


ORIGINAL ARTICLE

Fungal pretreatment to enhance the yield of phytochemicals and evaluation of α -amylase and α -glucosidase inhibition using *Cinnamomum zeylanicum* (L.) quills pressurized water extracts

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Significance and impact of the study: Microbial pretreatment is a novel technique that can be used to increase the phytochemical yield and hence the hypoglycaemic activity of Ceylon Cinnamon quills extracts. A significant inhibition of α -amylase and α -glucosidase activities was observed in extracts treated with *Trichoderma harzianum* in comparison with the known chemical inhibitor, Acarbose and untreated samples. The present study implicates that *T. harzianum* treatment has the ability to enhance the hypoglycaemic effect of Ceylon Cinnamon quills extract and the improved biological activities can be attributed to the presence of high percentages of proanthocyanidin and total phenolic content.

Keywords

Cinnamomum zeylanicum, pressured water extraction, *Trichoderma harzianum*, α -amylase, α -glucosidase.

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Abstract

Bioactive compounds entrapped in plant materials can be effectively recovered using fungal enzymes. *Cinnamomum zeylanicum* Sri Wijaya (SW) and Sri Gemunu (SG) accessions and commercially available *C. zeylanicum* (CC) were subjected to fungal pretreatment and extracted with pressured water (PWE, 0.098 MPa). Thirteen fungal species were isolated and the substrate utilization ability of the species was tested using cellulose, pectin and lignin (indirectly). Total phenolic content (TPC, Folin–Ciocalteu method), proanthocyanidin content (PC, vanillin method) and α -amylase and α -glucosidase inhibitory potential of the extracts were evaluated. The anti-diabetic drug, Acarbose was used as the positive control. *Trichoderma harzianum* (MH298760) showed the highest cell lysis ability and hence was used for the microbial pretreatment process. Extracts of SW treated with *T. harzianum* species (Pre-SW) gave the highest percentage yield (4.08% \pm 0.15%), significantly potent inhibition ($P < 0.05$) of α -amylase and α -glucosidase activities (IC₅₀ 57 \pm 8 and 36 \pm 8 μ g ml⁻¹ respectively), TPC (2.24 \pm 0.02 mg gallic acid equivalent g⁻¹), and PC (48.2 \pm 0.4 mg of catechin equivalent g⁻¹) compared to Pre-SG, Pre-CC and nontreated samples. *Trichoderma harzianum* treatment can enhance the hypoglycaemic properties, PC and TPC of Cinnamon extracts and provide new insights into the recovery of phytochemicals.

Introduction

Fungal pretreatment is a novel extraction method that can be used to enhance the biological activities of plant

extracts. Enzyme assisted methods are becoming popular as an alternative to chemical methods of extracting biologically active herbal compounds. Thermal degradation of phytochemicals, long extraction times, energy