Existence of bioactive flavonoids in rhizomes and plant cell cultures of *Boesenbergia rotunda* (L.) Mansf. Kulturpfl.

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Abstract

Callus and cell suspension cultures were explored as alternative sources of selected flavonoids and compared to those produced from rhizome of *Boesenbergia rotunda* (L.) Mansf. Kulturpfl. *B. rotunda* or fingerroot ginger is a medicinally important Zingiberaceae species. HPLC analysis showed the presence of alpinetin, pinocembrin, cardamomin, pinostrobin and panduratin A in the rhizomes, callus and cell suspension cultures of *B. rotunda*. Among the flavonoids, pinostrobin was predominant compared to panduratin A from the three sources. The rhizome extract of *B. rotunda* produced the highest quantity: a total of 5 selected flavonoids at 12975.52 ± 71.78 μg g⁻¹ dry weight (DW). In contrast, callus and cells suspension extracts yielded 120.61 ± 0.01 and 3.14 ± 0.12 μg g⁻¹ DW of the total selected flavonoids, respectively. However, this is the first report on the production of alpinetin, pinocembrin, cardamomin, pinostrobin and panduratin A from *in vitro* cultures of *B. rotunda* (L.) Mansf. Kulturpfl. Although the amount of flavonoids from *in vitro* cultures was not comparable to the rhizome, it is crucial to initially establish *in vitro* cultures and to proof the existence of these compounds in the cultures. This is a pre-requisite to enhance the accumulation of targeted bioactive compound through either metabolic engineering or chemical elicitation in future studies.

Keywords: Medicinal plant; Plant cell cultures; Secondary metabolites; Zingiberaceae.

Abbreviations: DW - dry weight; HPLC - high performance liquid chromatography; MS - Murashige and Skoog; NAA - α-naphthalene acetic acid; 2,4-D - 2,4-dichlorophenoxyacetic acid.