Optimization of Reynoutria Sachalinensis Extracts for Organic Pests Management

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Abstract:

Powdery mildew diseases are widespread in greenhouse and on agricultural crops, and cause a lot of damage to plants, resulting in high economic losses. The easy spread of this disease has always been a problem for farmers and many fungicides have been developed. Frequent applications of these fungicides were used to combat this disease. Many of them were not always friendly to environment, which raised the need of development of a new generation of ecological fungicides. Several studies have been conducted to determine the antifungal activity of plant extracts. Among them, the ethanolic extract of Reynoutria sachalinensis, an Asiatic plant recognised for antifungal properties, showed a good antifungal performance by enhancing the natural defense response of plants. In the present work, the polyphenolic extracts of leaves and stems of Reynoutria sachalinensis were studied as antifungal agents on powdery mildew disease of cucumber and tomatoes. Laboratory tests conducted by UV-Vis spectrophotometric method by using Folin-Ciocâlteu reaction and ethanolic extracts of this plant has yilded a significant content of polyphenols. The antioxidant activity and alkaloids content were analyzed, too. One of our goals consisted of optimization of the extracts preparation. This was done using Minitab 19 software and different ratios of ethanol: water, temperature, contact time and surfactants concentration were tested. The OptimClass software, an interactive system for multi-criteria decision making and evolutionary optimization (http://ecobionet.com/DSS.htm) was used for the interpretation of the results. It was concluded that the addition of surfactant based on fatty acid ethyl esters obtained from natural oils can improve the fungistatic and fungicidal effect of Reynoutria sachalinensis extracts in vineyards and greenhouses.

Keywords:

Reynoutria sachalinensis, extracts, polyphenols, DPPH, optimization.