

Bioactive Steroids and Triterpenes from *Melilotus messanensis* and Their Allelopathic Potential

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Journal of Chemical Ecology, 1997, Volume 23, Number 7, Pages 1781-1803

Abstract

Pentacyclic triterpenes are abundant in the plant kingdom and have a wide array of pharmacological activities. They also have insect antifeedant effects and therefore apparently play a role in plant defense. In this paper, we describe the insecticidal activity of pentacyclic triterpenes of plant origin from different chemical classes on several insect pests (*Spodoptera littoralis*, *Leptinotarsa decemlineata* and *Myzus persicae*), their phytotoxic properties and their selective cytotoxic effects on insect-derived Sf9 and mammalian CHO cells. We also discuss the role they play in plant defense based on these activities.

Keywords Triterpenes - Bioactivity - Antifeedant - Phytotoxic - Cytotoxic

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Triterpene-based plant defenses

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Received: 7 April 2010 / Accepted: 27 May 2010
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Abbreviations

FI	Feeding inhibition
CHO	Chinese hamster ovary cells
CPB	Colorado potato beetle
IGR	Insect growth regulation

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Sf9	<i>Spodoptera frugiperda</i> pupal ovarian cell
ΔB	Biomass gains
ΔI	Food consumption
ANCOVA	Analysis of covariance
DMSO	Dimethylsulphoxide
GABA	γ-Aminobutyric acid
CNS	Central nervous system
Tig	Tigloyl group

Introduction

Triterpenes are part of the terpenoid family, an extensive group of natural products, which are abundant in the plant kingdom. These compounds possess pharmacological properties exhibiting anti-inflammatory (Fu et al. 2005), antibacterial (Katerere et al. 2003), antifungal (Yuan et al. 2008), antiviral (Zhu et al. 2001; Kuo et al. 2009), antitumor (Saxena et al. 2006; Kuo et al. 2009), antidiabetic (Wen et al. 2005), antiulcerogenic (De Andrade et al. 2008), anticarcinogenic (Segal et al. 2006), hepatoprotective (Liu 1995), neuroprotective (Lee and Kim 2001), antiparasitic (Danelli et al. 2009), analgesic (Tapondjou et al. 2003), antioxidant (D'Abrosca et al. 2005) and other effects. The pharmacological activities of natural triterpenoids and their therapeutic implications have been reviewed (Dzubak et al. 2006).

Some tetracyclic triterpenes possess anti-insect properties. It is well known that azadirachtin, a seco-ring

Published online: 11 June 2010