Preparation and Characterization of Sophora Flavescens Extract as Natural Insecticide in Greenhouses

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Abstract:

The role of chemical insecticides in the management of pests is indisputable but the extensive and irrational use of chemicals in agriculture resulted in increasing resistances of the pests and in environmental problems. With the increasing development of pest resistances, it is not easy to achieve satisfactory control effects by using only agrochemical products and therefore, the research try to develop potential pesticide alternatives from bioactive plant natural products, that has received attention in recent years. It has been demonstrated that the principal bioactive constituents of Sophora flavescens are alkaloids which exhibit a wide range of activities, including insecticidal, antiviral and fungicidal effects and a lot of researches are focused on this natural extracts. Also, the polyphenolic extracts can have a potential biological effects. Our direction of the research was optimization of the preparation and characterization of Sophora flavescens root and seeds extract as natural insecticide in greenhouses. The studied pests were the most important insects for a large range of plants: aphids (Hemiptera: Aphididae) and greenhouse whitefly (Trialeurodes vaporariorum). The polyphenolic extracts were prepared and analyzed by UV-Vis spectrophotometric method. The content of polyphenols, total flavonoids and alkaloids was evaluated and antioxidant activity was quantified. The extracts were prepared for optimizing in various conditions established by Minitab 19 software using different ratios of ethanol: water, temperature, contact time and surfactants concentration. The optimal solutions were obtained using OptimClass software that is an interactive system for multi-criteria decision making and evolutionary optimization (http://ecobionet.com/DSS.htm). Our finding indicate that Sophora flavescens extracts in combination with natural surfactant can be considered an environmentally friendly promising tool for greenhouse pests control.