[1*], Thomas Isbrandt Petersen[1], Kasper Bøwig Rasmussen, Ulf Thrane[1], Mhairi Workman[1]

1: DTU Systems Biology

*genym@dtu.dk

The growing concern over eventual harmful effects of synthetic colorants has led to an increased nterest in natural coloring alternatives. Currently, these natural colorants are extracted from fruit skins or seeds and their production is thus dependent on the supply with raw materials. To overcome this limitation, the potential production of colorants by fungal cell factories is at the focal point of interest. Fungi are known to naturally synthesize and excrete diverse classes of pigments within an extraordinary range of colors, but are often difficult to grow under laboratory conditions and therefore so far not suitable for industrial production. However, several pigments used in the Asian food industry are produced by *Monascus purpureus*, but the production is associated with the mycotoxin citrinin. Hence, these pigments are not approved for human consumption in Europe and the USA [1].

To propose new microbial cell factories for safe and reliable color production and thereby providing an alternative for the European food market, the potential of the red pigment producer *Talaromyces atroroseus* was investigated. It was shown that *T. atroroseus* is able to produce red and orange pigments and a standard minimal cultivation medium as well as a standard cultivation protocol was proposed. Furthermore, *T. atroroseus* was physiological characterized in batch cultivation and different *Monascus* pigments were identified in the fermentation broth.

This study shows stable and controllable color production using a minimal medium as well as identification of the pigments produced by *T. atroroseus* and sets therewith the cornerstone in implementing pigment production in fungal cell factories.

Batch cultivation of *T. atroroseus* at pH 5

Production of orange pigments in a chemostat cultivation

References: [1] Mapari SA, Thrane U, Meyer AS. 2010. Fungal polyketide azaphilone pigments as future natural food colorants? Trends in Biotechnology 28 (6): 300-307