

Thermo gravimetric and Elemental Analysis of *Caesalpinia bonducella* Leaves Powder

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Abstract

Thermo Gravimetric Analysis and Differential Thermal Analysis are powerful tools in which changes in physical and chemical properties of materials are measured as a function of increasing temperature (with constant heating rate). The change in sample mass as a function of temperature provides heat stability information for plant powder sample.

Since the last decade, herbal medicines have become universally important and have made an impact on the world's health as well as international trade.¹ The realization that the herbal medicines are safe and more reliable has increased the interest in these medicines.²

The abundance of plant species in India is due to diverse ecosystems and good climatic conditions. Indian people use various seasonal plants in their diet.³ For human body, some heavy metals are required in a very small scale. If they are present on large scale, they are toxic.⁴

The aim of the study was to find out the preliminary elemental concentration in *Caesalpinia bonducella* leaves. *C. bonducella* is widely useful to treat various diseases.

The powdered *Caesalpinia bonducella* leaves material was analyzed for content of trace elements by energy dispersive x-ray fluorescence (XRF) spectroscopy. The elemental composition was studied by using SPECTRO IQ II (Ametek, Germany) with silicon drift detector SDD with 145 eV at 10 000 pulses resolution. The primary beam was polarized with the help of Bragg crystal and Highly Ordered Pyrolytic Graphite - HOPG target. The 100 mg of samples were determined during 300 s at voltage of 25 kV and 50 kV and current of 0.5 and 1.0 mA under helium atmosphere.

The elemental range for XRF spectroscopy is from Na to U. It is difficult to quantify elements smaller than sodium. In this study, the trace elements concentration from Na to U was determined in the *Caesalpinia bonducella* leaves powder by using XRF spectroscopy. The results showed different concentration of elements in the samples. The data from analysis shows that *Caesalpinia bonducella* leaves powder contain oxides of Mg, Al, Si, P, K, Ca, Ti, Mn and Fe in different proportions. The data indicates that metal content was 0.9 to 4965 ppm in powdered plant material.

Conclusion

The aim of the current study was to review and compile ethno botanical use of *Caesalpinia bonducella*. Thermo Gravimetric Analysis and Differential Thermal Analysis are powerful tools in which changes in physical and chemical properties of materials are measured as a function of increasing temperature (with constant heating rate). The change in sample mass as a function of temperature provides heat stability information for plant powder sample.

From thermal decomposition curve with the help of TGA, it is observed that the best temperature to obtain charcoal is 450° C.

It shows that this plant contains optimum values as compared with daily mineral intake standards. The results show that leaves of *Caesalpinia bonducella* is a strong source of iron and it may be used as a food supplement to increase the hemoglobin content.

Key words Thermo Gravimetric Analysis, Elemental Analysis, *Caesalpinia bonducella*

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