

The Use of Pulsed Electric Fields (PEF)-Treatment on the Yeast *Waltomyces Lipofer* and its Influence on the Extraction Yield of Single Cell Oils

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Today, a healthy and nutritious diet is becoming more and more important to the modern consumer and as well to national health programs. Functional food plays an important role at composing a well-balanced diet. Many of the functional ingredients in those foods, like ω -3- and ω -6-fatty acids or several vitamins, are liposoluble. So there is a demand for fats, which can easily be produced in high amounts and which have a very low up to none impact on the sensorial quality (taste, odor etc.) of the final product. Microbial produced oils, the so-called single cell oils, extracted from oleaginous yeasts offer an alternative to animal fats, like fish oils, which are often known to have a negative impact on the flavor and finally the quality of the produced food. Furthermore, the extraction of fat from yeasts by using pulsed electric fields and Miglyol®812 as solvent provides an energy efficient alternative to conventional methods.

Oleaginous yeasts, like *Waltomyces lipofer*, can contain up to 64% fat in their dry weight. This is the main reason, alongside an easy cultivation etc., for establishing *W. lipofer* as a model organism for the production of lipophilic substances. By using pulsed electric fields (PEF) during or after fermentation, the cell membrane of the yeast cells can be permeabilized, so that lipid extraction with a solvent, in our case Miglyol®812, becomes feasible. The main constituents of Miglyol®812 are esters of saturated coconut- and palmkernel oil-derived caprylic and capric fatty acids and glycerin. In the conducted experiments, applying pulsed electric fields on *W. lipofer*, several levels of field strength [kV/cm] and energy input [kJ/kg] were tested. Furthermore, cell vitality and the alteration of the lipid content via Flow Cytometry and Flow Particle Image Analysis (FPIA) were monitored.

It could be shown, that a combination of PEF-treatment during or after fermentation and a gentle extraction with Miglyol®812 enhances the extraction of fat from yeast cells. The present main objective of the project is to develop the batch process further to a continuous process, which is not feasible yet, because vitality and extraction have to be optimized.