PHYTOTOXIC POTENTIAL EFFECT OF EUCALYPTUS ESSENTIAL OILS FOR WEED CONTROL

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The widespread use of synthetic herbicides has resulted in herbicide-resistant weeds, disturbed ecological balance and negative effects on human health. Due to this fact, it is necessary to rely on alternative weed control strategies using natural compounds released by plants, as essential oils (EOs), since they have a short half-life as they are biodegradable, and safer than synthetic compounds, with little damage to the environment, without even contaminating ground water (Topal and Kocaçalıskan 2006). Essential oils from different species contain allelochemical compounds that possess significant phytotoxic activity. Azizi and Fuji (2006) demonstrated that Eucalyptus (family Myrtaceae) EOs showed strong inhibitory effects on germination of seeds of many crops and weeds.

The aim of this work is to evaluate the phytotoxic potential of four Eucalyptus species (*E. camaldulensis*, *E. lesouefi*, *E.occidentalis*, *E. torquata*) EOs, on weed seed germination of two dicotyledons (*Amaranthus retroflexus* and *Portulaca oleracea*) and two monocotyledons (*Avena fatua* and *Echinochloa crus-galli*) which are considered among the most serious weeds for the Mediterranean crops.

Fresh leaves of *E. camaldulensis* and *E. occidentalis* were collected in afforested area near Piazza Armerina, in province of Enna (Sicily, Italy) during November and December of 2017. The leaves of *E. lesouefi* and *E. torquata* were collected during March, April and May from Gabes, located in the South of Tunisia on 2015.

The four EOs were extracted by steam distillation with a Clevenger apparatus according to the standard procedure described in the European Pharmacopoeia (1975), and stored at 4 °C until they were use.

Weed seeds of *A. retroflexus, P. oleracea*, *A. fatua* and *E. crus-galli* were purchased from Herbiseed (England)

To test the phytotoxicity activity of the EOs, different concentrations were prepared: 0.125; 0.25; 0.5; 1; 2; 4 µl/ml for dicotyledons and 0.5; 1; 2; 4; 8 µl/ml for monocotyledons. The oils were loaded on the inner side of two layer of filter paper (73 g/m^2) in Petri dishes (9 cm diameter), after sowing twenty seeds of each weed type (10 in case of monocotyledons) on the base of the Petri dishes, in two other layers of filter paper wetted with 5ml of distilled water, in case of the dicotyledons, and 6 ml for the monocotyledons. The controls were prepared with the same quantities of distilled water. For each concentration, five replications were maintained. All the Petri dishes were kept in a growth chamber maintained alternating 30.0 +/- 0.1 °C, 16 h in light and 20.0

+/- 0.1 °C, 8 h in dark. To register germination and seedling length data, photos were taken after 3, 5, 7, 10 and 14 days, and they will be processed with Digimizer.