

## From the oceans to the fields – Producing wax esters in plants

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Industrial chemicals derive currently mainly from fossil oil-based raw materials. The availability of fossil oil however is declining. Plant oils provide functionally equivalent and renewable alternatives for these raw materials. Replacement of fossil oil used in the chemical industry with renewable plant oils and ensuring that growing demand for food oils is also met, will require a trebling of global plant oil production. This will rely on application of plant biotechnology to (i) tailor plant oils to have high purity of a single molecule, (ii) introduce unusual molecules that have specialty end-use functionalities and (iii) increase plant oil production not only by increasing oil content in seeds of current oil crops, but more importantly conversion of other high biomass crops into oil accumulating crops. Wax esters are normally minor constituents of plant oils exhibiting desirable properties for lubrication. Natural sources have traditionally been whales. Additionally some plants, bacteria and insects produce wax esters. Currently there is no biological source available for long chain length monounsaturated wax esters which are most suited for industrial applications. Therefore, we are exploring enzymatic activities from bacteria, insects and plants for the desired properties. Suitable enzymes are then analyzed for their suitability and additional requirements enabling the production of wax esters in oil crops. In order to minimize the risk of inadvertent mixing with seeds for food purposes and to prevent genes for industrial oil qualities from crossing into oil crops intended for food, we are not using any food crop in our genetic modifications. We use two oil crops as production platforms, *Camelina sativa* and *Crambe abyssinica* for producing wax esters as feed stocks for the chemical industry.