The Effects of Biodegradability of Chemical Metabolites in Latex on the Physio-Chemical properties of soil in Lamigo Hills, Jos, Plateau State

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Abstract

This study was carried out to ascertain the effects of degradability of chemical metabolites in latex underneath latex-producing plants in soil samples collected in Lamingo hill of Jos North lay out. Soil samples were collected using soil augar at 0.5 and 10 meters away from plant species. The latex-producing plants used are Euphorbia unispina viewed as A, Euporbia tirucalli regarded as B and 10 meters away from the plant is represented by C. Soil texture under the plants gave loamy sandy while soil away from the plants gave sandy loamy. The LSD of soil pH is 0.43, showed mean for soil samples as 0.075, 0.975 and 0.000 that is all the soil samples were alkaline in nature. Soil nitrogen had LSD of 0.07and the depicted sample mean were 0.000, 0.075 and 0.075 which explained that nitrogen content was higher under the plants and distance away from the plants showed a reduction in nitrogen content. The LSD for organic matter was 1.6 with sample mean established were 0.20, 2.30 and 2.50 which demonstrated that there were more organic matter under the latex-producing plants and less in the soil sample distance away from both plant species. The biodegradability of the chemical metabolites was expressed in the texture type as loamy sandy, in pH, nitrogen content and organic matter components that exist under the plant species, that is the plant parts that dropped to the ground comprise of latex in them with various chemical metabolites which decomposed, add to the fertility and porosity of the soil. Farmers can use latex producing plant parts in the preparation of compost manure and where the plant is in abundance on the farmland, it is an advantage to the farmer.

Key Words: Biodegradability, chemical metabolites, latex, Physio-chemical properties of soil, Lamingo hills and Jos

INTRODUCTION

In nature, plant products represent vast diversity of compounds with a variety of biological activities (Duke *et al*., 2010; Yang *et al*., 2018). The natural products represent a diverse classes of chemical compounds called chemical metabolites which have impact on different species of plants and animals. The environmental fate of chemical metabolites is a complex issue that is affected by the donor and receiver target plant species, as well as soil and environmental variables that affect the fate of the chemicals in soil complex (Figueiredo, 2008; Oh *et al*., 2009) Most of the chemical metabolites are present at low concentrations and undergo rapid chemical and biological degradation in the soil. The soil system has a living and dynamic influences on the fate and functions of chemical metabolites in time and space. The bioavailability of chemical metabolites in the soil is dependent on processes such as adsorption, leaching and degradations by abiotic and biotic factors (Duke, 2010; Manimegalai and Sukanya, 2014; Sumithra *et al.,* 2013).

Soil is one of the significant and appreciated resources of the nature. It is composed of elements of broken rock that have been changed by chemical and mechanical processes that include weathering and erosion (Wodaje and Alemayeh, 2014; Sumithra *et al*., 2013; Chaudhari, 2013). Most of the dying out components of our environment especially latex –producing plants are being destroyed by human activities like rapidly urbanization, industrialization population explosion, and agricultural waste and anthropogenic activity in and around pond (Coskun *et al*., 2006; Papi and Onaji, 2016; Borges *et al*., 2017).

Soil matrix forms the primary medium for the transport of chemical metabolites from a donor to a receiver plants. During this transportation, the soil matrix is capable of altering the bioavailability of chemical metabolites by various processes including sorption, chemical and

microbial degradation (Tharayil *et al*., 2008). Microbial degradation of substrate in soil matrix is related to biological activity of the compound, where toxic compounds are degraded slowly (Noriega *et al*., 2019).

Latex is a sticky substance that flows out of some plants after been injured, can be found in more than 20,000 plant species from some 40 families (Lewinsohn, 1991; Hunter, 1994). Metabolism is the sum of all the biochemical reactions carried out by an organism. Metabolites are the intermediate products of metabolism and are usually restricted to small molecules (Durairaj *et al*., 2018). This work was carried out to ascertain the effects of the chemical metabolites on the Physio-chemical properties of soil underneath and distance away from some latex-producing plants of Lamingo hills.

