

CHEMICAL AND MICROBIOLOGICAL ANALYSIS OF *ARISHTA*  
AND *ASAVA* WITH REFERENCE TO THE HERBAL  
PHARMACEUTICAL STANDARDIZATION

A DISSERTATION SUBMITTED IN FULFILMENT OF THE PhD  
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**ABSTRACT**

*Arishta* and *Asava* have been used in Ayurveda as medicines over 3000 years to treat several disorders. This study was carried out to evaluate the chemical and microbiological standards of commercially available and laboratory prepared *Arishta* and *Asava* that are widely used in Ayurveda medicine. The study includes determination of alcohols present in *Arishta* and *Asava* other than ethanol, determination of acetaldehyde, ethyl acetate, essential metal concentrations, determination of heavy metals, identification and evaluation of bacterial quality of products and enumeration of yeast and mold counts in these products, assessment of hygienic conditions in terms of Coliforms and *Salmonella* contamination, evaluation of anti-bacterial stress activity of the products. Gas Chromatography and Atomic Absorption Spectrophotometry was used in the chemical analysis. Pour plate and spread plate method, selective and non-selective enrichment method, physical and biochemical characterization tests were carried out in this study to evaluate the microbiological quality of the products. *Ashvagandharishta* (*Arishta*) and *Aravindasava* (*Asava*) that are widely used and consumed in Sri Lanka were selected for the analysis.

Result revealed that the mean value of methanol in commercially available *Arishta* is  $112.03 \pm 70.13$  mg/l and in *Asava* is  $93.77 \pm 63.50$  mg/l. Mean values of methanol in laboratory prepared *Arishta* is  $143 \pm 28.62$  mg/l and in *Asava* is  $129.41 \pm 5.22$  mg/l. In *Arishta*, iso propyl alcohol  $6.98 \pm 2.59$  mg/l, n propanol  $12.71 \pm 7.66$  mg/l, isobutanol  $29.03 \pm 22.17$  mg/l, isoemyl alcohol  $109.75 \pm 50.78$  mg/l are the mean values and  $6.06 \pm 2.25$  mg/l,  $6.97 \pm 4.48$  mg/l,  $22.49 \pm 5.74$  mg/l,  $85.63 \pm 12.96$  mg/l are the detected level of iso propyl alcohol, n propanol, isobutanol and isoemyl alcohol in *Asava* respectively. In laboratory prepared *Arishta*, iso propyl alcohol  $8.54 \pm 2.53$  mg/l, n propanol  $12.11 \pm 5.04$  mg/l, isoemyl alcohol  $123.01 \pm 33.88$  mg/l are the mean values and  $6.47 \pm 3.72$ mg/l,  $7.31 \pm 5.21$  mg/l,  $21.87 \pm 11.34$  mg/l,  $89.88 \pm 19.25$  mg/l are the detected level of iso propyl alcohol, n propanol, isobutanol and isoemyl alcohol in prepared *Asava* respectively. Mean values of ethyl acetate in commercially available *Arishta* and *Asava* are  $60.72 \pm 30.60$  mg/l and  $55.29 \pm 13.03$  mg/l respectively. However, it is  $104.22 \pm 67.33$  mg/l in prepared *Arishta* and *Asava*.

The concentration of organic volatiles, heavy metals and essential metals of the tested *Arishta* and *Asava* revealed that the commercially available samples are within the acceptable range of chemical standard parameters that are recommended by the WHO guidelines for different types of herbal products. The tested samples of *Arishta* and *Asava* are within the internationally acceptable microbiological quality, free from *Salmonella* and *Escherichia coli*. These preparations are hygienically in good condition. The bacteria isolated and identified in *Arishta* and *Asava* is *Bacillus subtilis* which is a Gram positive, rod shaped, non-acid fast, aerobic and produce heat resistant spores.

Keywords (*Arishta*, *Asava*, Volatiles, Heavy metal, *Salmonella* and *Escherichia coli*)