Assembly of a novel biosynthetic pathway for production of the plant flavonoid fisetin in Escherichia coli - DTU Orbit (10/08/2018)

Assembly of a novel biosynthetic pathway for production of the plant flavonoid fisetin in *Escherichia coli*

Plant secondary metabolites are an underutilized pool of bioactive molecules for applications in the food, pharma and nutritional industries. One such molecule is fisetin, which is present in many fruits and vegetables and has several potential health benefits, including anti-cancer, anti-viral and anti-aging activity. Moreover, fisetin has recently been shown to prevent Alzheimer's disease in mice and to prevent complications associated with diabetes type I. Thus far the biosynthetic pathway of fisetin in plants remains elusive. Here, we present the heterologous assembly of a novel fisetin pathway in *Escherichia coli*. We propose a novel biosynthetic pathway from the amino acid, tyrosine, utilizing nine heterologous enzymes. The pathway proceeds via the synthesis of two flavones never produced in microorganisms before – garbanzol and resokaempferol. We show for the first time a functional biosynthetic pathway and establish *E. coli* as a microbial platform strain for the production of fisetin and related flavonols.

**General information**
- State: Published
- Organisations: Novo Nordisk Foundation Center for Biosustainability, Research Groups, Applied Metabolic Engineering, Bacterial Cell Factories, iLoop
- Authors: Stahlhut, S. G. (Intern), Siedler, S. (Intern), Malla, S. (Intern), Harrison, S. J. (Intern), Maury, J. (Intern), Neves, A. R. (Intern), Förster, J. (Intern)
- Number of pages: 10
- Pages: 84-93
- Publication date: 2015
- Main Research Area: Technical/natural sciences

**Publication information**
- Journal: Metabolic Engineering
- Volume: 31
- ISSN (Print): 1096-7176
- Ratings:
  - BFI (2018): BFI-level 2
  - Web of Science (2018): Indexed yes
  - BFI (2017): BFI-level 2
  - Scopus rating (2017): CiteScore 7.95 SJR 3.337 SNIP 1.787
  - Web of Science (2017): Indexed yes
  - BFI (2016): BFI-level 2
  - Scopus rating (2016): CiteScore 8.33 SJR 3.626 SNIP 1.865
  - Web of Science (2016): Indexed yes
  - BFI (2015): BFI-level 2
  - Scopus rating (2015): SJR 3.6 SNIP 1.809 CiteScore 8.2
  - Web of Science (2015): Indexed yes
  - BFI (2014): BFI-level 2
  - Scopus rating (2014): SJR 3.395 SNIP 2.009 CiteScore 7.23
  - Web of Science (2014): Indexed yes
  - BFI (2013): BFI-level 2
  - Scopus rating (2013): SJR 4.036 SNIP 2.164 CiteScore 8.43
  - ISI indexed (2013): ISI indexed yes
  - Web of Science (2013): Indexed yes
  - BFI (2012): BFI-level 2
  - Scopus rating (2012): SJR 2.989 SNIP 1.847 CiteScore 6.72
  - ISI indexed (2012): ISI indexed yes
  - Web of Science (2012): Indexed yes
  - BFI (2011): BFI-level 1
  - Scopus rating (2011): SJR 3.049 SNIP 2.038 CiteScore 6.75
  - ISI indexed (2011): ISI indexed yes
  - Web of Science (2011): Indexed yes
  - BFI (2010): BFI-level 1
  - Scopus rating (2010): SJR 2.375 SNIP 1.786
  - Web of Science (2010): Indexed yes
Fisetin, Resokaempferol, Garbanzol, Cell factory, Biosynthetic pathway, Polyphenols

Electronic versions:
1_s2.0_S1096717615000828_main.pdf
DOIs:
10.1016/j.ymben.2015.07.002

Bibliographical note
This is an open access article under the CC BY-NC-ND license
(http://creativecommons.org/licenses/by-nc-nd/4.0/)

Relations
Projects:
Assembly of a novel biosynthetic pathway for production of the plant flavonoid fisetin in Escherichia coli
Source: PublicationPreSubmission
Source-ID: 114402414
Publication: Research - peer-review › Journal article – Annual report year: 2015