

Journal of Chemical, Biological and Physical Sciences



An International Peer Review E-3 Journal of Sciences

Available online at www.jcbpsc.org

Section E: Plant Biotechnology

CODEN (USA): JCBPAT

Research Abstract

Baccharis glutinosa L. (Asteraceae) as a Promising Allelopathic Plant to Control Some Pests of Organic Tomato Crop

Mariana Miranda^{1*}, Guillermo Delgado², Blanca E. Hernández-Bautista³, Ricardo Reyes-Chilpa², Martha L. Macías-Rubalcava², and Ana Luisa Anaya^{3**}

¹CIBA TLAXCALA, Instituto Politécnico Nacional.

²Instituto de Química, Universidad Nacional Autónoma de México.

³Instituto de Ecología, Universidad Nacional Autónoma de México. México.

Abstract: Modern agriculture has contributed to the problem of environmental damage by the indiscriminate use of synthetic agrochemicals. This problem has given rise to an extensive effort to find alternative ecological controls of pests, trying to preserve environmental quality and to reach multiple agricultural and organic productions to achieve a sustainable use of natural resources. Allelopathy could be one of the solutions to solve several agricultural problems. Farmers in Tlaxcala, Mexico want to grow organic tomato and asked us to find some natural controls for several of the main diseases and pests of this crop. We were starting the search of several allelopathic plants to deal with some of these diseases and weeds of tomato crop using allelochemicals. *Baccharis glutinosa* (Asteraceae) was a promising plant with a strong *in vitro* allelopathic effect on some plants (*Amaranthus* sp.) and phytopathogenic fungi (*Fusarium oxysporum* and *Phytophthora capsici*). These two last species caused crown and root rot to the crop. Aqueous leachates of the dry aerial part significantly inhibited *A. hypochondriacus* root growth (100%), and mycelia growth of both phytopathogens (50%). Dichloromethane-methanol (CH₂Cl₂-CH₃OH,1:1) extract at 200 µg ml⁻¹ inhibited (40%) the mycelia growth of both phytopathogens. Biodirected chemical fractionation of this organic extract produced some secondary and tertiary fractions with a strong inhibitory effect on mycelia growth of those fungi (83 and 100%), and structural analysis indicated the presence of labdene-type diterpenes. Our results suggest that possibly, a mixture of similar allelopathic compounds of *B. glutinosa* could be a good precursor of a natural pesticide for an organic production of tomato crop.

Keywords: : *Baccharis glutinosa*, tomato, *Amaranthus* sp., *Fusarium* sp., *Phytophthora* sp.

Corresponding author: M. Miranda

*cibamariana@hotmail.com. **alanaya@ecologia.unam.mx