Application of Modern Technologies in the Manufacture of Ayurvedic Drugs - Spray Drying & Ethanol Extraction of Two Selected Decoctions

by

Tissa Hewavithana

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Declaration

"The worked described in this thesis was carried out by me under the supervision of Prof. A. Bamunu Arachchi, Prof. M.H.A. Tissera, and Dr. K.K.D.S. Ranaweera and a report and this has not been submitted in whole or in part of any university or any other institution for another Degree/Diploma."

Date: 23/8/2006

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

Prof. A. Bamunuarachchi

Course coordinator

Former Head of the Department of Food science & Technology

Faculty of Applied Science- University of Sri Jayawardenapura

Sri Lanka

23/8-2006

Dr. K.K.D.S. Ranaweera

Head,

Department of Food science & Technology

Faculty of Applied Science- University of Sri Jayawardenapura

Sri Lanka

Prof. M.H.A. Thissera

Head,

Department of Mooladharma

Gampaha Wickramarachchi Ayurveda Institute

University of Kelaniya

Sri Lanka
AFFECTIONATELY DEDICATED

TO

My Late Father
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I hope this thesis will help to open a door, to bridge the existing gap between modern technology and Ayurveda drug manufacturing process.
Abbreviations

DPl – Dhānya Panchaka

TRI – Triphalā

1AL1 - Traditional Triphalā decoction sample 1
1AL2 - Traditional Triphalā decoction sample 2
1AL3 - Traditional Triphalā decoction sample 3
1BP1 - Spray dried Triphalā decoction sample 1
1BP2 - Spray dried Triphalā decoction sample 2
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“Application of Modern Technologies in the Manufacture of the Ayurvedic Drugs – Spray Drying & Ethanol Extraction of two Selected Decoctions”  

by Tissa Hewavithana

ABSTRACT

Ayurveda medicine has been in practice for many years in Sri Lanka. Despite many forms of drug preparations, decoctions (Kashāyas) have proved far better results in Ayurveda sector. In fact, the kashāya contains five types, namely Swarasa, Kalka, Kātha/Srita, Hima and Phānta. Among these five, Kātha or Srita is the most widely used preparation. It is useful to investigate innovative sophisticated strategies to improve the quality of Ayurveda preparations. For instance, Spray drying method and Ethanol extraction method can be used as alternative methods to traditional approach of drug preparation. In order to investigate the effectiveness of the alternative methods, it was necessary to select two widely used drugs. For this purpose, two decoctions were selected by using a questionnaire, distributed among selected physicians in different parts of the country; the Triphala which contains three drugs (Aralu, Bulu, Nelli), and other one was Dhanaya Panchaka which contains five drugs (Coriander, Dry ginger, Grass root, Immature bale fruit and Iriveriya).

Initially the two recipes were prepared as traditional decoction. In this case 50g of each drug was weighted for Triphala and 30g of each drug was weighed for Dhanaya Panchaka which were put in to two clay pots separately containing 4800 ml water each and boiled, reducing it up to 600 ml. Similarly another two sets of decoctions were prepared reducing them from 600 ml to
450 ml using a water bath. These samples were spray dried. For ethanol extraction another 2 sets of (150 g) raw materials were weighed and put into 70% alcohol and strained after a week which was then rotavaporized for the removal of the alcohol.

Then all the samples prepared according to spray dried method and ethanol extracted method were diluted up to 600 ml which were compared chemically by using sensory analysis, pH, specific gravity, refractive index, viscosity, total soluble solids, ash content, acid insoluble ash, total fat content, TLC Rf value, Absorbance and Tannin content.

The results were analyzed statistically by using one way ANOVA followed by the Tukey's test. While the corresponding p values are significantly different at the level of 0.05 in colour, consistency, specific gravity, Rf index, alcohol content, tannin content, ash content, viscosity and total soluble solids, but significantly same in odour, taste, pH value, acid insoluble ash, fat content and TLC Rf values at the same level. When using the Tukey’s test for the significantly different variables, refractive index, total soluble solids, viscosity, alcohol content, colour and consistency were significantly same. The results of the Spray dried samples showed similar composites to the traditional preparations than that of the Ethanol extracted preparations.

Thus it is possible to conclude that Spray drying method can be used as an alternative method to the traditional decoction preparing method and it is more suitable for decoctions containing raw materials with less volatiles. Further clinical research has to be designed in the future to investigating the effect of the drug.