# Camelina as Appropriate Bioenergetic Crop for Sustainable Full Cycle Ecomanagement in Temperate Climate Areas

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Development of full cycle carbon neutral renewable energy management strategies are important in the light of diminishing resources and strict emission control guidelines. Current research project provides comparative analysis of benefits and economic feasibility of main oilseed crops for utilization as biodiesel sources in temperate climate zones. During the project we have performed field studies and calculations based on the temperate climate conditions comparing common (sunflower, soybean, rapeseed) and uncommon (false flax or camelina) oilseed species for biodiesel and biomass production, based on the full cycle principle. Chromatographic analysis of oils indicated suitable chemical composition of the investigated oilseed species and biodiesel produced at the pilot plant unit proved to be suitable for compression ignition engines. It was suggested, that bioethanol needed for transesterification of the oils could be obtained from sweet sorghum as a source of fermentable sugars or lignocellulose that could occupy less than 10% of the cultivated territory. The oilcake is converted to high protein animal or fish feed, while the biomass could be compressed in to pellets for biomass burners. Glycerol byproducts are converted to organic detergent or reintroduced to the pelleted biomass for 19000 kJ/kg increase in the energy output or may be used as fuel. Results indicate that false flax is most suitable species when compared with soybean, sunflower or rapeseed due to undemanding soil conditions, draught resistance, high oil, protein and biomass yield and optimal oil parameters for biodiesel conversion with good lubricity, cetane number and low gelling temperature.

**Awards Won:**