Quantitative phytochemical analysis of *Combretum ovalifolium* Roxb. (Combretaceae)

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Abstract

The present study investigates the quantitative analysis of the major bioactive constituents of medicinally important plant *Combretum ovalifolium* Roxb. Flavonoids, alkaloids, tannins, phenols were reported in the ethanol extract. Percentage of major elements like carbon, nitrogen, phosphorus, potassium, sodium, calcium, magnesium and sulphur was determined. The significance of the plant in traditional medicine and the importance of the distribution of these chemical constituents are discussed with respect to the role of the plant in ethnomedicine in India.

Key words: Phytochemical constituents, *Combretum ovalifolium,* quantitative analysis.

Introduction

World plant biodiversity is the largest source of herbal medicine and still about 60 – 80% world population rely on plant based medicines which are being used since the ancient ages as traditional health care system. It is now clear that, the medicinal value of these plants lies in the bioactive phytochemical constituents that produce definite Physiological effects on human body. These natural compounds formed the base of modern drugs as we use today (Edeoga *et al.,* 2005; Akinmo-laudn *et al.,* 2007). Generally, phytochemicals are natural occurring compounds which have both stimulatory and inhibitory properties; they are bioactive and non – nutrient plants compounds with physiological action on human body (Okwu, 2001). The present study revealed the quantitative phytochemistry of *Combretum ovalifolium* Roxb. used by the people to cure various ailments.

Combretum ovalifolium Roxb.known as Kodimaruthu in Tamil, is a climber growing throughout India. This plant reported for terminal panicle crushed and applied as local antiseptic and antibiotic (Umberto Quattrocchi, 2012). Bark decoction is mixed with *Acacia feruginea* bark and *Albizia procera* bark given as an antidote (Panda, 2002). Bark juice is administered orally against jaundice (Sajeev and Sasidharan,1997).

Plant Description

Combretum ovalifolium Roxb. is a climbing shrub. Flowers - small, yellowish-white, glob-like. Flower spikes at the end of the branches. Sepals triangular-ovate, curved out. Note the sepal-cup with a hairy ring.

Materials and Methods

The identified plant of *Combretum ovalifolium* was collected from Singikulam hills Tirunelveli District, Tamil Nadu, South India. It was confirmed with voucher specimen deposited at the Survey of Medicinal Plants Unit, Govt. Siddha Medical College, Palayamkottai. The taxonomic features of the plant confirmed with the Flora of Presidency of Madras (Gamble, 1915 – 1921) and The Flora Tamil Nadu Carnatic (Mathew 1983 – 1988). The air-dried and powdered plant materials were taken in different amber coloured bottles, extracted (by Soxlet method) in ethanol and then the solvent were filtered off. The extract thus obtained from the plant was then subjected to qualitative tests. Total ash was determined by employing standard methods of analysis as described in *Pharmacopoeia of India* (Anonymous, 1996). The

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percentage of major elements like carbon, nitrogen, phosphorus, potassium, sodium, calcium, magnesium and sulphur was determined by the method of AOAC (1984). The trace elements like zinc, copper, iron, manganese, boron and molybdenum were determined by the method of Williams and Twine (1960). The minerals (N, P, K, Na and Ca) were estimated using Flame Photometer (Spectronics Flame Photometer, India). Alkaloids were determined by using the method of Harbone (1973). Flavonoids were determined by the method of Boham and Kocipal-Abyazan (1974). Biochemical estimation for Phenol (Farkes and Kiraly 1962) and Tannin (Aparna Buzarbarua, 2000) were carried out. Glycoside and serpentines were carried out on the powdered samples using the standard procedures as given in Anonymous, AOAC (1984).

Results and Discussion

Herbal medicines are free from side effects, adverse effects and they are economical and easily available will be beneficial for the mankind over the centuries. A phytochemical analysis is very useful in the evaluation of some active biological compound of some medicinal plants. The qualitative and quantitative analyses of *Combretum ovalifolium* Roxb. were carried out in dry samples. The results of quantitative determination of phytochemical constituents of *Combretum ovalifolium* is shown in table 1. High quantity of phenols and flavonoids were found on *Combretum ovalifolium*. The values of glycosides and serpentines were very trace on the plant.