LITERATURE REVIEW.

Biochemistry and Mode of Action of Latexes

The physical and chemical characteristics of the latex produced by certain plants can act as a defense against insects and other pathogens and many types of lattices are known to have high concentrations of enzymes (Giordani *et al.,* 1991). The two major defense-related components in lattices are in secondary metabolites (terpenoids, alkaloids, etc.) and different protein classes (Agrawal and Konno, 2009). Several of these defense-related components are (rubber, cysteine protease, alkaloids, etc.) appear in latex of distant phylogenetic groups, suggesting common functions and convergent evolution (Langenheim, 2003).

Chemical Metabolites of latex-producing Plants

Rubber (*cis*-1, 4-polyisoprene) is a terpenoid found in the latex of many plant species, across some 300 genera and 8 plant families (Bushman *et al*., 2006).

The stickiness of latex may be caused by at least three factors:

(*a*) Elasticity of *cis*-polyisoprene,

(*b*) Coagulation of rubber particles, and

(*c*) Adhesiveness of rubber particles to the surfaces of insects.

The chemical compositions of latex are:

Alkaloids are basic natural products containing nitrogen, many of which are toxic and typically do not have a primary function in plants. Alkaloids are produced by a variety of animals, microorganisms and plants and have been reported from the latex of many species, sporadically distributed among angiosperm families, including Papaveraceae and Moraceae (Samanani *et al*., 2006 and Weid *et al*., 2004).

Latex of many plants in the Apocynaceae contains cardenolides and this range from trace amount up to 30% dry mass of latex (Seiber *et al*., 1982). Cardenolides have also convergently evolved in a few other plant families (e.g., Brassicaceae, Celastraceae, Fabaceae), but in these cases they are not associated with latex (Groeneveld, 1999).

Terpenoids are extremely diverse group of carbon-based compounds that are derived from five-carbon isoprene units. Terpenoids are likely to have many functions in plants, including pollinator attraction, defense, and roles in primary metabolisms (Mazoir *et al*., 2008).

Phenolics are large group of multifunctional carbon-based secondary metabolites produced by the Shikimate pathway that includes tannins, lignins and flavonoids. Latex of the sweet potato, *Ipomoea batatas* (Convolvulaceae) contains high concentrations of hexadecyl, octadecyl, and eicosyl esters of *p*-coumaric acids (Snook, 1994).

Proteases are enzymes that cleave protein and are found in all living organisms. Various types of proteases are found from latex of plants belonging to diverse phylogenetic clades. The latex-like resin exudates of mango, *Mangifera indica* (Anacardiaceae), contain both serine and cysteine proteases (Saby *et al*., 2003; Pechan *et al*., 2000).

Protease inhibitors are thought to function as anti-nutritive secondary metabolites by binding to proteases and preventing the digestion of protein. Trypsin (serine protease) inhibitors are found in latex of *Carica papaya* (Azarkan *et al*., 2004).

Lectins are carbohydrate-binding proteins that have affinity with specific sugar moieties, which often have toxic activities against animals including insects. Several types of lectins have been found in latex from Euphorbiaceae, Moraceae, Apocynaceae, and phloem sap from Cucurbitaceae. Chitin-binding proteins with hevein-like domains, such as the wheat germ lectin, are toxic and inhibit the synthesis of the insect gut peritrophic membrane (Hopkins and Harper, 2001).

Chitinases, these are enzymes that degrade chitin (important components of insects' gut peritrophic membrane) widely found in plant latex from several plant families including Caricaceae, Moraceae, and Euphorbiaceae. Because chitin is the major constituent of the cell wall of fungi, so the enzyme is destructive to fungi, as a result, it is reasonable to assume that chitinases protect the leaves from infection by pathogenic fungi as well (Azarkan *et al*., 2004; Kabir *et al*., 2006; Lawrence and Novak, 2006).

