Isolation and Structural Elucidation of Bioactive Molecules from Selected Natural Sources

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Spices and herbs are one of the best sources for bioactive molecules which are useful for food industry. Among solvent extracts of *Mammea longifolia* (Guttiferae; minor spice), *Decalepis hamiltonii* (Asclepiadaceae family; monotypic genus; herb), and chilli (major spice) spent, methanol extract from the buds of *M. longifolia* showed the highest antioxidant (DPPH test) and radical scavenging activity (xanthine and xanthine oxidase system assay by monitoring the chemiluminescence). Dried buds of *M. longifolia* are extensively used in Indian culinary for flavouring foods. Dried flower buds are also used inspice blends such as Garam Masala powder in India.

The active extract was further fractionated using column chromatography on silica gel. Some polar fractions with strong antioxidant activity were assumed to contain proanthocyanidins by the UV spectrum and colour reaction with methanolic hydrochloric acid. Purification of the proanthocyanidins was attempted using various resins and gels. Purified fraction was subjected to NMR (1D: ^{1}H and ^{13}C, and 2D: HSQC and COSY) and MS analysis, which supported the presence of proanthocyanidins. Thiolysis of this fraction, followed by HPLC analysis indicated their monomer unit as epicatechin, and the mean degree of polymerization as approximately 7.5. The fractionation of polymeric proanthocyanidins was attempted using Sephadex-LH20 and sea sand. The mean degree of polymerization of separated fractions, on thiolysis followed by HPLC analysis, varied from 2.7 to 9.8. This is the first report of proanthocyanidins from *M. longifolia.* Plant proanthocyanidins are known as the functional food factors that possess a variety of physiological activities such as antioxidant, antimicrobial, anti-allergy, hair-growth promotion, anti-caries, anti-hypertensive and inhibition against activities of some enzymes and receptors.

Other fractions from *M. longifolia* yielded thirteen compounds, which include two novel compounds, viz., quercetin 3-O-(2",4"-di-*E*-p-coumaroyl)- α -L-rhamno-pyranoside and quercetin 3-O-(3",4"- di-*E*-*p*-coumaroyl)- α -L-rhamnopyranoside along with known compounds kaempferol, quercetin, isopropylidenedioxy derivative of shikimic acid, kaempferol 3-(2",4"-di-*E*-p-coumaroyl)- α -L- rhamnopyranoside, kaempferol 3-(3",4"-di-*E*-p-coumaroyl)- α -L-rhamnopyranoside, kaempferol 3- α -L- rhamnopyranoside, Quercetin 3- α -L-rhamnopyranoside, shikimic acid, kaempferol 3-O- β -D-glucopyranoside, quercetin 3-O- β -D-glucopyranoside and β -sitosterol- 3-O- β -D-gluco pyranoside. This is the fourth and third reports for compounds kaempferol 3-(2",4"-di-*E*-p-coumaroyl)- α -L-rhamnopyranoside and kaempferol 3-(3",4"-di-*E*-p- coumaroyl)- α -L- rhamno pyranoside respectively from nature. However, this is the first report for both the compounds from Guttiferae family.