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Element analysis of *Tamilnadia uliginosa* retz. tirveng & Sastre (Rubiaceae)

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Abstract
Fresh leaves and fruits of *Tamilnadia uliginosa* were used for the present study. In the present study, elements like Mg, K, Na, Fe, Mn, Ca, Pb, Cu present in *T. uliginosa* was carried out to assess its medicinal properties. The result also is helpful in standardization and identification of plant as well as crude drug for the future analysis and preparation of drug.

Keywords: mineral analysis, elements, *Tamilnadia uliginosa*

Introduction
The earth is endowed with a rich wealth of medicinal plants. In India, plant derived drugs have been used in traditional systems of medicines such as Unani, Ayurveda, Siddha and Homoeopathy since ancient times Charakasamhita (1000 BC) detailing the use of medicinal plants used in Ayurvedic system of medicine, recorded the use of over 340 drugs from plants. Plants provide directly usable drugs, and a variety of chemical compounds that can be used as starting points for the synthesis of new drugs with improved pharmacological properties (Ballabh *et al*., 2008) [4]. Medicinal herbs and their preparations (hot and cold infusions, decoction, and tinctures) are widely used by human beings all over the world (Arpadjan *et al*., 2008) [1]. Medicinal plants can be defined as plants that are commonly used for treating and preventing specific ailments and diseases (Anselem, 2004) [2]. These plants are either "wild plant species" those which grow spontaneously in self maintaining populations in natural or semi-natural ecosystems existing independently of direct human actions in contrast to the "domesticated plants species" those that have arisen through human actions such as selection or breeding and depend on management for their existence. Even though herbs had been priced for their medicinal, flavoring and aromatic qualities for centuries; the synthetic products of the modern age surpassed their importance. Today however, the herbal products symbolize safety in comparison to the synthetics that are considered unsafe to both human and environment. According to World Health Organization (WHO), more than 80% of the world's populations, mostly in developing countries depend on traditional plant based medicines for their primary health care needs (Pier Angeli *et al*., 2009). Medicinal plants are the richest bioresource of drugs in traditional systems of medicines (Adnan *et al*., 2014) [3]. The ancient people observed that some ingredients used in food had the specific properties for maintaining or eliminating certain diseases and maintaining good health (Vijayakumar *et al*., 2009) [11]. Scientific validation, including the nutritional, pharma-cognostic and phytochemical characterization is the essential step in the characterization of a medicinal plant (Habib ul Hassan *et al*., 2014) [7].

Rubiaceae, the coffee family is the fourth largest flowering plant family which includes about 500 genera and 6,000 species of herbs and shrubs (Evans, 2002) [6]. Members of the family tend to be concentrated in warmer and tropical climates around the world. A wide variety of growth forms are present in the family. While shrubs are the most common, members can also be trees, lianas or herbs. The family name is after the madder genus *Rubia* which is derived from the Latin word "ruber" meaning "red". The family was described by Antoine Laurent de Jussieu. The group contains many commonly known plants, including the economically important coffee (*Coffea*), quinine (*Cinchona)*, gambier (*Uncaria*), horticulturally valuable madder (*Rubia*), West Indian jasmine (*Ixora*), partridge berry (*Mitchella*), *Morinda*, *Gardenia*, and *Pentas*.

Materials and Methods
Study area
The study area selected is Muthanga Wild Life Sanctuary located in Wayanad District of Kerala, coming under Nilgiri Biosphere Reserve on the Western Ghats (Figs.1and 2). The Muthanga Wild Life Sanctuary is contiguous with the protected area network of Nagarhole and Bandipur National Park of Karnataka on the north east and Mudumalai National Park of Tamil Nadu on the southeast. Rich in biodiversity, the sanctuary is an integral part of the Nilgiri Biosphere Reserve, which has been established with the specific objective of conserving the biological heritage of the region. The total extent of the area is 344.44km^2 and is divided into two discontinuous portions with revenue lands in between. The North West portion of the sanctuary has only one range namely, Tholpetty covering an area of 77.67km^2. This range is contiguous with Nagarhole National Park, also known as Rajiv Gandhi National park, Nagarhole in the northeast, Kakkankotte reserve forest in the north and Brahmagiri hills of North Wayanad forest division in the east. The southern portion of the sanctuary comprises an area of about 266.77km^2 (Ratheesh *et al*., 2011) [10].

