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A Comparative Study on Fruit Peels and Mixed (Fruit Peels and Vegetable Peels) Formulation as a Natural Fertilizer to the Soil

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Abstract

Vegetable peels and fruit peels of onion, garlic, pomegranate, orange and banana are highly rich in ion, nitrogen, and potassium. The vegetable peels and fruit peels were powdered for the preparation of three formulations as Formulation 1, Formulation 2, Formulation 3. The three different formulations were applied for the plant growth as a natural fertilizer. Fenugreek seeds were used to test the utilization of fruit peel powder and vegetable peel powder as a natural growth enhancer. Fenugreek has the benefits of lowering sugar levels. After 20 days, plant growth was measured and the soil has been analysed. Among the three formulations, the fruit peels extract and vegetable peels extract was found more suitable for plant growth.

Keywords*: - Vegetable peels, Fruit peels, Fertilizers*

INTRODUCTION

Agriculture is the science and art of cultivating the plant. Agriculture was the key development in the rise of sedentary human civilization, whereby farming of domesticated species created food surpluses that enabled people to live in cities. The history of agriculture began thousands of years. Fertilizers are any organic or inorganic material of natural or synthetic origin. The materials that are added to a soil to supply plant nutrients essential to the growth of the plants. Fruits contain a high amount of antioxidants that are beneficial to our health in many ways.

NATURAL FERTILIZERS

Fertilizers are any of a large number of

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natural and synthetic materials, nitrogen, phosphorus, potassium compound that are added to soil or sprayed on the leaves of the plant to grow; nutrients are needed from the air and the soil. Natural fertilizers are fertilizers that are derived from animal matter, vegetable matter. They are naturally occurring organic fertilizers, including animal waste, slurry. In contrast, the majority of fertilizers used in commercial farming are extracted from minerals (or) produced industrially. Organic agriculture, a system of farming, allows for certain fertilizers are amendments.

BENEFITS OF ORGANIC FERTILIZERS

Organic-based fertilizers include three specific categories:

- Organic fertilizer
- Organic mineral fertilizer
- Organic soil improvers

FERTILIZER FROM POMEGRANATE PEEL

Pomegranate peel and fruit has been known as such a source of iron and other nutrients and minerals. Pomegranate peels carry a host of macro and micronutrients for plants. It is allowed to be used as organic fertilizers. Suggestive nutrients content in pomegranate peels is

- Phosphorus-0.003%
- Potassium-1.6%
- Calcium-0.1%
- Magnesium-0.2%
- Boron-0.003%
- Copper-0.001%
- Zinc 0.001%
- Iron – 0.002%

Each fruit peel has been known as a rich source of iron. Peels of pomegranate cover around 60% of the fruit and they hold various types of ingredients, including flavonoid compounds, which are minerals such as calcium, magnesium, phosphorus, potassium and sodium. Pomegranate peel and fruit has been known as such a source of iron and other minerals are rich in fruit peels. Especially the application of peels as fertilizer will provide important minerals and nutrients to plants. Using pomegranate peels as fertilizers will provide over plants with a variety of vital minerals and nutrients.

FERTILIZERS FROM BANANA PEELS

Macronutrients like N, P, K are the needed things for most of the plants. Potassium is used to move water and nutrients between cells. It strengthens the stem of the plant and protects them from the disease. It is used to help the flowering process and

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throughout to able to improve the quality of the fruit of plants. Banana peels contain calcium, which helps plants take up more nitrogen, which same as potassium.

ORANGE PEELS AS FERTILIZERS

Orange peels contain phosphorus, nitrogen and potassium. Using orange peels as the organic materials to replenish the nutrients in the garden. The process has the benefits of natural fertilizer with the benefits of minimizing waste material. Orange peels are green ingredients that add nitrogen to the compost pile. Both banana peels and orange peels add nutrients to the soil as they decompose; peels contain d-Limon, a natural chemical that destroys waxy coating on ants and aphids, causing them to suffocate and dies. Orange peels are highly fragrant, giving off a repellent scent to keep ants and aphids.