Polyphenol oxidase (PPO) and peroxidase (POD) are common plant oxidases reported from Euphorbiaceae, Moraceae, and Anacardiaceae (Saby *et al*., 2003). PPOs and some PODs are regarded as plant anti-herbivore defense proteins, because they oxidize mono- or di-hydroxyphenolics that are ultimately converted in *o*-quinones, which then covalently bind to amino acids such as cysteine and lysine, making them inaccessible, and decrease the nutritive value of leaf protein (Walz *et al*., 2004).

In addition some latex proteins are confined to specific plant taxa and have been suggested to be involved in plant defense. These compounds include phosphatase in Euphorbiaceae. Lipase in Caricaceae, Euphorbiaceae, Apocynaceae, glutaminyl cyclase in Caricaceae (Papaya) (Azarkan *et al*., 2004) and gum arabic glycoprotein, a high-molecular-weight, hydroxyproline-rich arabinogalactan-protein found from exudates of *Acacia senegal* (Fabaceae) (Goodrum *et al*., 2000).

Latex- producing plants

Latex, referred to a sticky substance that flows out of some plants upon wounding (Lewinsohn, 1991; Hunter, 1994). It is stored in laticifers (specialized cells or chains of cells containing latex and seals wounds as it coagulates when discharged from those. Besides the simple sealing of the wound, latex functions range from a plant defense system to the rebuilding of the mechanical properties of wounded plants (Agrawal and Konno, 2009).

Euphorbia tirucalli L.

Euphorbia tirucalli L. belongs to the dicotyledonous order Euphorbiales, family Euphorbiaceae, sub-section *tirucalli*. *Euphorbia tirucalli L*. belongs to the dicotyledonous order Euphorbiales, family Euphorbiaceae, subsection *tirucalli* (Bruyns *et al*., 2006) *E. tirucalli* has been reported to present numerous pharmacological activities. The species has been patented for modern drugs such as prostate cancer medicine and has a very high ethno-medicinal value (Duke *et al.,* 2010). It is a shrub or a small tree endemic to tropical areas with pencil-like branches from which it derives its vernacular name, the pencil-tree. *E. tirucalli* generally evergreen since its stems and branches remain green all year round and are rarely fed on by herbivores. It bears white poisonous latex which may possibly account for the low herbivore pressure and medicinal features (Ankita *et al*., 2013).

Figure 1: *Euphorbia tirucalli*

Taxonomic Description

Kingdom: Plantae.
Division: Magnoliophyta.
Class: Magnoliopsida
Order: Malpighiales.
Family: Euphorbiaceae.
Genus: Euphorbia

***Euphorbia unispina* L.**

Euphorbia unispina is a spiny, succulent shrub with a stout, sparsely-branched stem that can be up to 3 or 4 metres tall; it looks rather like a cactus. The branches can be 16 - 25mm thick, usually with a few leaves at their tips. The whole plant is a silvery grey, it is covered with shallow tubercles and horny spine shields up to 1 cm in diameter with a single spin (Burkil, 2004).

Rocky hills and slopes in savannah at elevations up to about 800 metres

Taxonomic Description

Kingdom: Plantae.
Family: Euphorbiaceae.
Subfamily: Euphorbioideae
Tribe: Euphorbieae
Subtribe: Euphorbiinae
Genus: Euphorbia.

MATERIALS AND METHODS

Study Area

This research was carried out in Lamingo hills, Jos North Lay-out, Katton Rikkos, Jos. The area has rocky outcrop with the following longitude and latitude N09^{0} 53.578^{I,} E008^{0} 54.389^{I} and N090 53.310^{I}, E008^{0} 54.502^{I}. It has human settlement made of large numbers of civil servants

Soil Sampling

Using soil auger, 4 sites at underneath of each plant or plot were sampled to a depth of 15 cm (top soil). To ensure that all parts of a plot were sampled, underneath each plant or plot was divided in four sections and four sampling points were randomly selected in each quarter for soil collection. Four sample sites underneath the plant at 0.5 meters and 10 meters away from the plants. Soil underneath *Euphorbia unispina* was coded ' A', soil underneath *Euphorbia tirucalli* was coded 'B' and soil taken from 10 meters away from the plants was labeled C

