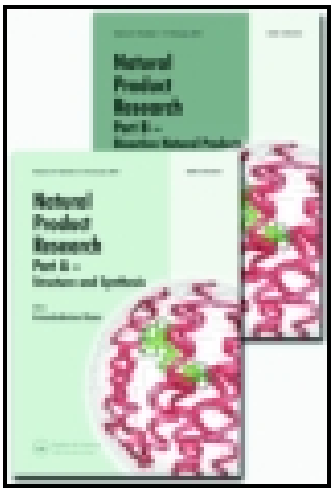

Natural Product Research: Formerly Natural Product Letters
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/gnpl20

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Published online: 27 Oct 2010.

To cite this article: U.L.B. Jayasinghe , B.M.M. Kumarihamy , A.G.D. Bandara , J. Waiblinger & W. Kraus (2003) Antifeedant Activity of Some Sri Lankan Plants, Natural Product Research: Formerly Natural Product Letters, 17:1, 5-8, DOI: 10.1080/10575630290034285

To link to this article: http://dx.doi.org/10.1080/10575630290034285

Natural Product Research, Vol. 17, No. 1, pp. 5–8

Taylor & Francis
healthsciences

ANTIFEEDANT ACTIVITY OF SOME SRI LANKAN PLANTS

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(Received 29 March 2002; In final form 14 April 2002)

Twenty nine solvent extracts from twenty Sri Lankan plants were examined for antifeedant activity against the fourth instar larvae of Mexican bean beetle, *Epilachna varivestis* Muls., Coccinellidae. Extracts of *Sarcococca brevifolia* (Buxaceae), *Strychnus nux vomica* (Loganiaceae), *Diploclisia glaucescens, Coscinium fenestratum* (Menispermaceae), *Syzygium caryophyllatum* (Myrtaceae), *Pittosporium zeylanicum* (Pittosporaceae), *Lasianthus gardneri* (Rubiaceae), *Ferronia limonia* (Rutaceae) and *Allophylus cobbe* (Sapindaceae) have shown strong antifeedant activity.

Keywords: Antifeedant activity; *Epilachna varivestis*; Sri Lankan plants

INTRODUCTION

Synthetic pesticides are the major approach to controlling pests. However, their use has caused serious environmental problems and the development of the resistance in the target organisms. Therefore it is necessary to identify simple and environmental friendly alternative methods to manage pests. Plants synthesise and store a variety of secondary metabolites used in defense against fungi, bacteria, virus and insects. One category of such defense substances is made up of chemical compounds that interfere with insect feeding. Antifeedants are substances which when tasted by the pest can result in the cessation of feeding either temporarily or permanently depending upon their potency. Since antifeedants do not directly cause death to the predator, they provide an alternative method to regulate the economical and ecological damage caused by predators. Many antifeedants have been characterized and show a wide variety of structures. Azadirachtin is one of the potent antifeedant found in *Azadirachta indica*, which is known for its use in folk medicine. In this paper we report the results of

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ISSN 1478-6419 print: ISSN 1478-6427 online
DOI: 10.1080/10575630290034285

screening of some Sri Lankan plant extracts for antifeedant activity against the Mexican bean beetle, *Epilachna varivestis* Muls., Coccinellidae.

MATERIALS AND METHODS

Plant Material and Preparation of Extracts

Plants were collected from the various parts of Sri Lanka in 1997/1998 and identified by direct comparison with specimens available at the Royal Botanical Garden by Mr. H.D. Ratnayake and Mr. A. Weerasooriya, Royal Botanical Garden, Peradeniya. Voucher specimens are deposited at the Institute of Fundamental Studies. Air-dried and ground plant materials were sequentially extracted (12 h × 3 times) in room temperature with cold *n*-hexane, dichloromethane and methanol or directly with cold methanol using shaker. The insoluble materials was filtered by filter paper and evaporated to dryness under reduced pressure at 40°C.

Test for Antifeedant Activity

The leaves of bush bean *Phaseolus vulgaris* were used to feed the insect and as a test plant. Fourth instar larvae of the Mexican bean beetle, *Epilachna varivestis* Muls., Coccinellidae were used as test insect. In the dual choice test system larvae have a choice between treated and untreated leaf surface. One half of the leaf is applied with a methanol solution of the extract (5 mg of each plant extract in 2 ml of methanol) to be tested and the other half with only methanol as a control. After drying the solvent with air, the leaf is placed in a petri-dish on a wet filter paper covered with a piece of gauze. To control the leaf area available for feeding, a punched petri-dish with a 6 cm diameter hole in the middle is placed on the leaf such that equal areas with the test sample and the control are exposed. Two larvae are placed on the leaf and all these are covered up with another petri-dish and left for 24 h. Three repetitions were done. The eaten area of the leaf is estimated after 24 h. The relative antifeedant activity (RAA) of the extract were calculated using the following formula and are given in Table 1 [1].

