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

by

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Declaration

"The worked described in this thesis was carried out by me under the supervision of Prof.A. BamunuĀrachchi 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"

23/08/2006

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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

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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

DPk –Dhānya Panchaka

TRI-Triphalā

1AL1-Traditional Triphalā decoction sample1

1AL2- Traditional Triphalā decoction sample2

1AL3-Traditional Triphalā decoction sample3

1BP1- Spray dried Triphalā decoction sample1

1BP2- Spray dried Triphalā decoction sample2

1BP3- Spray dried Triphalā decoction sample3

1CE1-Ethanol extraction of Triphalā sample 1

1CE2- Ethanol extraction Triphalā sample 2

1CE3- Ethanol extraction Triphalā sample 3

2AL1-Traditional Dhānya Panchaka decoction sample1

2AL2- Traditional Dhānya Panchaka decoction sample2

2AL3-Traditional Dhānya Panchaka decoction sample3

2BP1- Spray dried Dhānya Panchaka decoction sample1

2BP2- Spray dried Dhānya Panchaka decoction sample2

2BP3- Spray dried Dhānya Panchaka decoction sample3

2CE1-Ethanol extraction of Dhānya Panchaka sample 1

2CE2- Ethanol extraction of Dhānya Panchaka sample 2

2CE3- Ethanol extraction of Dhānya Panchaka sample 3

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ABSTRACT

Āyurveda 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 *Āyurveda* sector. In fact, the kashāya contains five types, namly *Swarasa, Kalka, Kwātha/Sritha, Hima* and *Phānta*. Among these five, *Kwātha* or *Sritha* is the most widely used preparation. It is useful to investigate innovative sophisticated strategies to improve the quality of *Āyurveda* 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 *Dhanya 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 R_f 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, R_f 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 R_f 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.