All the soil samples collected from one plot were further broken into small pieces, stones and gravels were discarded and the soil was mixed thoroughly. Only about 2 kg of the original composite sample was taken at each 0.5 meters and 10 meters, placed in a polythene bag and carefully labeled with the location and number of the plant type collected in plots before being transported to the Laboratory at Federal College of Land Resources, Kuru, Jos. for soil analysis (Haase, 1992; Ukpong, 1994).

In the laboratory, large lumps were further broken up and the soil was finally spread out on a large sheet of paper on benches and allowed to air dry, the soil sample was ground in a mortar with a woody pestle which allowed the aggregate particles to be crushed but no actual broken down occurred. The sufficiently ground soil was sieved through a 2 mm sieved, while stone and large root residues were discarded. The fine soil which passed through a 2 mm sieve was stored in labeled small polythene bag ready for soil analysis.

Soil Analysis

Textural Class Determination

This was carried out by means of hydrometer method (Bouyoucos, 1962; Ibitoye, 2008).

Air-dry soil of the quantity 51g which had passed through the 2 mm sieve was weighed and transferred to suitably labeled containers. A quantity of air-dry 51 g soil sample represents approximately 50 g oven-dry soil.

The percentage of sand, silt and clay in the inorganic fraction of soil was measured in this procedure. The method was based on Stoke's law governing the rate of sedimentation of particles suspended in water. The samples were treated with 25 ml of 5% sodium hexa-metaphosphate (calgon) along with 100 ml of distilled water to complex Ca^{++}, Al^{3+}, Fe^{3+}, and other cations that bind clay and silt particles into aggregates.

They were all stirred with a stirring rod before transferring to a mechanical shaker where they were shaken for 24 hours. At the end of the shaking, the suspension was carefully transferred into labeled 1 litre glass cylinders.

With the hydrometer in suspension, distilled water was added to the lower blue line. After filling up to the line, the hydrometer was removed.

Each soil sample in the glass cylinder was then stirred with a rubber attached to the end of a glass rod. The stirring was done several times to ensure effective dispersion of particles.

About 20 to 30 seconds after stirring was done, the hydrometer was gently lowered into the suspension until it was floating. The first reading of the hydrometer was taken at 40 seconds. The hydrometer was removed and the temperature of the suspension was taken with a thermometer.

In this way, the hydrometer and temperature readings were taken for all the 20 cylinders containing the soil samples from the 20 plots. After 3 hours, the hydrometer was again allowed gently into the

suspension and lowered to float. The hydrometer readings were taken for each soil suspension in each glass cylinder.

The first reading measured the percentage of silt and clay in the suspension, while the second reading measured the percentage of sand.

Calculations;

Temperature and density corrections:

- ✓ Add 0.2 units to the readings of the samples for every (20 ^oC), and subtract 0.2 units for every below (20 ^oC).
- ✓ Subtract the density of the blank at each reading, from the corresponding density readings for the samples.

% Clay = corrected hydrometer reading at 3hr x 100/ weight of sample

% Silt = corrected hydrometer reading at 30 seconds x 100/ weight of sample - % clay

% Sand = 100% - % silt - % clay

Textural classes of the plots were read off from a soil textural triangular.

Determination of Soil pH

This was done on the 2 mm sieved soil sample. 10 g of soil were suspended in 20 ml of 0.01 ml Calcium Chloride solution. The suspension was allowed to stay for 30 minutes, stirring occasionally.

The pH meter used was MSE'S Spectro-plus instrument in the institution for the analysis. The pH meter was calibrated with pH 7.0 and 4.0 buffer before used. The electrodes were inserted gently into the partly settled soil suspension and the pH read off on the pH meter when the reading became steady. No stirring was done during the measurement.