Antioxidants and free radical scavengers, which prevent oxidative cell damage, have strong anti-cancer activity (Okwu and Josiah, 2006). The flavonoid content of ethanol extract of the *Combretum ovalifolium* was found to be 1.26 (mg kg^{-1}). As antioxidants, flavonoids from these plants provide anti-inflammatory activity (Okwu, 2004). This may be the reason *Combretum ovalifolium* is used in treatment of wounds, burns and ulcer in herbal medicine. The tannin content of the plant was found to be 0.22 (mg kg^{-1}). Herbs that have tannins as their main component are astringent in nature and are used for treating intestinal disorders such as diarrhoea and dysentery (Dharmananda, 2003; Lutete *et al.*, 1994), thus exhibiting antimicrobial activity. One of the largest groups of chemical produced by plants is the alkaloids and their amazing effect on humans has led to the development of powerful pain killer medications (Raffauf, 1996). These, also explains the reason why traditional medicines healers often use *Combretum ovalifolium* in treating wounds and burns. The alkaloids level of *Combretum ovalifolium* shows that the sample can be used as a CMS stimulant and as powerful pain relievers (Nwali, 2012).

The human body requires a number of minerals in order to maintain good health. A number of minerals essential to human nutrition are accumulated in different parts of plants as it accumulates minerals essential for growth from the environment (Ajasa *et al.*, 2004). Macro and microelements influence biochemical processes in the human organism (Brouns and Vermeer, 2000). Study of elements with respect to indigenous medicinal plant reveals that major and trace elements have significant roles. The minerals are very important in human nutrition. Calcium (Ca), potassium (K) and magnesium (Mg) are reported to be responsible for the repair of worn out cells, strong bones and teeth, building of red blood cells and for body mechanisms (WHO, 1996). Also, Ca and K are essential for disease prevention and control and may therefore contribute to the medicinal influences of the plant (Aliyu *et al.*, 2008). Pottasium (K) is needed for growth and transmission of the nervous system to transmit messages as well as regulating the contractions of muscles (Ajasa *et al.*, 2004). Demirezen and Ahmet (2006) analyzed various vegetables (cucumber, tomato, green pepper, lettuce, parsley, onion, bean, eggplant,

pepper mint, pumpkin and okra) and reported that the Zn concentration varies from1.56 - 2.59 ppm and similarly the present analysis reported that the Zn concentration (1.59 ppm) was within the recommended international standards. Zn is an essential metal for the normal functioning of various enzyme systems. Zn deficiency, particularly in children, can lead to loss of appetite, growth retardation, weakness, and even stagnation of sexual growth (Saracoglu *et al*., 2009).

This study therefore has provided some biochemical basis for the ethanomedical use of extracts from *Combretum ovalifolium* Roxb.in treatment and prevention of infections. As a rich source of phytochemical *Combretum ovalifolium* can be a potential source of useful drugs.

Table 1: Quantitative phytochemical constituents of *Combretum ovalifolium*

Parameter	leaf	stem	root	bark
Moisture (%)	5.49	5.78	5.48	5.68
Organic Carbon (%)	11.32	11.58	11.29	11.50
Total Nitrogen (%)	1.23	1.21	1.28	1.29
Total Phosphorus (%)	0.26	0.25	0.34	0.27
Total Potassium (%)	3.29	3.25	3.12	3.48
Total Sodium (%)	0.16	0.12	0.05	0.18
Total Calcium (%)	4.16	4.12	4.29	4.56
Total Magnesium (%)	4.28	4.26	4.06	4.26
Total Sulphur (%)	0.61	0.59	0.52	0.65
Total Zinc (ppm)	7.68	7.64	7.25	7.82
Total Copper (ppm)	0.74	0.72	0.65	0.78
Total Iron (ppm)	82.16	81.26	85.12	83.19
Total Manganese (ppm)	52.18	52.06	51.16	56.48
Total Boron (ppm)	0.54	0.55	0.50	0.56
Total Molybdenum (ppm)	0.02	0.02	0.02	0.02
Total Alkaloids (mg kg-1)	2.52	2.48	2.52	2.68
Total Flavonoids (mg kg-1)	2.92	2.90	2.89	3.09
Tannin (mg kg-1)	0.56	0.52	0.55	0.59
Lignin (mg kg-1)	0.26	0.29	0.31	0.27
Glycosides (mg kg-1)	0.03	0.03	0.10	0.05
Serpentines (mg kg-1)	0.021	0.02	0.05	0.02
Carbohydrates	1.929	2.026	2.017	1.923
Amino acids	0.356	0.266	0.128	0.691
Lipids	0.13	0.10	0.12	0.14
Protein	0.479	0.562	0.901	0.734
Phenols	0.316	0.162	0.745	0.270

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