Plant metabolites as stimulants and/or inhibitors of parasitic plant seed germination

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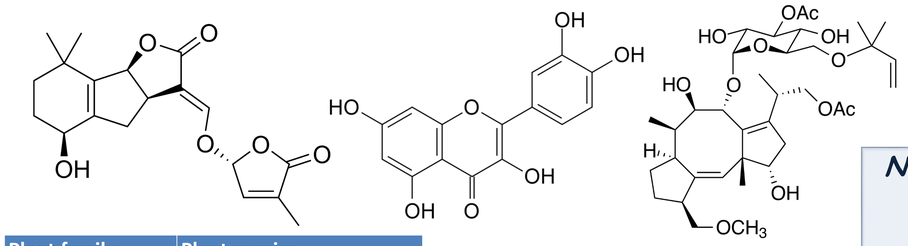
ISOLATION AND CHEMICAL CHARACTERIZATION OF BIOACTIVE COMPOUNDS FROM NATURAL SOURCES AS ENVIRONMETALLY FRIENDLY HERBICIDES

- Broomrapes (*Orobanche* and *Phelipanche* spp.), are holoparasitic weeds that severely infesting a large number of important crops and causing severe yield losses. Their continuous spread have a great negative impact on agriculture production over many years, because seeds can survive in soil for a long time



Natural compounds with potential herbicidal activity

Plant family	Plant species
Convolvulaceae	Convolvulus arvensis (CA)
Solanaceae	Solanum nigrum (SN)
Solanaceae	Datura stramonium (DS)
Zygophyllales	Tribulus terrestres (TT)
Portulacaceae	Portulaca oleracea (PO)
Asteraceae	Conyza bonariensis (CB)
Amaranthaceae	Amaranthus retroflexus (AR)
Amaranthaceae	Amaranthus albus (AA)
Boraginaceae	Heliotropium europeaum (HE)
Urticaceae	Urtica diodica (UD)
Polygonoceae	Polygonum aviculare (PA)
Malvaceae	Malva sylvestris (MS)
Asteraceae	Silybum marianum (SM)
Papaveraceae	Fumaria officinalis (FO)
Brassicaceae	Capsela bursa-pastoris (CBP)
Brassicaceae	Diplotaxis erucoides (DE)
Brassicaceae	Diplotaxis virgata (DV)

Table 1 Weed Species donor of allelopathic activity

- Exploitation of weeds allelopathic phenomenon and the search for secondary metabolites, with stimulating or inhibiting activity against parasitic plants, as model herbicides, aimed at controlling the early stages of parasitic plants growth with metabolites extracted from weed plant root as reported in Table 1

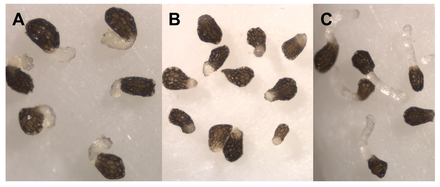


Fig. 1 (A) and (B), inhibition activity on *Phelipanche ramosa* of *Portulaca oleracea* and *Convolvulus arvensis* root organic extract

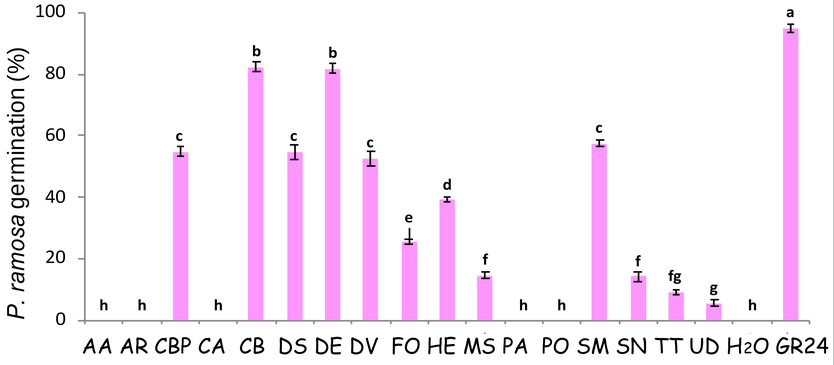
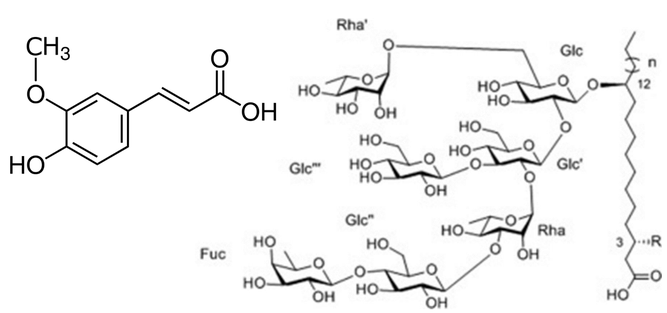


Fig. 2 Stimulation activity of root organic extract of all the plants on *P. ramosa*

- Preliminary investigation (Chromatography and NMR) of the organic extract obtained from *Convolvulus arvensis* allowed to identify ferulic acid and a mixture of glycosylated fatty acids



PRELIMINAR RESULTS

- Development and synthesis of new ecofriendly bioactive molecules.
- Formulation of selected metabolites

FURTHER PROPOSALS

CONCLUSIONS

This research is innovative as it proposes an alternative method to the massive use of synthetic herbicides for the management of pests, through the exploitation of allelopathy phenomenon, using metabolites from weedy plant roots for the biocontrol of the parasitic ones.

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