Spectaflavoside A, a new potent iron chelating dimeric flavonol glycoside from the rhizomes of Zingiber spectabile Griff.

Yasodha Sivasothy, A. Hamid A. Hadi, Khalit Mohamad, Kok Hoong Leong, Halijah Ibrahim, Shaida Fariza Sulaiman, Kheng Leong Ooi, Khalijah Awang

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Zingiber spectabile Griff., locally known as tepus fonah, is native in the moist lowland forests of Peninsular Malaysia. The leaves are used to flavour food and in the preparation of traditional medicine. The pounded leaves are applied as a poultice to inflamed eyes and on to the body to reduce swelling. The young rhizomes are sliced, soaked in vinegar and used to flavour food or as an appetizer. The rhizomes are also used in cough and asthma complication, as a germicide, stimulant, tonic and in the treatment of cancer. A previous phytochemical investigation of the methanol extract of the rhizomes afforded several flavonoids and sesquiterpenoids, and their cell growth inhibitory assays against colon carcinoma SW480 cells were reported. We describe herein the detailed spectroscopic characterisation of a new dimeric flavonol glycoside; spectaflavoside A (1), along with seven known phenolic compounds (2-8) isolated from the dichloromethane and ethyl acetate extracts of its rhizomes (Fig. 1).

Iron is an essential nutrient for the growth, development and long-term survival of most organisms. However, high tissue iron concentrations have been associated with the development and progression of several pathological conditions, including certain cancers, liver and heart disease, diabetes, hormonal abnormalities and immune system dysfunctions. Iron overload can be relieved by the administration of an appropriate chelating agent which can combine with the iron, thus increasing its rate of excretion by the formation of thermodynamically stable complexes which are excreted through the urine or faeces. Flavonoids from edible and medicinal plants, culinary herbs and spices, have long been recognized for their broad biological, pharmacological and medicinal properties such as antioxidant, anti-inflammatory, antimicrobial, oestrogenic, cytotoxic, antitumoural, antiviral and many others. Most of the beneficial health effects of flavonoids are at least partly attributed to their iron chelating abilities. Hence, this prompted us to investigate the iron chelating activity of the isolates. Furthermore, the cytotoxic activities of the selected isolates against lung, prostate, skin, pancreatic, liver, colon and breast cancer cell lines were also evaluated. In turn, this Letter would enable us to better understand the utilization of the rhizomes of Z. spectabile in the traditional treatment of a variety of ailments.

Z. spectabile was collected from Negeri Sembilan in November 2009. The plant was identified by one of the authors, Professor Halijah Ibrahim and a voucher specimen (KU 0108) has been deposited with the University Malaya herbarium.

Dried, powdered rhizomes (200 g) of Z. spectabile were successively extracted with CH2Cl2 and EtOAc at room temperature following which the respective extracts were subjected to various chromatographic techniques, affording compounds 1-8 and their structures were established by means spectroscopic analysis.