Purification and Insecticidal Action Of A Trypsin Inhibitor From Poncianella pyramidalis Seeds

Guimarães, L.C. ¹,², Oliveira, C.F.R. ¹,², Marangoni, S. ¹, Macedo, M.L.R. ²*

¹ Department of Biochemistry, IB, UNICAMP, SP, Brazil; ² Department of Food Science, CCBS, LPPFB, UFMS, MS, Brazil.

The use of synthetic insecticides has caused problems therefore Proteinase Inhibitors are constantly studied as an alternative to chemical insecticides. In this work, a trypsin inhibitor from Poncianella pyramidalis seeds (PpTI) was purified, partially characterized and its biological activity was evaluated both in vitro and in vivo assays. The inhibitor is constituted by a single band on SDS-PAGE in non-reduced and reduced conditions (0.1 M DTT) and show an accurate mass of 19.042 Da, revealed by mass spectrometry ESI-TOF. PpTI is stable over a wide range of temperature (until 80 °C), pH (2-10) and the presence of DTT caused a marked decrease in inhibitory activity, suggesting that the reactive site is stabilized by disulfide bridges. In vitro assays revealed an ability to inhibit midgut proteases of Anagasta kuenhiiella, Spodoptera frugiperda, S. eridana, S. cosmioides and Anticarsia gemmatalis. When incorporated into artificial diet (0.25; 0.5 and 1 %) and offered to A. kuehniella, PpTI showed insecticide activity on larval development, caused direct effects on the average weight and survival, in comparison to control group. In conclusion, a novel trypsin inhibitor was purified and has been characterized. More detailed assays will be conducted for better characterize this inhibitor, with the objective to offer a biotechnological tool alternative for pest control.

Keywords: Insecticide activity, Poncianella pyramidalis, Trypsin Inhibitor

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