ONION PEELS AS FERTILIZERS

The use of onion peel as an organic potassium-rich fertilizer for all the plants growing indoors. The usage of onion peels can increase disease resistance, growth, strong, stems and productivity. It is rich in calcium, iron, magnesium and copper. Onion peels contain a substance that destroys pathogenic.

FERTILIZERS FROM GARLIC PEELS

Garlic is possible the most widely used vegetable in all words cuisines. But most of us threw away their skin and peels. Plants are stationary by nature, producing everything they need to defend, protect and healing them.

It makes protective properties in these outer coverings; the environmental attacks take place. The outer skin of garlic provides an excellent source of vitamins A, C, E and numerous antioxidants. The peeling of garlic removes the phenyl propionic antioxidants, which provide the heart and helps to fight the process along with the help to increase immunity and lower cholesterol.

FENUGREEK BENEFITS

Fenugreek has benefits for lowering sugar levels, increasing testosterone. Fenugreek may also reduce cholesterol levels, lower inflammation, and help with appetite control nut more research is needed. Fenugreek is an herb in the same family as soy. People use its fresh and dried seeds, leaves, and roots as a spice, flavouring agent, and supplements. Fenugreek may be able to help reduce

1. Cancer
2. Diabetes

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3. Obesity
4. High cholesterol
5. Bacterial fungal, viral infections
6. Inflammation
7. Balance cholesterol
8. Reduce fever

Fenugreek is an herb long used in alternative medicine. It is a common ingredient in Indian dishes and is often taken as a supplement.

EXPERIMENTAL METHOD

Study Area

Erode district is surrounded by Karnataka state in North- West, Coimbatore district in West, Dindigul and Karur district in South, Salem in East. The district is lying between 10-35 degrees and 11-60 degrees of north latitude and 76 degrees and 77 degrees of east longitudinal and meter above the mean sea level. Erode district is an agriculture-based area through industrial population growth.

COLLECTION AND RECOVERY OF FRUIT AND VEGETABLES PEEL

Fruit peels and vegetable peels are collected from fruit juice vendors and shopkeepers. These fruit peels and vegetable peels are collected from vendors and removed unnecessary substances from that. Fruit and vegetable peels of pomegranate, orange, banana, onion, garlic were collected. The collected fruit and vegetable peels were washed thoroughly with tap water to remove the unwanted materials, including seeds. The washed peels were cut into small pieces and it dries in sunlight for 15 days. The dried fruit peels were powdered individually using mortar and stored at room temperature. The dried fruit peels were powdered individually using mortar. Before using the mortar, it would be cleaned with distilled water and dried. The dried fruits and vegetable peels were powdered by mortar and stored at room temperature.



Fig. 1

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COMPARITIVE OF DIFFERENT FRUIT AND VEGETABLE PEELS AND THEIR EXTRACT

A different formulation of fruit peel powder was used to compare plant growth. Each formulation was mixed with water in different quantities. The fruit peels are taken in different quantities such as 1g, 3g, 6g.

- 1g of fruit peels containing pomegranate, orange, onion, garlic, banana was taken in 100ml of distilled water and mixed thoroughly for the preparation of the extract. The mixture was stirred for 2 hours by using a magnetic stirrer.

- 3g of fruit peels containing pomegranate, orange, onion, garlic, banana was taken in 300ml of distilled water and mixed thoroughly for the preparation of the extract. The mixture was stirred for 2 hours by using a magnetic stirrer.

- 6g of fruit peels containing pomegranate, orange, banana were taken in 600ml of distilled water and mixed thoroughly for the preparation of the extract. The mixture was stirred for 2 hours by using a magnetic stirrer.