After each measurement, the electrodes were rinsed with de-ionised water and wiped dry with a clean filter paper.

At interval, the electrodes were standardized again with the buffer solution to ensure that there was no fluctuation. Readings of all the 20 samples were repeated two times to ensure reproducibility and that the instrument was in good working condition (Ibitoye, 2008 and Carter, 1992).

Determination of Percentage of Soil Organic Matter

This was carried out on 0.5 mm sieved soil samples. The Walkley-Black titrimetric method was used (Walkley and Black, 1934; Ibitoye, 2008).

One (1.0) g of sieved soil was weighed out in triplicate and transferred to 500 ml conical flask. By means of pipette, 10 ml of 1N potassium dichromate solution (49.04 g of $K_2Cr_2O_7$ made up to 1 litre with distilled water) was added. The flask was swirled gently to mix.

Twenty (20) ml of concentrated sulphuric acid was added rapidly using a graduated cylinder. The soil was swirled gently until soil and reagents were mixed, after which it was swirled more vigorously for 1 minute. The flask was rotated again and allowed to stand for about 30 minutes.

After standing for 30 minutes, 100ml of distilled water was added to dilute the mixture. 10 ml of 85% Ortho-phosphoric acid, about 0.2 g sodium fluoride and 3-4 drops of diphenylamine indicator were added.

The excess dichromate was titrated using 0.5 N ferrous ammonium Sulphate (prepared by dissolving 196.1 g Fe $(NH_4)_2.6H_2O$ in 800 ml water containing 20 ml concentrated Sulphuric acid and diluted to 1 litre), until a green colour was reached. The colour changes were dark green to blue to light green.

Two reagent blanks were run, using the same procedure except that no soil was used.

Soil samples calculation using plots. Formulae used.

(a) Milliequivalent of oxidisable material per gram (Meq. Ox/g) =

$$\frac{\text{ml of Fe}^{2+}\text{ for blank-ml Fe}^{2+}\text{ for sample x normality of Fe}^{2+}}{\text{Wt of soil in gram}}$$

(b) % Carbon = Meq. ox/g x 0.003x100 x f

Where f=correction factor

Therefore % carbon=Meq. ox /g x 0.399

(c) % organic matter = % C x 1.729

For all calculation, ml of Fe^{2+} for blank (average of 2 readings) = 22.15 and stand normality of Fe^{2+}= 0.5 (Carter, 1992; Ibitoye, 2002).

Determination of Total Percentage Soil Nitrogen

Reagents

1. Sulfuric acid, concentration H_2SO_4 reagent grade

2. Digestion catalyst- Mix together 1000 g of ground sodium sulfate (reagent anhydrous Na_2SO_4) or potassium sulfate, and 25 g cupric sulfate (reagent anhydrous $CUSO_4$) 10 g of Sodium selenium (Se) powder.

Procedure

1. Weighed 3.0 g of soil, was added inserted into a 75 ml volumetric digestion tube.
2. 3 g scoop of digestion catalyst was added and mixed thoroughly with the dry soil.
3. 10 ml of concentrated H_2SO_4 was added to the soil catalyst mixture. Note that, it is essential that all dry material be completely moistened and thoroughly mixed with the acid to ensure complete digestion.
4. Blank solutions were prepared for each set of sample analyzed by following step 2-3 above using no soil. Allow the samples and blank to stand overnight.
5. Tubes were placed on a digestion block at 15^0C. Samples were checked every 20 minutes for foaming. After one hour (or more, if foaming persist), temperature rose to 25^0C and continue digestion for one hour. After one hour at 25^0 C temperature was to 35^0C and heat until samples were completely digested, usually about two additional hours. At completion, mineral soil was grayish-white while organic soil was blue-green in colour.
6. Samples were removed from block and left under a fume hood to cool. Then 10-20 ml distilled water was added to each tube to keep the samples from hardening.

