

## **Microorganisms as Sources of Functional Lipids**

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Certain fatty acids including gamma linolenic acid (GLA), eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA), conjugated linoleic acid (CLA) and arachidonic acid (AA) are attracting interest because of their potential health benefits. The current commercial sources of these fatty acids are unlikely to meet future requirements. This situation has led to an increased attention paid to microorganisms which are capable to produce high value fatty acids, especially those of medical importance.

Microorganisms have some advantages over plants and animals such as having the ability to grow in a very short time, to grow on various waste materials, simple metabolic regulation and control. Also microorganisms used in functional lipid production should have some properties including low nutritional requirement, ability to use complex substrates, capacity for genetic modification, high cell yield or high metabolite production. Obtained fatty acid composition can be altered by changing growth conditions such as substrate composition, temperature, surfactant addition, absence or excess of some nutrients, growth phase of microorganism, extraction methods and using r-DNA technology. Industrial use of microorganisms for the production of certain fatty acids requires design of a process including the parameters affecting the structure of lipids.

Certain fungi, bacteria, yeasts and algae may represent suitable sources of fatty acids. Marine microalgae have taken the most attention for an alternative EPA production. Oleaginous yeasts are considered as potential producers of exotic fats' substitutes such as cocoa butter. While some bacteria can produce industrially interesting special lipids and exceptionally structured triacylglycerols, lactic acid bacteria and *Bifidobacterium* species can form CLA from linoleic acid. With special emphasis on fungi, strains belonging to the fungal order Mucorales can produce GLA up to 30% in the lipid fraction and also can produce EPA, DHA and AA.

The objective of this presentation is to review the studies conducted on the production of functional lipids from bacteria and fungi as well as those on the effects of fermentation parameters for lipid production and composition.