$$\mathrm{RAA} = \frac{\%\ \text{eaten leaf area}_{\text{untreated}} - \text{eaten leaf area}_{\text{treated}}}{\%\ \text{eaten leaf area}_{\text{untreated}} + \text{eaten leaf area}_{\text{treated}}} \times 100\%$$

RESULTS AND DISCUSSION

Twenty nine solvent extracts from twenty Sri Lankan plants were examined for antifeedant activity against the fourth instar larvae of Mexican bean beetle, *Epilachna varivestis* Muls., Coccinellidae. Some of these plants are used in Sri Lanka for medicinal purposes [2,3]. The used plant part, the nature of the extract, medicinal uses and the antifeedant activity are described in Table I. Various extract of *Sarcococca brevifolia* (Buxaceae), *Strychnus nux vomica* (Loganiaceae), *Diploclisia glaucescens*, *Coscinium fenestratum* (Menispermaceae), *Syzygium caryophyllatum* (Myrtaceae), *Pittosporium zeylanicum* (Pittosporaceae), *Lasianthus gardneri* (Rubiaceae), *Ferronia limonia*

TABLE 1 Antifeedant activity of some Sri Lankan plants

Plant	Medicinal uses	Part	Extract	Activity
Buxaceae				
Sarcococca brevifolia Stapf ex Gamble	No reports	Aerial	c. Alkaloids	100%
Sarcococca brevifolia Stapf ex Gamble		Aerial	MeOH	60%
Loganiaceae				
Strychnus nux vomica L.	Ulcers, diarrhea, cholera, epilepsy	Bark	MeOH	100%
Menispermaceae				
Diploclisia glaucescens (B1.) Diels[a]	Venereal diseases biliousness	Stem	Hexane	–
Diploclisia glaucescens (B1.) Diels[a]		Stem	CH_2Cl_2	100%
Diploclisia glaucescens (B1.) Diels[a]		Stem	MeOH	100%
Coscinium fenestratum (Gaertn.) Colebr.	Tetanus, antiseptic, ulcers	Stem	MeOH	100%
Myrtaceae				
Syzygium caryophyllatum (L.) Alston	Ulcers, diabetes, purgative, astringent	Stem	MeOH	100%
Syzygium assimile Thw.	No reports	Leaves	MeOH	25%
Pittosporaceae				
Pittosporum zeylanicum Wight	No reports	Aerial	c. Alkaloids	60%
Rubiaceae				
Lasianthus gardneri (Thw.) Hook. f.	No reports	Stem	MeOH	54%
Rutaceae				
Ferronia limonia (L.) Swingle	Diarrhea, dysentery, biliousness, snake bite	Bark	MeOH	100%
Sapindaceae				
Allophylus cobbe (L.) Bl.[a]	Emmenagogue, fractures	Stem	Hexane	54%
Allophylus cobbe (L.) Bl.[a]		Stem	CH_2Cl_2	54%
Allophylus cobbe (L.) Bl.[a]		Stem	MeOH	
Pometia eximia Hook. f.	No reports	Stem	MeOH	25%

[a]sequential extraction; c. Alkaloids – crude alkaloid fraction.

(Rutaceae) and *Allophylus cobbe* (Sapindaceae) have shown strong antifeedant activity. These extracts could be potential for the isolation of antifeedant compounds.

Further the extracts of *Anacardium occidentale* L. (Anacardeaceae-bark, methanol), *Ilex walkeri* Wight & Gardn. ex Thw. (Aquifoliaceae-leaves, methanol) *Anogeisus latifolia* (Roxb.ex.Dc.) Wall (Combretaceae-stem, methanol), *Litsea ovalifolia* (wight) Hook. f. (Lauraceae-leaves, methanol), *Thespesia populnea* (L.) Soland. ex Corr. (Malvaceae-bark, methanol), *Psychotria sohmeri* Kiehn. Pl. (Rubiaceae-stem, methanol), *Dimocarpus longan* Lour. (Sapindaceae-stem, *n*-hexane, dichloromethane, methanol sequential extraction), *Lepisanthus tetraphylla* (Vahl) Radlk (Sapindaceae-stem, hexane, dichloromethane, methanol sequential extraction), *Madhuca longifolia* (L.) J.F. Macbr. (Sapotaceae-bark, methanol) did not show any antifeedant activity and are not included in Table I.

Acknowledgment

One of us ULBJ wishes to thank the Alexander von Humboldt Foundation for the Research Fellowship.

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