7. The ammonium nitrogen content of the digest solution was determined with a rapid flow analyzer, which relies on ammonium to complex with Salicylate to form indophenols blue. This colour was intensified with Sodium nitro-prusside and measured at 660 nm. This determination was made using the Kjeldahl distillation method. The samples were analyzed on an auto-analyzer by continuing with steps 8-9 below to determine total Nitrogen using calculation in this method.
8. Samples were brought to volume with deionized water in 75 ml digestion tubes and mixed.
9. Clear digested solutions were analysised either by allowing samples to settle overnight and pipetting an aliquot or by filtering through and acid washed filtering apparatus fitted with what-man filter paper. Digest solutions were refrigerated prior to analysis.

Calculation

Percentage total Nitrogen= (ppm NH_4 +-N in digest solution) $\times \frac{75ml}{sample\ size\ (g)} \times \frac{1}{10.000}$

The Kjeldahl method outlined by Carter, (1993) was modified by eliminating the water from the digestion step. One further modification was the determination of NH_4-N spectro-photometrically rather than by Kjeldahl distillation and titration (Ibitoye, 2008 and Koptsik *et al*., 2003).

The data obtained were analyzed by Microsoft Excel 2013. Data collected were subjected to analysis variance (ANOVA in Microsoft excel).

RESULTS

The results showed the chemical analysis of some soil parameters of Lamingo hills. The tables below depict values at ($P \geq 0.05$) of soil parameters of pH, Nitrogen, Organic matter and also show Least Significant Difference (LSD) between Soil Samples figures according to their physio-chemical properties and texture.

Table 1: Physio-chemical analysis of soil in Lamingo Hills at Jos North Layout

SAMPLES	P^H	NITOGEN	ORGANIC MATTER	CLAY	SILT	SAND	TEXTURAL CLASS
	Average of the Parameters						
A	6.29	0.20	6.67	13.13	15.5	71.37	Loamy Sandy
B	6.23	0.20	6.85	9.13	13.00	77.87	Loamy Sandy
C	6.21	0.13	4.36	17.88	16.5	65.62	Sandy Loamy

Table 2: Shows Least Significance Difference of pH in Soil Samples Collected

SAMPLES	MEAN VALUE OF p^H	LSD	RESULTS
A & B	0.075	0.43	Accepted
A & C	0.075		Accepted
B & C	0.000		Accepted

Table 3: Shows Least Significance Difference of Nitrogen in Soil Samples Collected

SAMPLES	MEAN VALUE OF NITROGEN	LSD	RESULTS
A& B	0.000	0.07	Accepted
A & C	0.075		Rejected
B & C	0.075		Rejected

TABLE 4: Shows Least Significance Difference of Organic Matter in Soil Samples Collected

SAMPLES	MEAN VALUE OF O.M.	LSD	RESULTS
A & B	0.20	1.6	Accepted
A & C	2.30		Rejected
B & C	2.50		Rejected

Table 1 shows average of soil parameters analyzed and textural classes of soil samples collected The results depict that soil samples from underneath the experimental plants show loamy sandy and soil samples distance away from the plants show sandy loamy, it is less fertile.

Table 2 reveals there was significant difference between pH of the soil samples collected for analysis, which implies that, all the soil samples were alkaline in nature and none of the soil sample showed acidity.

Table 3 depicts that; A & B were soils underneath the experimental plants and showed high nitrogen content but the soil samples that have the combination of soil sample C, soil distance away from the plants influences others, hence showed less nitrogen content

Table 4 shows that A & B were soil samples underneath the experimental plants depicted high organic matter content but the soil samples that have the combination of soil sample C, soil distance away from the plants influences others, thus showed less organic contents.

DISCUSSION

Soils may also influence the relative activity of chemical metabolites in combination (s), because chemical metabolites are generally exuded in mixtures of metabolites that often include other chemicals preferential sorption of compounds into the soil matrix could further alter availability. Most of the chemical metabolites are present at low concentrations and undergo rapid chemical and biological degradation in the soil. The soil system has a living and dynamic tempts on the fate and functions of chemical metabolites in time and space (Sukanya, 2014; Sumithra *et al.,* 2013).