APPLICATION OF FRUIT AND VEGETABLE PEELS IN SOIL:

Three formulations of fruit and vegetable peels are applied properly in soil. Peel powder was applied in soil and properly mixed for uniform distribution. Control and 3 replications were maintained for each formulation. Soil that contains 2kg in one pot, 1g fertilizers are applied to the pot. Soil that contains 2kg in another pot, 3g of fertilizers is applied to the pot. Soil that contains 2kg in another pot, 6g of fertilizers is applied to the pot. After 10days, seeds of fenugreek were sown and water with fertilizer mixture was poured every day. After 15 days, seeds of fenugreek were sown on various pots. Each pot sown with 20 seeds and water with extract was poured every day. Results were observed after 20 days of inoculation.

RESULT AND DISCUSSION

Fruit peel fertilized both powder and extract applied soil samples were analyzed for the nutritive values of soil. Nitrogen, Potassium, Phosphorus was mainly observed. After the applications of three different formulations in soil, soil fertility is increased. For analysis of fruit peels and vegetable peels, mainly five parameters are measured: Nitrogen, Phosphorus, Potassium, Electrical conductivity, Organic content, pH value.

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3g



1g 6g

Fig. 2

Table 1

SAMPLE NO.	pH VALUE	ELECTRICAL CONDUCTIVIY	ORGANIC CARBON CONTENT	NITROGEN(N)	PHOSPHORUS (P)	
SAMPLE 1-1g (mixed)	8.92	0.29dSm power-1	0.26%	208.3 kg/ha	11.6 kg/ha	
SAMPLE 2-3g (mixed)	8.48	0.12dSm power-1	0.31%	216.1 kg/ha	11.8 kg/ha	
SAMPLE 3-6g (only fruit peels)	8.80	0.16dSm power-1	0.24%	214.3 kg/ha	11.7 kg/ha	268.3 kg/ha
SAMPLE 4-control	8.92	0.32dSm power-1	0.17%	205 kg/ha	11.4 kg/ha	

CONCLUSION

An organic fertilizer replenishes the soil naturally, without leaving chemical residues; it gives good crop yields under sustainable agricultural practice. Natural fertilizer is safer than chemical fertilizer in plants such as (pomegranate, orange, banana, onion and garlic) peels.

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Sustainable agriculture would ideally produce good crop yields with minimal impact on ecological factors such as a fertile organic farming system. Fertile soil provides ecological nutrients for crop growth, supports an adverse and active biotic community, exhibits a typical soil structure, and allows for an undisturbed decomposition. Crop productivity in organic farming is achieved by a combination of management strategies, among which the development of an efficient and effective nutrient plays an important role. Organic farming seems to be more appropriate as it is considered important, like sustainable. Agriculture is the most sector for ensuring food security, alleviating poverty and conserving vital natural resources that the world's present and future generation will be entirely dependent upon for their survival. Fruit peel fertilizer in the form of both powder and extract was applied to the soil samples. The samples were analysed for the nutritive values of soil. Nitrogen, Phosphorus, Potassium, pH values, Organic content test has been taken.

In sample 1, it contains a high pH value of 8.85. Low pH may vary among plants. Soils with high pH may cause a release of aluminium that can stunt a plant's growth and alter nutrient. Some plants may also suffer from manganese and iron toxicity that causes yellow spots. It contains low NPK values.

In sample 2, it contains a moderate pH value of 8.48. In soils, it is measured in slurry of soil mixed with water and pH between 3 to 9 being neutral. It contains high NPK values. Nitrogen, phosphorus, and potassium are the primary nutrients in commercial fertilizers. Each of these fundamental plays a key role in plant nutrients. It helps the plant grow faster while also increasing the production of seeds and fruit and battering the quality of leaves and crops.

In sample 3, it contains a high pH value of 8.80; the high pH value defines the negative logarithm of the activity of hydrogen ions in a solution. Soil pH is considered the master variable in soils as it affects many chemical processes. When the plant-soil pH has increased, the plant's ability to absorb certain nutrients is disturbed.

In sample 4, it contains a high pH value of 8.92, the high pH value release of aluminium that can suffer a plant growth. It defines the negative logarithm of the activity of hydrogen ions in the solution.

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