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RESEARCH ARTICLE

COMPARATIVE CHEMICAL PARAMETERS OF THE LITTER COLLECTED FROM THE SELECTED TREE CANOPY RELATED WITH URBAN GREENING IN NIRMALA COLLEGE CAMPUS, COIMBATORE, TAMILNADU

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ABSTRACT

Over the coming decades, our cities likely face an array of associated problems, including: rising temperature, water shortages, food scarcity and increased storminess with concomitant flooding, wind damage and coastal erosion. Less favourable aspects include contribution of gardens and gardening to green house gas emission, misuse of fertilizers and pesticides and introduction of alien plant species Effective environmental planning, including urban greening, can assist greatly in improving the quality of the urban environment and the livelihoods of the people who live in urban areas. There is need to plant trees that provide multiple benefits, particularly in house compounds for providing edible pods, flowers, fruits, leaves etc. As a result of impacts associated with urban infrastructure, arborists and urban landscape managers perform remedial management actions to make urban soils more suitable plant-growing environments, remedial soil management actions include irrigation, aeration, radial trenching, mulching, and fertilization, all of which further alter the physical, chemical and biological properties and thus the nitrogen status of urban soils. In urban environments human alter these soil-forming factors by impacts associated with urban infrastructure. The aim is to improve our quality of life in an increasingly densely populated, fast-living world. People have to find back to natural and green open spaces that become more and more important for our personal development, wellbeing and recreation due to increasing urbanization. In the present Chemical parameters of the litter collected from the tree canopy in the college campus were analyzed and the result were compared with the standard soil profile.

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INTRODUCTION

Cities emerge from various settings: Forests, grasslands, deserts and farmlands are consequently environmental change is highly variable. Where green material precedes urban development and there is quick reduction in vegetation and increase in exposed soil with initial clearing. Urban greening is an integrated approach to the planting, care and management of all vegetation in cities, towns, townships and informal settlements in urban and peri- urban areas. Urban green spaces play a significant role for people to have social contacts or find rest in order to achieve this inner harmony and well being. Soil contains about three times more organic carbon than vegetation and about twice as much carbon is present in the atmosphere (Batjes and Sombrook, 1997; Kumar and Nair, 2006; Dinakaran, 2008). The coming decades, our cities likely face an array of associated problems including, rising temperatures, water shortages, food scarcity and increased storminess-with continent flooding, wind damage and coastal erosion (Australian Greenhouse Office, 2006; Gleeson, 2007; Frumkin *et al.,* 2008). Man activities (Sheikh and Kumar, 2010). The biomass of leaf and branch cover of each tree was calculated with the help of crown volume. Plant litter and residual quantity but also directly affected soil nutrient supply and soil properties in urban areas (Zhao and Wang, 2010). As many urban forest ecosystem services are directly related to the amount of healthy and functioning leaves, tree covers becomes a simple measure of the extent of the urban forest and consequently the magnitude of services provided by the forest. It is the management of trees for their contribution to the physiological, sociological, and economic well-being of urban society.

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Urban forestry deals with woodlands, groups of trees, and individual trees where trees bestow a great variety of benefits and problems.

MATERIALS AND METHODS

Study Area

Coimbatore is a city in Tamil Nadu, South India. It is the second largest city and urban agglomeration in the Indian state of Tamil Nadu after Chennai. It is the capital city in Kongu nadu region and is often been referred to as the Manchester of south India. The city is located on the banks of the Noyyal River surrounded by the Western Ghats and is administered by the Coimbatore Municipal. Nirmala college academic campus is located in the southern parts of the Western Ghats. The total area of college campus is 20 acre. The temperature during both summer and winter varies between 28º c to 34º c. Soil in this area is red loamy soil which is more fertile than sandy soil. Its porosity allows high moisture retention and air circulation

Plate 1. Study Area

Collection of tree canopy soil samples

For the present study five different trees of different genera were selected in the college campus to find out the Physical parameters of tree canopy soil. The tree canopy soil samples were collected during the year, 2013. Soil with litter formation and ground vegetation from the corners and center of the selected samples of *Butea monosperma*, (Lamk.) *Taub., Jacaranda mimosifolia, D. Don., Cassia fistula*, Linn., *Albizzia lebbeck* (L), *Benth.,* and *Peltophorum pterocarpum* (DC.)k. Heyne., were collected separately in sterile bags. Barren land soil is taken from the same campus was kept as control. Soil was taken from the depth of 0-50cm. Soil samples were packed in sterile bags, and as soon as possible returned to the laboratory and processed within 2 days.

