
Talk

Future oilcrops for a demanding world

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ABSTRACT

Oil-producing crops currently occupy about 10% of global arable land and are second only to carbohydrate crops in terms of their importance as providers of calories for both humans and their livestock. In addition to their edible roles, oil crops also provide a wide range of industrial products, known collectively as oleochemicals, and are increasingly used as a biofuel, especially biodiesel, and as feedstock by the chemical industry.

Due to the increasing utilization of these plant products, a substantial increase in the total production of vegetable oil is required. This increase has the potential to be met by increasing the oil content in presently used oil crops or introducing new high-oil-yielding crops. However in order to increase the yield of lipids in plants, the pathway that produces these compounds and the mechanisms that control it must be better understood. Most plants accumulate oil in the seed predominantly in the form of triacylglycerols (TAGs), a glycerol backbone onto which three fatty acids are sequentially esterified. The synthesis and assembly of TAG in plants is complex, involving a metabolic network of fatty acid fluxes through multiple subcellular compartments containing alternative pathways to produce different lipid compositions. Much progress has been made in understanding how plants produce and accumulate oils. The specific enzymes involved in the metabolic pathway leading to triacylglycerols (TAGs) stored in the oil bodies, as well as the pathway that supplies the precursors generated from imported sucrose, are to a large extent known. However, we still have a poor understanding in key areas such as factors important for regulating the flux of photosynthates into storage compartments, the synthesis of fatty acids, or the level of oil content in storage tissues. Hence, research in these areas is of great importance to enable a substantial increase in vegetable oil production.

REFERENCES