



Flavonoids from the Chinese Fern *Polypodiun hastatum* Thunb. and Relevant Antioxidative Activity

Jingyu DUAN^{1,2} §, Yuanhua LIU² §, Chunping ZHANG²,
Xianyong WEI^{1*}, Zhimin ZONG¹, Huankai YAO^{2*}, & Yan LI^{2*}

¹ School of Chemical Engineering & Technology, China University of Mining and Technology,
1 Daxue Road, Xuzhou 221116, P. R. China

² School of Pharmacy, Xuzhou Medical College, Xuzhou, Jiangsu 221004, P. R. China

SUMMARY. Phytochemical investigation on the whole plant of *Polypodiun hastatum* Thunb. leads to the isolation of six flavonoids including (+)-afzelechin-5-O-β-D-apiofuranoside (**1**), kaempferol-7-O-α-L-rhamnopyranoside (**2**), juglanin (**3**), 3-O-α-L-arabinofuranosyl-kaempferol-7-O-α-L-rhamnopyranoside (**4**), 3-O-α-L-rhamnopyranosyl-kaempferol-7-O-α-L-rhamnopyranoside (**5**), and 3-O-β-D-apiofuranosyl-(1→2)-α-L-rhamnopyranosyl-kaempferol-7-O-α-L-rhamnopyranoside (**6**). Their structures were determined on the basis of spectroscopic analysis. All the flavonoids were obtained from the plant for the first time including a new one, (+)-afzelechin-5-O-β-D-apiofuranoside. Their antioxidative activity was evaluated via DPPH radical scavenging assay and ABTS^{•+} radical scavenging assay.

RESUMEN. La investigación fitoquímica en toda la planta de *Polypodiun hastatum* Thunb. condujo al aislamiento de seis flavonoides: (+)-afzelequina-5-O-β-D-apiofuranósido (**1**), kaempferol-7-O-α-L-ramnopiranosido (**2**), juglanina (**3**), 3-O-α-L-arabinofuranosil-kaempferol-7-O-α-L-ramnopiranosido (**4**), 3-O-α-L-ramnopiranosil-kaempferol-7-O-α-L-ramnopiranosido (**5**) y 3-O-β-D-apiofuranosil-(1→2)-α-L-ramnopiranosil-kaempferol-7-O-α-L-ramnopiranosido (**6**). Sus estructuras se determinaron sobre la base de análisis espectroscópico. Todos los flavonoides se obtuvieron de la planta por primera vez incluyendo uno nuevo, (+)-afzelequina-5-O-β-D-apiofuranósido. Su actividad antioxidante se evaluó a través de DPPH ensayo de captación de radicales y ensayo de depuración de radicales ABTS^{•+}.

KEY WORDS: Antioxidative activity, Flavonoids, *Polypodiun hastatum* Thunb.

* Authors to whom correspondence should be addressed. *E-mails:* wei_xianyong@163.com (X. Wei); hkyao@xzm.edu.cn (H. Yao); liyan@xzm.edu.cn (Y. Li).

§ These authors contributed to this work equally.