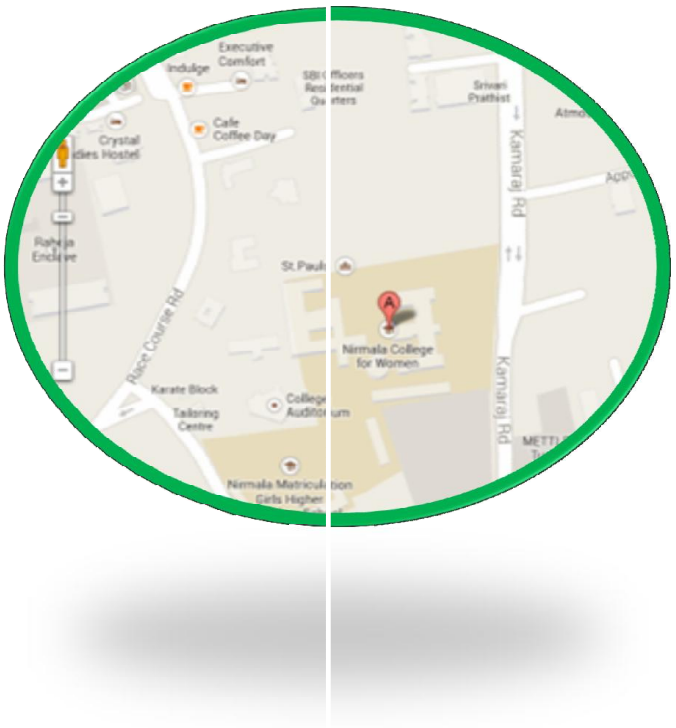

Plate 2. Location Map

Sample 1. Plate 3. *Butea monosperma, (Lamk.) Taub.,*

Litter

Plant organs die and ultimately whole plants die but dead plant material or litter, continue to have powerful effects on ecosystem, drinking nutrient turnover, soil formation and atmospheric composition. Soil properties in turn have strong impacts on plant community composition, diversity and productivity (Wright *et al.,* 2004). Litter accumulation is a major structuring force in prairies. In fall grass prairies, fire works as an agent that removes the litter layer thereby increasing yield and altering species diversity and composition (Dyksterhuis *et al*., and Schmutz, 1947; Weaver and Roland, 1954).

Sample 2. Plate 4. *Jacaranda mimosifolia,* D. Don.,

Sample 3. Plate 5. *Cassia fistula,* Linn .,

Sample 4. Plate 6. *Albizzia lebbeck*, (L,) Benth.,

Mineral profile of the litter formed by the selected tree

Mineral profiles of the litters formed by the selected trees of the leaves, wood logs, flowers, fruits were analyzed. The fallen fresh and dry leaves, flowers, fruits and seeds were powdered and kept in airtight container and the mineral profiles were analyzed.

Sample 5. Plate 7. *Peltophorum pterocarpum*, (DC.) K. Heyne.,

RESULTS AND DISCUSSION

Chemical parameters of the litter collected from the selected tree canopies were represented in Table & Charts (1-9).

Chemical analysis of litter collected from the selected tree canopy

Comparative Nitrogen content of the litter collected from the selected tree canopy soil

The percentage of Nitrogen was high in *Albizzia lebbeck,* (L), *Benth*., (2.98) followed by *Butea monosperma* (Lamk.) *Taub.,* 2.76, *Peltophorum pterocarpum* (DC.) K. Heyne., 2.76, *Jacaranda mimosifolia, D. Don*., 2.8 and *Cassia fistula,* Linn.,2.74 percentage (Chart 1).

Comparative Potassium content the litter collected from the selected tree canopy soil

The percentage of Potassium was found to be approximately same in all the samples and in *Albizzia lebbeck* (L), *Benth*., (0.068) was recorded as high (Chart 2).

Comparative Phosphate content present in the litter collected from the selected tree canopy soil

The percentage of Phosphate was found to be high in *Butea monosperma* (L), Benth., as (0.085). In all the other samples the percentage of Phosphate was (0.08) (Chart 3).