Plant Material
Fresh leaves and fruits of *Tamilnadia uliginosa* were collected from the Muthanga Wild Life Sanctuary and Kuruva Island.

Fresh leaves and fruits were washed and used directly for the analysis of macroscopic and microscopic characters. For other analyses dried powder of the plant parts were used. For this the plant parts were subjected to shade drying for about ten weeks. The dried plant materials were powdered and the powder was passed through a mesh sieve and stored in air tight containers. The species for the proposed study was identified and authenticated by using the Flora of Presidency of Madras by Gamble. A voucher specimen of the plant has been deposited in the Herbarium of Department of Botany, University of Kerala, Kariavattom. (KUBH5810).Relevant photographs of the plants were taken from the field itself and important points were noted in the field book on the spot.

Method of mineral analysis

The estimation of mineral content was carried out as per the procedure mentioned by health protection branch laboratories, bureau of nutritional science (Okoro *et* al., 2012) [8]. The sample was prepared by dry ashing and various elements were calculated by flame atomic absorption spectroscopy. The samples were burned to ashes in muffle furnace at 450°C for 16 h. Then the ash was wetted with water and sufficient amount of nitric acid was added to cover the ash. Refluxed on a hot plate for 1h.Then heat was reduced and gently evaporated the acid. Again samples were returned to muffle furnace at 375°C for 1hour.Repeated heating until a white ash is obtained. Added 2.5ml dilute HCl and dissolved the ash by boiling the solution, cooled and made up to appropriate volume with water. Determination of elements was done using flame atomic absorption spectroscopy.

Results

The amounts of various elements in decreasing order in fruits were potassium, magnesium, sodium, calcium, manganese, iron, zinc and copper respectively. In stem the occurrence of these elements was in the decreasing order of potassium, sodium, manganese, magnesium, iron, zinc and copper while in roots it was in the order- potassium, sodium, magnesium, calcium, manganese, zinc, iron and copper.

Result of mineral analysis of fruit, root, and stem is represented in Fig. 1

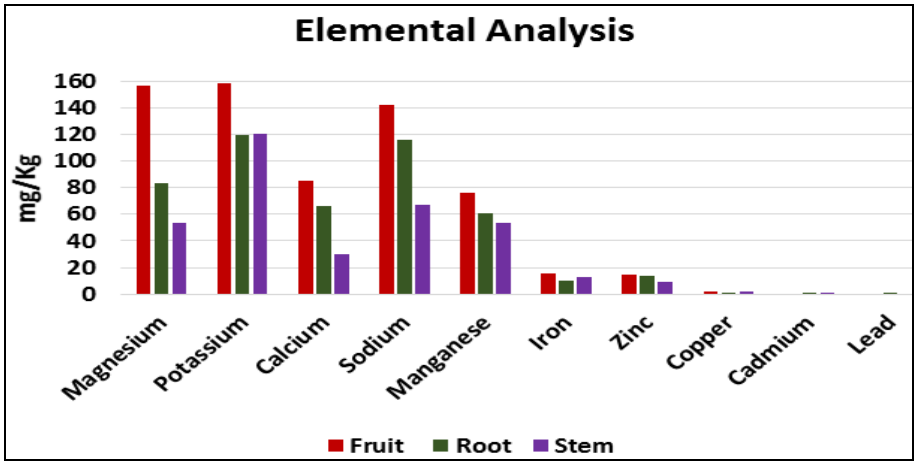

Fig 1: Elemental analysis of fruit, root and stem of *T. uliginosa*

Summary and Conclusions

Plants have been the source of many important drugs because they are able to produce various chemical entities and bioactive molecules through the process known as metabolism. These bioactive molecules are used as the active ingredients of modern medicine or as the lead compounds for new drug discovery. Though the Ayurvedic system of medicine has a long history of use of medicinal plants, yet they lack adequate scientific documentation of plants and standardization of drugs particularly based on modern scientific knowledge. The medicinal properties of a plant depend upon the bioactive phytochemical constituents present in it and which shows various physiological effects on human body. So through phytochemical screening of plants can detect the various important compounds which can be used as the base of modern drugs for curing various diseases. In the present study, elements like Mg, K, Na, Fe, Mn, Ca, Pb, Cu present in *T.uliginosa* was carried out to assess its medicinal properties. The result also is helpful in standardization and identification of plant as well as crude drug for the future analysis and preparation of drug.

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