

**Comparison of Berberine content in *Berberis ceylanica*
Schneider and market samples of Daruharidra**

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Thesis submitted to the University of Sri Jayawardenepura in partial fulfillment of the requirements for the award of the Master of Science in Industrial Utilization of Medicinal and Aromatic plants on 2010.

DECLARATION

The work described in this thesis was carried out by me under the supervision of Dr. G.A.S.Premakumara (Head, Herbal Technology Section, Industrial Technology Institute, Colombo) and Prof. S.Samarasinghe (Head, Department of Chemistry, University of Sri Jayawardenapura) and a report on this has not been submitted in whole or in part to any university or any other institution for another Degree.

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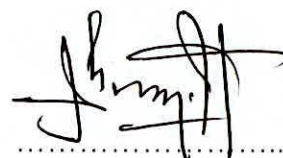
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We certify that the above statement made by the candidate is true and that this thesis is suitable for submission to the university for the purpose of evaluation.

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Comparison of Berberine content in *Berberis ceylanica* vs. market samples of Daruharidra

T.K. Nawarathna

ABSTRACT

Berberis Linn. (Family: Berberidaceae), a genus of shrubs or small trees, distributed in the temperate and sub tropical parts of Asia, Europe and America. The genus consists of species which are commonly used in many traditional systems of medicines. *Berberis aristata* DC commonly known as Daruharidra, native to mountainous parts of North India and Nepal. It is an erect glabrous spinescent shrub, 3-6 m in height with obovate to elliptic, subacute to obtuse, entire or toothed leaves. Flowers in yellow in corymbose racemes, berries oblong-ovoid to ovoid, bright red. *Berberis ceylanica* Schneider is endemic to Sri Lanka and distributed in mountain forests and forest borders up to about 2200 m height. It is a shrub in 3 m or taller, with ovate, elliptic or obovate, subserrulate or 1-2 spinose leaves. Flowers in yellow in subumbellate racemose, berries ellipsoid to obovoid excluding very short style. Berberine is one of the important alkaloidal active principles of this genus. The present study was carried out to (a) quantify the berberine content and (b) to compare physico-chemical parameters and TLC fingerprints of *B. ceylanica* and market samples of Daruharidra.

Physico-chemical parameters such as moisture content, total ash, acid insoluble ash, water soluble ash, ethanol and water extractable matter were determined for *B. ceylanica* and market samples of Daruharidra. The TLC fingerprints of *B. ceylanica*

were comparable in terms of R_f values and color to that of Daruharidra market samples. Hot and cold extraction techniques were used to extract alkaloids from stems of *B. ceylanica* and market samples of Daruharidra. Detection and quantification of berberine were performed by TLC densitometry at the wavelength of 366 nm. The linear regression analysis data for the calibration plot showed a good linear relationship with a correlation coefficient of 0.991. Berberine content of methanolic extracts of *B. ceylanica* was $1.68 \pm 0.70\%$. On the other hand there was a wide variation of berberine content in market samples, berberine content of market sample I and market sample II were $1.50 \pm 0.003\%$ and $2.72 \pm 0.039\%$ respectively.

In conclusion, this study indicates the similarities in chemical profiles of *B. ceylanica* and market samples of Daruharidra in terms of TLC fingerprints and berberine content and possibility of using *B. ceylanica* as a substitute of Daruharidra.

Key words: *Berberis aristata*, *Berberis ceylanica*, Berberine, Physico-chemical parameters, TLC Densitometry