Comparative Calcium content present in the litter collected from the selected tree canopy soil

In *Cassia fistula, Linn*., the percentage of Calcium was recorded as (0.44). In *Butea monosperma* (Lamk.) Taub., as (0.33) percentage, *Jacaranda mimosifolia,* D. Don., as (0.32) and *Albizzia lebbeck,* (L), *Benth.,* as 0.28, *Peltophorum pterocarpum* (DC.) k. Heyne., as (0.23) percentage (Chart 4).

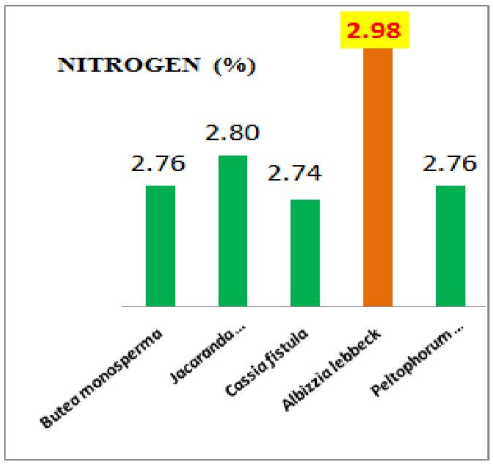

Chart 1. Comparative Nitrogen content present in the litter collected from the selected tree canopy soil

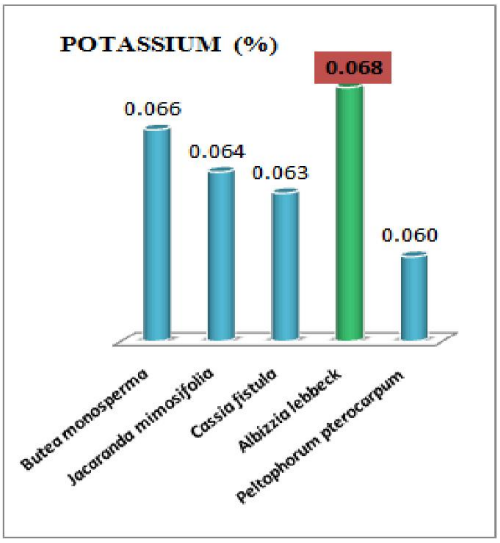

Chart 2. Comparative Potassium content present in the litter **collected from the selected tree canopy soil**

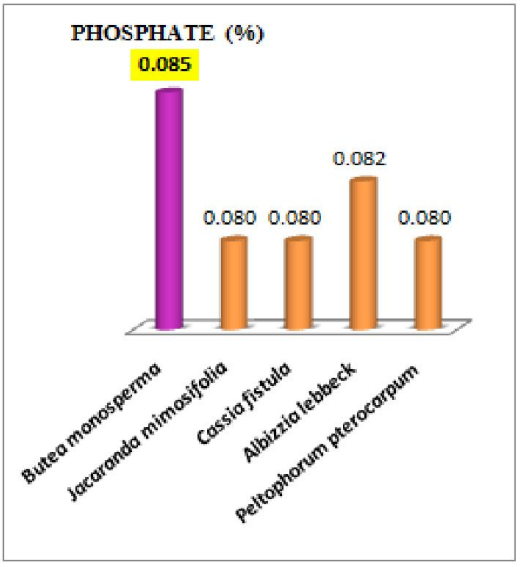

Chart 3. Comparative Phosphate content present in the litter collected from the selected tree canopy soil

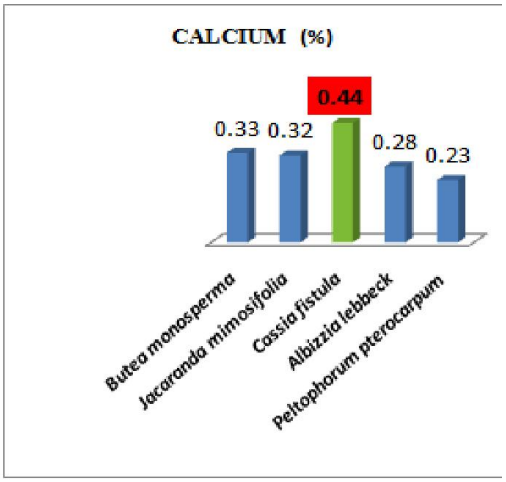

Chart 4. Comparative Calcium content present in the litter collected from the selected tree canopy soil

