

Enzymatic Aqueous Extraction of Oil from Rapeseed and Sunflower: Myth or Reality ?

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Traditionally, the extraction of oil from oilseeds like rapeseed or sunflower is carried out by pressure and exhaustion with hexane. For many years, various strategies have been developed in aqueous phase in order to remove solvent from the process. For about thirty years, enzymes have been employed to make the breakdown of vegetable walls easier and thus to contribute to the release of oil. Nevertheless, none of these substitution processes lead to industrial stage because of insufficient outputs, stable emulsions and still high cost of enzymes. Nowadays, the growing need to reduce the impact of industrial processes on environment boosts projects in the area of sustainable development and white biotechnology. Extracting oil without hexane will contribute to secure production plants and to decrease emissions of volatile organic compounds (V.O.C.).

The important development of biotechnology allows the production of a variety of powerful and less expensive enzymes that open up new outlets for environmentally friendly processes. In this context, the complete elimination of organic solvents from the process is our goal in extracting oil and proteins from rape and sunflower seeds. We precisely defined the composition of the cellular walls of studied seeds in order to design efficient enzymatic cocktails well suited to destroy them.

Several cocktails were formulated and tested on cellular walls and whole seeds. The physico-chemical parameters of the system, the presence of emulsion and the yield of oil were investigated by always keeping in mind a future industrial scale up.

Research ongoing in this subject will be presented and will lead us to argue for or against an industrial future for enzymatic aqueous extraction of edible oil and proteins.