DOI :10.31357/fapsmst.2010.00403

# 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.

24.06.2010 .....

Date

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Signature of the candidate

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.

1. Dr. G.A.S.Premakumara

Date 24.06.2010

Signature

2. Prof. S.Samarasinghe

Date 07/07/2010

Signature

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## ACKNOWLEDGEMENT

My sincere thanks and heartfelt gratitude to my supervisors Dr. G.A.S. Premakumara (Head, Herbal Technology Section, Industrial Technology Institute) and Prof. S. Samarasinghe (Head, Department of Chemistry, University of Sri Jayawardenapura) for their invaluable guidance and advice throughout this study.

It has been a great privilege to have worked with Dr. G.A.S. Premakumara as he has been a constant source of inspiration and encouragement. A deep sense of gratitude is expressed to him for his generous advice and guidance in conducting this investigation.

I extend my special thanks to Prof. S. Samarasinghe for her unhesitant help and cooperation at all times has contributed immensely to make this thesis a success.

I am grateful to Mr. P. Marasinghe(Senior Scientist, Bandaranayake Memorial Ayurvedic Research Institute) for his valuable advice, encouragement and suggestions through out the research project.

Thanks also extended to Prof. A. Abeysekara (Dean, Faculty of Applied Science, University of Sri Jayawardenapura) for his advice, guidance and cooperation for this study.

I wish to express my thanks to Mrs. R. Gunawardene (Commissioner, Department of Ayurveda) and Dr. D. Senasekara (Director, Bandaranayake Memorial Ayurvedic Research Institute) for granting me the study leave to undertake this project.

I would like to thank the Director, Industrial Technology Institute for providing necessary resources and facilities during this study.

I extend my special thanks with deep sense of gratitude more than as can be expressed here, the knowledge which I acquired from Mrs. Menuka Arawwawala (Research officer, Herbal Technology section, Industrial Technology Institute). I offer her a very special word of thanks for carefully reading through all my drafts and made a number of useful comments and suggestions. Despite the pressure of work, she made herself available whenever I needed her help and guidance.

Thanks also extended to Dr. C.Wijayasiriwardene (Research officer, Herbal Technology section, Industrial Technology Institute) for his assistance and support for the pharmacognosy part of this study and also to Mrs. V.S. Bandara Mrs. Pushpa Fernando who helped me in numerous ways in providing technical assistance in the laboratory in addition to their other assignments.

I also express my gratitude to all the staff members of Herbal Technology Section at ITI who helped me in numerous ways during the project.

Finally, I wish to express my deepest gratitude to my husband Mr. S.R.R.Silva for his encouragement and moral support during this study.

**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 boarders 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 ± 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 ± 0.003% and 2.72 ± 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