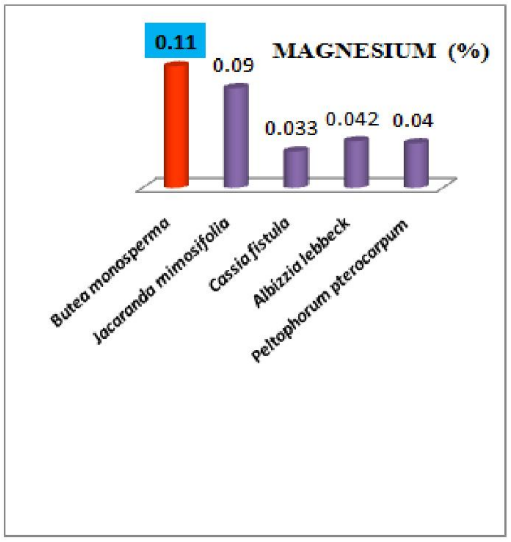

Chart 5. Comparative Magnesium content present in the litter collected from the selected tree canopy soil

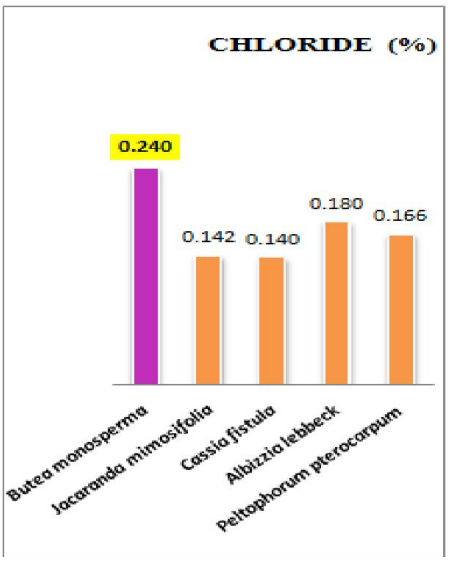

Chart 6. Comparative Chloride content present in the litter collected from the selected tree canopy soil

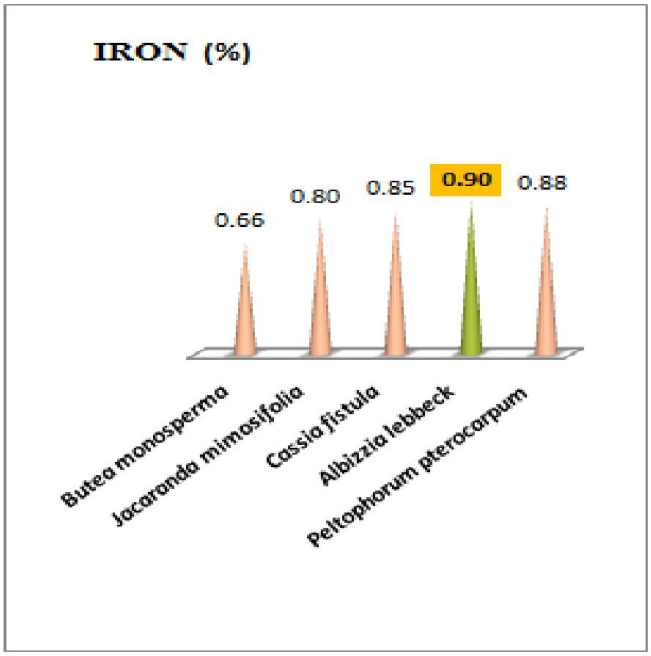

Chart 7. Comparative Iron content present in the litter collected from the selected tree canopy soil

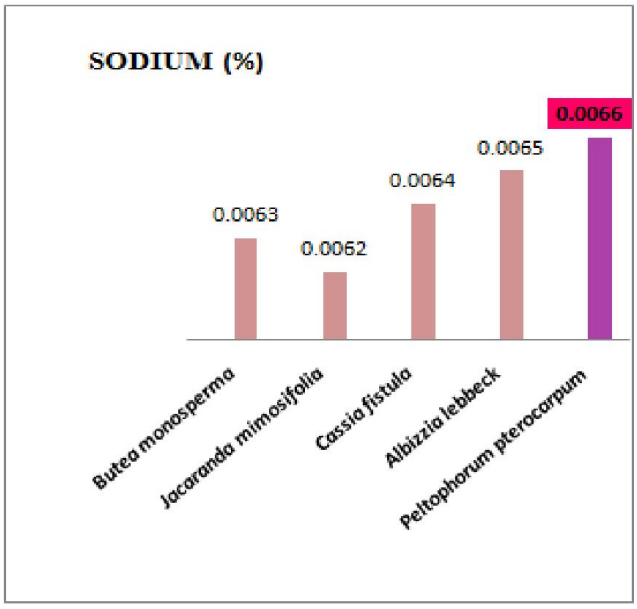

Chart 8. Comparative Sodium content present in the litter collected from the selected tree canopy soil

