Biotechnology in the production of high-oleic sunflower oil

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19/06/2023

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Aims of the degree project:

-Learning the history of the product, its properties, and the biochemical processes that lead to obtaining high oleic sunflower oil.

-Investigate the techniques currently available to produce high oleic oil, what they are based on, their potential use and their advances in high oleic sunflower oil.

Conclusions:

It has been learned the synthesis route of oleic acid and the enzymes that make possible its abundance in sunflower oil. The basis of current genetic modification techniques has been studied, how they manage to modulate the presence of specific enzymes and the achievements in the genetic modification of high oleic oils.

- **FAD2-1A** and **FAD2-1B** isoforms → synthesis of **Δ-12 oleate desaturase**, an enzyme that produces linoleic acid from oleic acid. Its inhibition is the goal of modern genetic modification tools such as **crispr-cas9**.

- 2019→Calyxt company brought to market the **first gene-edited food product** in the US. A mutation was produced to knock out the function of the FAD2–1A and FAD2–1B gene by the **TALEN** technique.

Acetyl-CoA and Malonyl-CoA

↓ Fatty acid synthase

Palmitic acid (16:0)

↓ Elongase Elovl-6

Stearic acid(18:0)

↓ Δ9-desaturase

Oleic acid(18:1 Δ9)