CHEMISTRY AND BIOACTIVITY STUDIES OF *FLACOURTIA INERMIS* AND *PUNICA GRANATUM*

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During this research, fruit extracts of *Flacourtia inermis* Roxb. (Lovi) (Flacourtiaceae) and seeds extracts of *Punica granatum* Linn. (Delum) (Punicaceae) were subjected to several bioassays in order to assess the value of these fruits and fruit extracts as potential candidates in medicinal and agrochemical fields.

Plant materials were extracted with ethyl acetate, methanol and n-butanol and tested with DPPH (2, 2'-diphenylpicrylhydrazyl) radical scavenging assay, brine shrimp lethality assay, lettuce seeds germination assay and TLC autobiography method with *Cladosporium cladosporioides*. The same plant extracts were subjected to α-amylase inhibition bioassay against porcine pancreatic α-amylase enzyme using starch as the substrate and dinitrosalicylic acid as the indicator, lipase inhibition bioassay against *Candida rugosa* lipase enzyme using *p*-nitrophenylbutyrate as the substrate and α-glucosidase inhibition bioassay against *Saccharomyces cerevisiae* α-glucosidase using *p*-nitrophenyl-α-D-glucopyranoside as the substrate.

The EtOAc extract from *F. inermis* fruits showed high enzyme inhibitory activities, cytotoxic properties and antioxidant properties, and was subjected bioactivity guided fractionation based on the α -amylase assay. Active compound was identified as malic acid and IC_{50} values for α- glucosidase, α-amylase and lipase activities were 58.15 ppm, 96.40 ppm and 69.03 ppm respectively. The IC_{50} value for antioxidant activity based on the DPPH radical scavenging assay was recorded as 6.20 ppm. The *S*-configuration was assigned to the compound based on the occurrence of only *S*-Malic acid in nature.

The total polyphenol content of *F. inermis* fruits was determined as 1.28 g/ 100 g of fresh fruits by the Folin-Ciocalteu method using gallic acid as the standard and anthocyanin content was determined as 0.107 g/ 100 g of fruits as cyanidin-3-glucoside equivalents using pH differential method. LC-MS/MS analysis of the methanol extract of *F. inermis* revealed the presence of monocaffeoylquinic acids (*Mr* 354), dicaffeoyl quinic acids (*Mr* 516), feruloylquinic acid (*Mr* 368), methylcaffeoylquinates (*Mr* 368), caffeoyl shikimates (*Mr* 336) and several flavonoids and flavonoid-glycosides.

P. granatum seeds extracts exhibited moderate DPPH radical scavenging activity, but the EtOAc extract showed strong phytotoxicity towards lettuce seeds germination. There were no enzyme inhibition properties of these extracts. Activity guided fractionation furnished eight pure compounds from the EtOAc extract and structures of five compounds were identified as 10 – hydroxyl -1, 2, 6a, 6b, 9, 9,12a – heptamethyl - 2, 3, 4, 5, 6, 6a,7, 8, 8a, 10, 11, 12, 13, 14b- tetradecahydro-1H-picene-4a-carboxylic acid (ursolic acid), 17-(5-Ethyl-6-methylheptan-2-yl)-10,13-dimethyl-2,3,4,7,8,9,11,12,14,15,16,17-dodecahydro-1H-cyclopenta [a] phenanthrene tetradecanoate (Myristic acid ester of β-sitosterol), 17-(5-Ethyl-6-methylheptan-2-yl) -10,13-dimethyl-2,3,4,7,8,9,11,12,14,15,16,17- dodecahydro-

1H-cyclopenta[a]phenanthren-3-ol (β-sitosterol), methyl tetracosanoate (methyl ester of a C24 fatty acid) and 1-(4-docosenoyl)-3-(1,1-dimethylbutoxy)glycerol. One pure compound was highly active against lettuce seed germination, and its structure was partially identified as a polyacyl glycerol with m/z 658 molecular peak. But the spectral data was not enough for the complete structure elucidation.