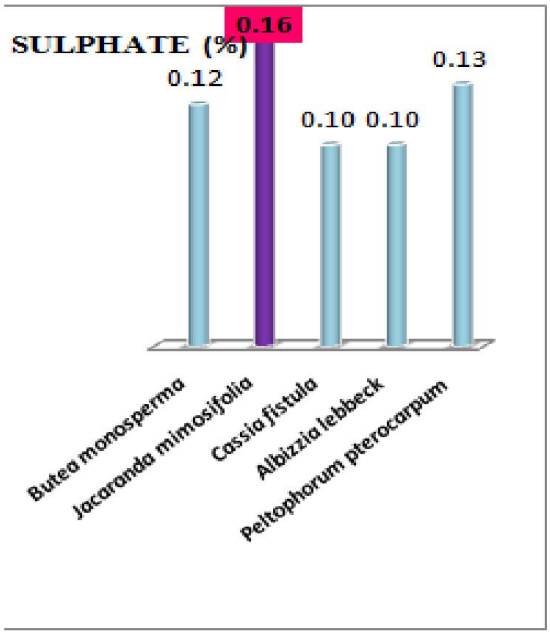

Chart 9. Comparative Sulphate content present in the litter collected from the selected tree canopy

Comparative Magnesium content present in the litter collected from the selected tree canopy soil

The percentage of Magnesium is high in *Butea monosperma* (lamk.) Taub., (0.11) and (0.09) in *Jacaranda mimosifolia*, D. Don., other sample percentage is very low (Chart 5).

Comparative Chloride content present in the litter collected from selected tree canopy soil

The percentage of the Chloride level is high in *Butea monosperma (Lamk.) Taub.,* (0.24), In *Albizzia lebbeck,*(L), *Benth*., (0.18) percentage and other samples are low (Chart 6).

Comparative Iron content present in the litter collected from the selected tree canopy soil

In *Albizzia lebbeck,* (L), Benth., the percentage of Iron content is (0.9), *Peltophorum pterocarpum* (DC.) k. Heyne., (0.88) percentage, *Cassia fistula,* Linn., (0.85) percentage, *Jacaranda mimosifolia,* D. Don., (0.8) percentage and *Butea monosperma* (Lamk.) Taub., (0.66) presence of iron percentage is low (Chart 7).

Table 5. Mineral profile of the litter collected from the selected tree canopy

S.No.	Minerals	Butea monosperma	Jacaranda mimosifolia	Cassia fistula	Albizzia lebbeck	Peltophorum pterocarpum
1.	Nitrogen	2.76%	2.80%	2.74%	2.98%	2.76%
2.	Potassium	0.066%	0.064%	0.063%	0.068%	0.060%
3.	Phosphate	0.085%	0.080%	0.080%	0.082%	0.080%
4.	Calcium	0.33%	0.32%	0.44%	0.28%	0.23%
5.	Magnesium	0.11%	0.09%	0.033%	0.042%	0.040%
6.	Chloride	0.240%	0.142%	0.140%	0.180%	0.166%
7.	Iron	0.66%	0.80%	0.85%	0.90%	0.88%
8.	Sodium	0.0063%	0.0062%	0.0064%	0.0065%	0.0066%
9.	Sulphate	0.12%	0.16%	0.10%	0.10%	0.13%

Comparative Sodium content present in the litter collected from the selected tree canopy soil

The percentage of sodium in *Peltophorum pterocarpum* (DC.) *K. Heyne*., high (0.0066) and other samples are low in percentage (Chart 8).

Comparative Sulphate content present in the litter collected from the selected tree canopy soil

The percentage of the Sulphate is high in the tree sample *Jacaranda mimosifolia,* D. Don., (0.16), and (0.13) percentage in *Peltophorum pterocarpum* (DC.) *K. Heyne*., (0.12) percentage in *Butea monosperma (Lamk.) Taub.,* and other two samples *Cassia fistula, Linn., Albizzia lebbeck,* (L), Benth., are (0.1) percentage of Iron is present (Chart 9).

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