Medicinal Chemistry & Drug Discovery

Inforesights Publishing

Anticancer, antioxidant activities and GC-MS analysis of glucosinolates in two cultivars of broccoli

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Abstract

In the present study, two cultivars of broccoli i.e. *Palam smridhi* (PS) and *Palam vichitra* (PV) were fingerprinted based upon the presence of glucosinolate (GLS) hydrolytic products by gas chromatography-mass spectroscopy. The extracts were analysed for the antioxidant activity using DPPH, DNA nicking assays and cytotoxic effect using different cell lines *viz.* ovary (OVCAR-5), breast (MCF-7), colon (Colo-205) and prostate (PC-3) by SRB assay. The GC-MS data of two varieties showed a great difference in the profile of GLS. The dichloromethane extract of PS showed the presence of allylisothiocyanates, 3-butenylisothiocyanates, 3-methylthiopropylisothiocyanates, sulforaphane and PV showed the presence allyl isothiocyanates, 3-butenylisothiocyanates, 3-methylthiopropyl-isothiocyanates, iberin, and sulforaphane. It was observed that the sulforaphane was present both in PS and PV. The iberin is present only in PV. The head space analysis of PS showed the presence of 3-butenylisothiocyanates and PV showed the presence of allylisothiocyanates and 3-butenylisothiocyanates.

Keywords: Broccoli; Isothiocyanates; Head space analysis; Gas chromatography; mass spectroscopy; DPPH assay; Plasmid nicking Assay; Sulforhodamine B assay

Introduction

Broccoli is classified under the *italica* cultivar group of *Brassica oleracea* L. The glucosinolates (GLS) are a large group of sulphur-containing secondary plant metabolites, which occur in all the economically important varieties of *Brassica*. The consumption of vegetables especially crucifers, reduces the risk of developing cancer (Zhang, et al., 1992). More than 120 different glucosinolates have been identified till date (Chen and Andreasson, 2001), all of which share a common of β-D-thioglucose, a sulphonated oxime moiety with a variable