

Alternanthera paronychioides and the molecular basis of the anti-glucotoxic activity

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Abstract

The *Alternanthera paronychioides* has been studied by their notorious anti-glucotoxic activity¹, however the chemical characterization had not been done yet. With the use of HPLC-UV-DAD and UPLC-ESI-MS/MS the present work allowed to identify four heterosides possibly associated with the anti-glucotoxic activity; Vitexin and Isovitexin, associated with the alpha-glucosidase inhibition², Flavosativaside and Rutin, associated with the aldose-reductase inhibition³. The identified substances were quantified and the extraction methodology was optimized. The study allowed to clarify some of the pharmacological bases involved in the therapeutic uses of the specie, until then empirical.

Key words:

Alternanthera paronychioides, Flavonoids, anti-glucotoxic activity.

Introduction

The *Alternanthera paronychioides* has been studied by their notorious anti-glucotoxic activity in pancreatic beta-cells¹, however the chemical characterization had not been done yet.

The objective of this study was to find and quantify the main substances probably involved in the anti-glucotoxic activity in the aqueous and ethanolic standardized extracts of *A. paronychioides* using High-performance liquid chromatography with UV/Diode Array Detection (HPLC-UV-DAD) and Ultra-performance liquid chromatography-electrospray tandem mass spectrometry (UPLC-ESI-MS/MS).

Results and Discussion

With HPLC-UV-DAD, four major flavonoids were identified and quantified being these; 2^o-O-beta-D-glucopyranosil-vitexin (also know as Flavosativaside), Vitexin, Isovitexin and Rutin. By UPLC-ESI-MS/MS a fifth substance was identified as coumaric acid (probably trans-p-coumaric acid, a precursor of the apigenin).

All the flavonoids identified have aldose-reductase inhibition activity^{3,4}, reducing some diabetes complications⁵, and Vitexin and Isovitexin also have potent alfa-glucosidase inhibition activity how previously reported², reducing postprandial blood glucose levels⁶.

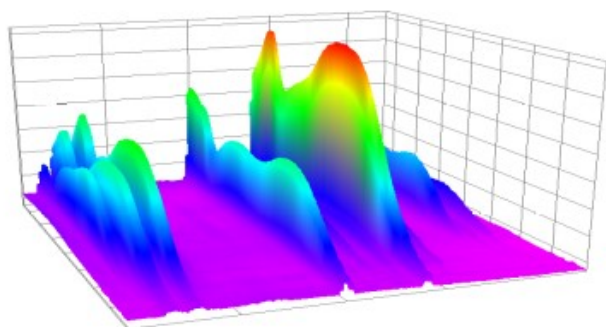


Image 1. HPLC-UV-DAD chromatogram of ethanolic extract.

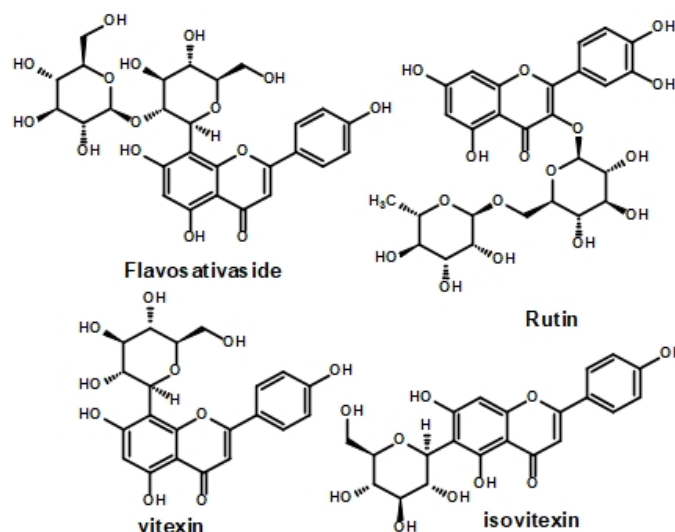


Image 2. Major flavonoids identified in *A. paronychioides*.

Conclusions

By the experiments performed, these data suggest that Vitexin, Isovitexin, Flavosativaside and Rutin are probably responsible by the anti-glucotoxic effect of the aqueous and ethanolic extracts of *A. paronychioides*. More studies will be needed to confirm these hypothesis and to evaluate the therapeutic potential of the use of these extracts for prevention and treatment of *diabetes mellitus* complications.

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