Marigold or *Calendula officinalis*, a novel oil crop for pharmaceutical and industrial applications

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Calendula officinalis is an annual or short-lived perennial herb native to southern Europe, and grown at commercial scale for flower and seed production. Compounds present in the essential oil of the flowers exhibit antibacterial, antiviral, anti-inflammatory, anti-tumor and antioxidant properties. The flower carotenoids can serve as a food or textile colorant. The seeds are a source of the conjugated C18:3 fatty acid calendulic acid, can be used as organic compound for the industrial production of paints, coatings and adhesives. Usually, the crop is cultivated either for the production of flowers or the production of seeds. We have tested *C. officinalis* as a dual purpose crop for arable cropping in Flanders. A set of varieties (n >10) were tested in comparative variety trials for dual purpose. Flower and seed yield was monitored as well as the concentration of important compounds (carotenoids, flavonoids, faradiols, polyphenols). Trade-off between maximum flower harvest and maximum seed yield by limiting the flower harvest to 4, 3 or 2 flower harvests before seed set was studied. We concluded that a maximum yield was obtained when two flower harvests were taken beginning of July and a final seed harvest in August- September. In addition, field trials were conducted aimed at solving a number of technical questions related to cultivation such as fertilization, plant density and most importantly weed control. The mechanization of the crop was optimized by developing a prototype flower harvester. Three different flower picking systems were assessed. Finally, large scale production of *Calendula officinalis* was set up with Flemish farmers, yielding batches of flowers and seed for pilot studies on the valorisation of flowers and seeds. Valorisation routes in food, pharmaceutical and industrial applications will be discussed.