

CAMPTOTHECIN, TOTAL PHENOLICS AND FLAVONOIDS CONTENT IN SELECTED PLANTS BELONGING TO *Rubiacea* AND *Acanthaciae* FAMILIES

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Plants contain a variety of phytochemicals which are biochemically vital to all kinds of organisms, especially for humans. They have therapeutic values for most challengeable diseases including cancer. The traditional physicians have been using plant decoctions or extracts for the treatment and prevention of cancer. Hence a study was planned with leaves, stems and roots of *Morinda tinctoria*, *Nauclea orientalis*, *Ophiorrhiza rugosa*, *Pavetta indica* and *Adathoda justacia*, immature and mature fruits of *Nauclea orientalis*, flowers of *Ophiorrhiza rugosa* and stems with leaves and roots of *Oldenlandia umbellata* to investigate their antioxidant activity, total phenolic and flavonoid contents. Further HPLC analysis was performed to determine the camptothecin content in *Nauclea orientalis* and *Ophiorrhiza rugosa*.

Antioxidant activity was determined in water extract of different parts with the aid of 1,1-diphenyl-2-picrylhydrazyl assay. Highest (lowest EC₅₀ value) and lowest antioxidant activities (highest EC₅₀ value) were observed in *Ophiorrhiza rugosa* leaves ($38.6 \pm 1.4 \mu\text{g/ml}$) and *Morinda tinctoria* stems ($5968.1 \pm 1596.1 \mu\text{g/ml}$) respectively. *Ophiorrhiza rugosa* (range of 38.6 ± 1.4 to $457.8 \pm 13.8 \mu\text{g/ml}$) and *Nauclea orientalis* (range of 81.7 ± 2.8 to $871.5 \pm 28.4 \mu\text{g/ml}$) showed good antioxidant activity, i.e all parts analyzed showed lower EC₅₀ values. Antioxidant activity observed in *Ophiorrhiza rugosa* in decreasing orders are leaves > flowers > roots > stems and in *Nauclea orientalis* mature fruits > leaves > stems > immature fruits > roots. EC₅₀ values in *Pavetta indica* ranges from 120.9 ± 0.2 to $1224.6 \pm 37.7 \mu\text{g/ml}$ and the antioxidant capacity in decreasing order are leaves > stems > roots. EC₅₀ values of *Adathoda justacia* ranges from 949.1 ± 29.7 to $1293.6 \pm 72.4 \mu\text{g/ml}$ of stems > roots > leaves, *Morinda tinctoria* (403.6 ± 71.8 to $5968.1 \pm 1596.1 \mu\text{g/ml}$ of leaves > roots > stems) and *Oldenlandia umbellate* (stems with leaves- $223.9 \pm 11.7 \mu\text{g/ml}$ and roots- $2105.3 \pm 309.3 \mu\text{g/ml}$).

Total phenolic and total flavonoid content were determined as μg of gallic acid equivalents per gram dry weight (μg of GAE) and μg of tannic acid equivalents per gram dry weight (μg of TAE) respectively. Maximum and minimum total phenolic content present in *Ophiorrhiza rugosa* flowers ($56.5 \pm 3.6 \mu\text{g}$ of GAE) and *Oldenlandia umbellata* roots ($2.7 \pm 0.1 \mu\text{g}$ of

GAE). The highest and lowest total flavonoid content recorded in *Ophiorrhiza rugosa* flowers (52.5 ± 6.2 μg of TAE) and *Pavetta indica* roots (2.7 ± 1.4 μg of TAE).

Screening and quantifying camptothecin was performed using High Performance Liquid Chromatography (HPLC) technique. Carbamazepine was used as the internal standard for the developed and validated method. The retention time of camptothecin and carbamazepine were 3.0 ± 0.1 and 4.2 ± 0.2 minutes respectively. The suspected peaks of camptothecin were observed in all extracts of all parts of *Nauclea orientalis* and *Ophiorrhiza rugosa*. *Nauclea orientalis* roots had the highest amount of camptothecin. The maximum and minimum quantity of camptothecin were present in methanol extract of *Nauclea orientalis* roots (31.5 ± 0.008 $\mu\text{g}/\text{mg}$) and chloroform extract of *Nauclea orientalis* leaves (0.5 ± 0.005 $\mu\text{g}/\text{mg}$) respectively. The highest and lowest quantity were observed in methanol:ethanol (9:1) extract of leaves (11.0 ± 0.006 $\mu\text{g}/\text{mg}$) and chloroform extract of stems (1.0 ± 0.004 $\mu\text{g}/\text{mg}$) respectively in the various parts of *Ophiorrhiza rugosa*. Methanol and methanol related extracts were high in camptothecin than chloroform or water extracts. In chloroform extract, maximum and minimum quantity of camptothecin were observed in flowers (3.5 ± 0.001 $\mu\text{g}/\text{mg}$) and stems (1.0 ± 0.004 $\mu\text{g}/\text{mg}$) of *Ophiorrhiza rugosa* and roots (22.0 ± 0.003 $\mu\text{g}/\text{mg}$) and leaves (0.5 ± 0.005 $\mu\text{g}/\text{mg}$) of *Nauclea orientalis*. In methanol extract, maximum and minimum quantity of camptothecin were observed in leaves (10.5 ± 0.002 $\mu\text{g}/\text{mg}$) and stems (2.0 ± 0.001 $\mu\text{g}/\text{mg}$) of *Ophiorrhiza rugosa* and roots (31.5 ± 0.008 $\mu\text{g}/\text{mg}$) and leaves (2.0 ± 0.001 $\mu\text{g}/\text{mg}$) of *Nauclea orientalis*.