The soil pH is a measure of the acidity or alkalinity in soils. pH is defined as the negative logarithm (base 10) of the activity of hydronium ions (H+ or, more precisely, H_3O^+ aq) in a solution. A pH below 7 is acidic and above 7 is alkaline. Soil pH is considered a master variable in soils as it controls many chemical processes that take place in the surrounding soil. It specifically affects plant nutrient availability by controlling the chemical forms of the nutrients. All soil samples collected for analysis showed alkaline in nature with the influence of the soil piled up underneath the plants. The soil samples would be recommended for farming activity since acidic soil was not available.

Nitrification is a biological process and proceeds rapidly in warm, moist, well-aerated soils. Nitrification slows at soil temperatures below 15°C, thus, the general recommendation is that

Ammonia (NH_4^+ forming) fertilizers should not be applied in soil until test is carried out Nitrogen exists in soil system in many forms and changes (transforms) very easily from one form to another. The route that nitrogen follows in and out of the soil system is collectively called the nitrogen cycle and is biologically influenced.

Biological processes, in turn, are influenced by prevailing climatic conditions along with the physical and chemical properties of a particular soil. Nitrogen is available under the latex producing plants soils sample than distance away from the plant soil samples collected for analysis, there was significant difference between the Nitrogen content because of the rate at which Nitrogen cycle occur at different soil matrix which may probably due to the effect of Euphorbia species *Euphorbia* species *(Euphorbia unispina & Euphorbia tirucalli*) debris like leaves ,latex, bark, dead or decayed plant parts fall to the bottom of the plant and influences of microorganisms on the plant parts, so latex the dropped via the debris are broken down fast and become available for plant's utilization for growth.

Organic nitrogen that is present in soil, crop residues, and manure is converted to inorganic nitrogen through the process of mineralization**.** In this process, bacteria digest organic material and release ammonium (NH_4^+) nitrogen. Formation of NH_4^+ increases as microbial activity. Bacterial growth is directly related to soil temperature and water content. The ammonium supplied from fertilizers is the same as the ammonium supplied from organic matter. Ammonium-nitrogen has properties that are of practical importance for nitrogen management. Plants can absorb NH_4^+ N^-. Ammonium also has a positive charge and therefore, is attracted or held by negatively charged soil and soil organic matter. This means that NH_4^+ does not move downward in soils. Nitrogen in the ammonium form that is not taken up by plants is subject to other changes in the soil system.

Soil organic matter (SOM) is the organic matter component of soil, consisting of plant and animal residues at various stages of decomposition, cells and tissues of soil organisms, and substances synthesized by soil organisms. Soil organic matter exerts numerous positive effects on soil physical and chemical properties, as well as the soil's capacity to provide regulatory ecosystem services. Particularly, the presence of soil organic matter is regarded as being critical to soil function and soil quality. The soil underneath latex producing plants (*Euphorbia unispina and Euphorbia tirucalli*) show soil texture as loamy sandy, while the soil samples away from the plants are most likely to be sandy, so the droppings from the latex producing plants have great influence on the biodegradation in the soil, thus make the soil more fertile and recommended for agricultural activity.

CONCLUSION

This study revealed that the physio-chemical parameters like pH are alkaline to slightly neutral in both the soil samples underneath latex producing plants and soil distance away from the latex plants. Whereas nitrogen concentration is low in soil distance away from the plants due to high anthropogenic activities by man depriving easy percolation of water during rainfall and run off. The latex exuded by plants via leaves droppings, bark, flowers and fruits do not have effects on the soil physio-chemical parameters due to none percolation and easy degradation, thus the biodegradability of the latex is possible

Organic matter content is noticeable in soil under latex producing plants when compared to the soil away from the plant which is not unconnected with effects of soil microorganisms on falling leaves of *Euphorbia unispina & Euphorbia tirucali* and allow favourable biodegradability, thus chemical metabolites degrade when in the soil.

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