

LIGNANS FROM *BRASSICA FRUTICULOSA* AND THEIR PHYTOTOXICITY

D'Abrosca B.^a, Carillo P.^a, Cozzolino C.^a,
Della Greca M.^b, Fiorentino A.^a, Fuggi A.^a, Monaco P.^a

^a Dipartimento di Scienze della Vita, Seconda Università degli Studi di Napoli
via Vivaldi 43–81100 Caserta

^b Dipartimento di Chimica Organica e Biochimica, Università Federico II,
Complesso Universitario di Monte S. Angelo via Cinthia, 86120 Napoli

The study of the biological activity of metabolites from natural source is a matter of great importance for the discovery of new potential drugs and agrochemicals. The search for new molecular skeletons among natural substances could provide novel classes of products to be utilized as alternatives to synthetic ones¹, in this field the allelochemicals offer the potential for the discovery of new natural herbicides.

As part of our research on bioactive natural products isolated from spontaneous plants² present in Italy and their use as natural herbicide models, we have investigated *Brassica fruticulosa* Cyr., a plant belonging to the large family of Brassicaceae.

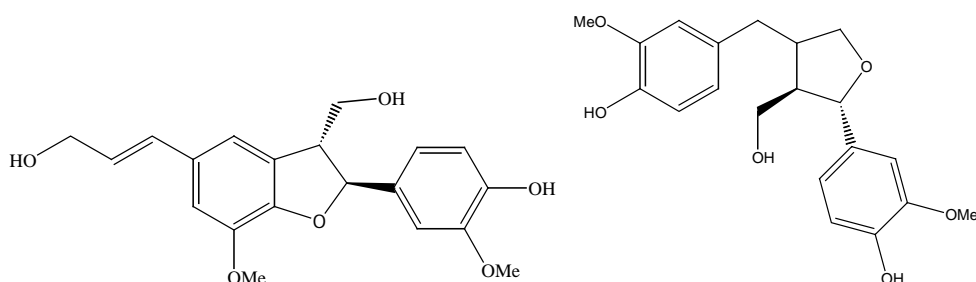
The analysis of extract led to the isolation of lignans, neolignans, sesquilignans and a dilignans. The structures have been assigned on the basis of spectroscopic data, and four compounds have been isolated for the first time³.

Lignans are derived from the shikimic pathway and are widely distributed in plants; these compounds exhibit interesting antimicrobial, antiviral, herbicidal, or antifeedant activities.

In this investigation we evaluated the phytotoxicity of compounds isolated on three species test⁴: two dicotyledons *Lactuca sativa* L. (lettuce), *Lycopersicon esculentum* M. (tomato) and one monocotyledon *Allium cepa* L. (onion). All the compounds have been tested for their effects on seed germination and plant growth.

The most relevant effect observed was a strong inhibition of germination of *Lactuca sativa* produced by dehydroconiferil alcohol (**1**) and lariciresinol (**2**), which their inhibiting activity was retained also at a 1 nM concentration.

The effect of different concentrations of lariciresinol and dehydroconiferil has also been tested on pigment, carbohydrate, amino acids and protein levels of lettuce seedlings grown on MS medium⁵.



1

2

REFERENCES

1. Torsell K. B. G. *Natural Product Chemistry. A mechanistic, biosynthetic and ecological approach.* Swedish Pharmaceutical Press: Stockholm, Sweden. 1997. 305.
2. D'Abrosca B.; Della Greca M.; Fiorentino A.; Monaco P.; Previtiera L.; Simonet A. M.; Zarrelli A. Potential allelochemicals from *Sambucus nigra*, *Phytochemistry* 2001. 58, 1073-1081.
3. Cutillo F.; D'Abrosca B.; Della Greca M.; Fiorentino A.; Zarrelli A.; Lignans and neolignans from *Brassica fruticulosa*: effects on seeds germination and plant growth. *Journal Agricultural and Food Chemistry* : 2003. 51, 6165-6172.
4. Macias F.A.; Castellano D.; Molinillo J. M. G. Search for a standard phytotoxic bioassay for allelochemicals. Selection of standard target species. *Journal Agricultural and Food Chemistry* 2000. 48, 2512-2521.
5. Carillo P.; Mastrodonardo G.; Nacca F. and Fuggi A. Effect of nitrate on nitrogen metabolism of durum wheat seedlings under salinity. Submitted to *Planta*.