Nano fertilizers from the extracts of peels of apple and pineapple and their application for the growth of tomato and pea plants

Introduction

:Today ,farmers need better ways to grow crops without harming the soil or the environment. Normal chemical fertilizers help plants grow, but they can also cause problems if used too much. A new idea is using nano fertilizers, which are made of very tiny particles. These small particles can be absorbed by plants more easily and give them the nutrients they need without much waste.

Fruit peels like those of apple and pineapple, are usually thrown away as waste. But these peels actually have useful natural compound that can be used to make nano fertilizers. This not only helps recycle waste but also makes farming more eco-friendly.

When these nano fertilizers are given to plants like tomato and pea they can improve seed germination,help the roots and shoots to grow stronger and increase flowering and yield.

In this way,using apple and pineapple peels to prepare nano fertilizers is a simple smart and sustainable method to grow healthy crops with protecting the nature .

Problem

- The study focus on exploring the possibility of using apple and pineapple peels which contains
- Apple peels contains potassium, calcium, magnesium ,iron, zinc,phosphorus ,vitamines -c act as antioxidant and growth enhancer .vitamin-a an b-complex support overall plant metabolism.
- Pineapple peels contains copper, zinc, calcium, iron, and rich in minerals enzymes and bioactive compounds which are highly suitable for the formation of nano fertilizers.

Hypothesis

- Nano fertilizer prepared from the peels of pineapple and apple can promotes plant growth to greater extend.

Objectives

- To increase plant growth.
- To protect plants from diseases.
- To analyze the difference in plant response.
- To compare the effectiveness of peel based nano fertilizer.
- To promote the utilization of fruit peel.

Preparation of fertilizer

Nano fertilizer from extracts of peepls of apple

1kg of apple peels will be collected and washed thoroughly with tap water ,then with distilled water to remove the surface dust and chemical. I will keep the apple peels for air drying for 24-48hours until it completely dries .after drying the apple peels will be grinded Then I will mix 10gms of apple peel powder with100ml of distilled water. I will heat the mixture at 60-70° C for 30-45 minutes with constant stirring and i will keep the mixture for cooling after its get cool we will filter the solution using whatman no.1 filter paper .the thick sludge will be separated from clear filtrate .Again we will be heating the clear filtrate at 70°c with continuous stirring at 300rmp .after that I will be adding urea and citric acid (5%solution)
drop wise still pH 5.1 and will be drying thick filtrate at105°c,then again we will be grinding into fine powder.

Preparation of Nano zinc particles as fertilizer prepared using extract of apple peels

I will be dissolving 0.1M zinc nitrate [zn(NO3)2] in distilled water,then will be adding the apple peel drop wise into the zinc nitrate solution (1:1or 1:2 ratio) under stirring to maintain the reaction at 60- 80°c for 2-4 hours ,later I will adjust the PH 8-10 using NaOH then will observe the colour changes (yellowish-brown) indicating nano particles formation.later I will keep the reaction to cool at room temperature .centrifuge at10,000rmp for 15-20 mintues to collect nano particles .then will wash the pellet 2-3 times with distilled water and enthanol and keep for drying in an oven at 60°c overnight .

Nano fertilizer from extract of peels of pineapple

1kg of fresh pineapple peels will be collected and wash thoroughly to remove dirt and contamination then I will be keeping it for sun dry untill it turn crisp .and then i will be grinding into fine powder using the blender .then I will take 10-20gms of dried peel and i will add 100-200ml of distilled water then I will be boilling it for 20-30 mintues ,cool and filter using filter paper .the filtrate extract will be appear as brownish-yellow

Preparation of Nano zinc particles as fertilizer prepared using extract of pineapple

i will dissolve 0.1M zinc nitrate [zn (NO3)2] in distilled water ,then I will be adding pineapple peel extract with zinc solution in an (ration of 1:1 or 1:2) then I will heat the mixture for 2-3 hours I will observe the colour changes and its kept for for cooling at room temperature.centrifuge at 8,000-10,000rmp for 15 mintues then I will be washing the precipitate with distilled water and ethanol and keep for drying in an oven at 60°c and I will be grinding into fine powder

Material used

- Pots
- Soil
- Seeds of plant A- Tomato seeds
- Seeds of plant B- Pea seeds
- Apple peels
- Pineapple peels

Procedure for tomato plant

Controller 1 : I will be taking a medium pots with soil then i will be adding 10-15 tomato seeds to it then I will be watering the pots daily with sufficient sunlight .

