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Application of spray drying and ethanol extraction technologies in manufacture of *Triphala Kwatha*

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Ayurveda has been recognized as one of the medical systems, by locals and internationals for many reasons. Of natural drug formulations, *kwatha* (decoction) is the most effective and popularly used counterpart. Despite their popularity, production of these formulations with extended shelf life at larger scale is extremely difficult. A study was carried out to establish a protocol for novel presentation form of t*riphala* (*Terminalia chebula, Terminalia bellarica, Embellica officinalis*) *kwatha* which was prioritized by a preliminary survey on the recommendations made by Ayurvedic practitioners. The *Triphala* decoction was prepared in three different ways; as per a traditional decoction recipe, spray drying of concentrated decoction and ethanol extraction. As for the traditional form, ingredients were added to water and boiled, to reduce the volume. Similarly, another sample was prepared using the same method which was spray-dried by using a lab scale spray dryer. The ethanol extraction was prepared by using 70% ethanol. Then it was strained after one week and rotavaporised to remove the ethanol fraction. Spray dried and ethanol extracted samples were separately dilute in the same volume of water, before the comparative sensory and physio-chemical tests were carried out, based on the original recipe and procedure. The results obtained were statistically analyzed by using one way ANOVA followed by the Tukey's test. The corresponding P values were significantly the same for the three samples at the level of 0.05 with regard to pH, total fat content, odour and taste (P=0.681P=0.182 P=0.282 P=0.906). Although the corresponding P values for the specific gravity, the refractive index and the tannin content were significantly different, the colour, consistency (P=0.000) and total soluble solids (p=0.058) of these three forms remained the same. When using the Tukey's multiple comparison test for this significantly different variables, the refractive index, total soluble solids, colour and consistency were significantly the same in

traditional *kwatha* and reconstituted spray dried powder. Traditional and spray-dried forms contained more soluble solid particles than the ethanol extraction. The colour of the spray dried preparation showed no significant difference when compared with that of the traditional decoction. With respect to specific gravity and tannin content, means of all three forms were significantly different from each other. The results of the reconstituted spray-dried sample showed a similar thin layer chromatography distribution pattern compared with that of the traditional product. It can be recommended that spray drying method be used as an alternative method to the traditional method of *triphala kwatha*.

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