

# FUNGUS AS A SOURCE OF CAROTENOIDS

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## OBJECTIVES

1. Carotenogenic synthesis is mostly carried out by filamentous fungi and yeasts.
2. Can metabolism products lead to inhibition of synthesis?
3. Can environmental conditions affect carotenogenesis?
4. Can carotenoid production be improved?

## 1. REASONS TO USE FUNGUS

- ◆ Fermentation processes are faster and more productive.
- ◆ It is possible to guarantee that the metabolite of interest is produced under controlled conditions.
- ◆ Ability to use various substrates.
- ◆ Genus of *Rhodotorula* and *Xanthophyllomyces* produce more types of pigments



Figure 1: *Rhodotorula* (Soto, 2016)

## 2. REASONS TO PRODUCE CAROTENOIDS

- ◆ Important in the food industry
- ◆ Broad applications
- ◆ Growing market →

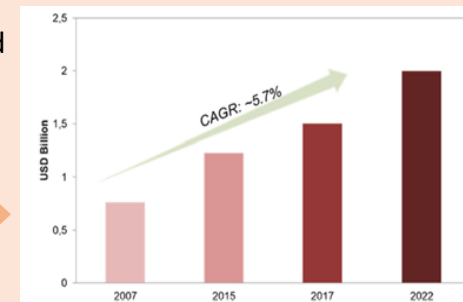


Figure 2: Analysis and perspective of the world carotenoid market for the period between 2007-2022. (Mussagy et al. 2019)

## 3. METABOLIC PATHWAY OF *X. dendrorhous*

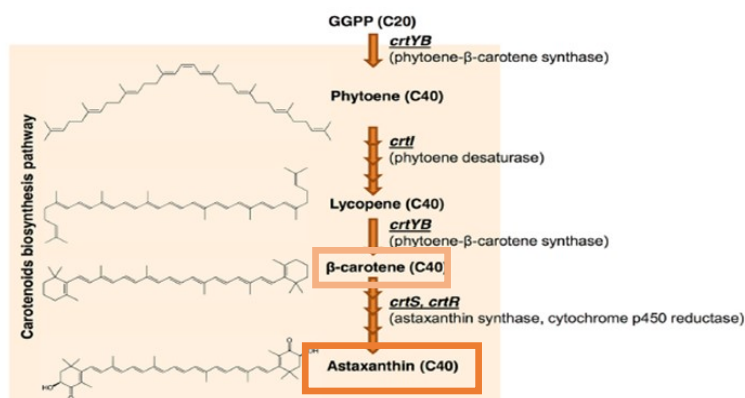


Figure 3: Carotenogenic synthesis pathway. (Córdova et al. 2016).

## 4. METABOLIC PATHWAY OF *R. glutinis*

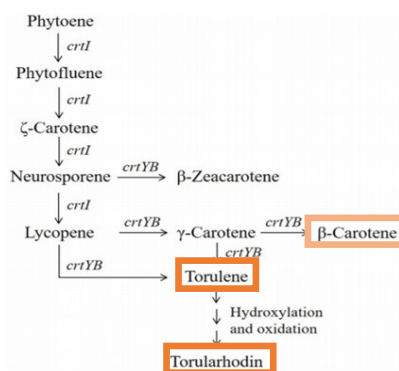
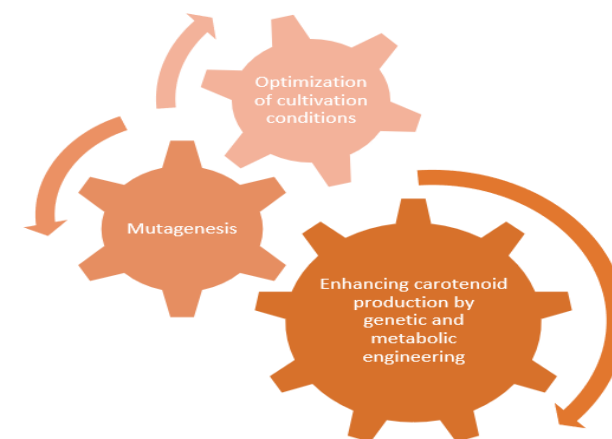


Figure 4: Carotenogenic synthesis pathway. (Tang et al. 2019)

## 5. STRATEGIES FOR ENHANCED PRODUCTION OF CAROTENOIDS



## CONCLUSIONS

1. Most filamentous fungi and yeasts are producers of β-carotene.
2. The products of metabolism are capable of inhibiting synthesis (In case of *R. glutinis* further investigation is needed)
3. Environmental conditions significantly affect pigment synthesis
4. Increase yield by optimizing growing conditions, mutagenesis and genetic and metabolic engineering.