Procedure 2 : Nano fertilizer from extract of peels of apple or pineapple

I will be taking a medium size pots with soil then I will be adding 10-15 tomato seeds ,after that I will be watering the pots daily with sufficient sunlight , then to promote the growth I will be adding the extract peel of 10gm apple or pineapple powder to the tomato plants

Procedure 3: Nano zinc particles as fertilizer prepared using extract of peels

I will be taking a medium size pots with soil then I will be adding 10-15 tomato seeds to it I will be watering it daily with sufficient sunlight After this I will be adding nano zinc particle as extract of peels

Procedure for pea plant

Controller 1 : I will be taking a medium size pots with soil then i will be adding 10-15 pea seeds to it then I will be watering the pots daily with sufficient sunlight .

Procedure 2 : Nano fertilizer from extract of peels of apple or pineapple
I will be taking a medium size pots with soil then I will be adding 10-15 pea seeds ,after that I will be watering the pots daily with sufficient sunlight , then to promote the growth I will be adding the extract peel of 10gm apple or pineapple powder to the pea plants

Procedure 3: Nano zinc particles as fertilizer prepared using extract of peels
I will be taking a medium size pots with soil then I will be adding 10-15pea seeds to it I will be watering it daily with sufficient sunlight After this I will be adding nano zinc particle as extract of peels

Observation

Plant A - Tomato plant

Table 1 - study on the growth of plant A without any fertilizer over a period of 25 days

S. no	Description	Date of seeds sown	Date of Germination	Length of stem	No.of leaves	No.of flowers
1	Controlled					
2	Controlled					
3	controlled					

Table -2 study on the growth of plant A Nano fertilizer from extract of peels of apple over the period of 25 days

S.no	Description	Date of seeds sown	Date of Germination	Length of stem	No.of leaves	No.of flower
1	10g					
2	10g					
3	10g					

Table -3 study on the growth of plant A with 10gms of nano zinc particles as fertilizer prepared using extract from the peel of apple over a period of 25 days.

S.no	Description	Date of seed sown	Date of germination	Length of stem	No.of stem	No.of flower

1	10g					
2	1 0g					
3	10g					

Table -4 study on the growth of plant A with 10gms of nano fertilizer from extract of peels of pineapple over a period of 25 days.

S.no	Description	Date of seeds sown	Date of germination	Length of stem	No.of stem	No.of flower
1	10g					
2	10g					
3	10g					

Table 5 - study on the growth of plant A with 10gms of nano zinc particle as fertilizer prepared using extract of peel of pineapple using the extract from the peel of pineapple over the period of 25 days

S.no	Description	Dates of seeds sown	Date of Germination	Length of stem	No.of leaves	No.of flowers
1	10g					
2	10g					
3	10g					

Plant -B Pea plant

Table 1 - study on the growth of plant B without any fertilizer over a period of 25 days.

S.no	Description	Date of seeds sown	Date of Germination	Length of stem	No.of leaves	No.of flowers
1	Controlled					
2	Controlled					
3	controlled					

Table -2 study on the growth of plant B Nano fertilizer from extract of peels of apple over the period of 25 days

S.no	Description	Date of seeds sown	Date of Germination	Length of stem	No. Of leaves	No.of flower
1	10g					

2	10g					
3	10g					

Table -3 study on the growth of plant B with 10gms of nano zinc particles as fertilizer prepared using extract from the peel of apple over a period of 25 days.

S.no	Description	Date of seed sown	Date of germination	Length of stem	No.of stem	No.of flower
1	10g					
2	10g					
3	10g					

Table -4 study on the growth of plant B with 10gms of nano fertilizer from extract of peels of pineapple over a period of 25 days.

S.no	Description	Date of seeds sown	Date of germination	Length of stem	No.of stem	No.of flower
1	10g					
2	10g					
3	10g					

Table 5 - study on the growth of plant B with 10gms of nano zinc particle as fertilizer prepared using extract of peel of pineapple using the extract from the peel of pineapple over the period of 25 days

S.no	Description	Date of seeds sown	Date of Germination	Length of stem	No. Of stem	No.of flower
1	10g					
2	10g					
3	10g					