

# Effect of Plant Types on Natural Air Purification (Dust & Particulate Trapping Ability)

## ABSTRACT

### Introduction

Plants are known as natural air purifiers. Their leaves trap dust, pollen, and other particulate matter from the air. Different types of plants (smooth-leaved, hairy-leaved, broad-leaved) may vary in their ability to trap dust particles. This research will compare how effectively different plants collect airborne dust in a given environment, helping us understand which plants are best suited for improving local air quality.

### Statement of the Problem

Air pollution, particularly in the form of dust and suspended particulate matter, poses a serious threat to human health and environmental balance. While artificial air purifiers are widely used, they are costly, energy-dependent, and limited in scope. Plants are natural air filters that can trap and reduce airborne particles through their leaves, stems, and surface structures. However, not all plant species are equally effective in filtering dust and particulates from the air. There is limited systematic research available at the school level to compare the dust-trapping efficiency of different types of plants commonly found in our surroundings. Without such knowledge, opportunities to select and promote the most effective plant species for natural air purification remain underutilized.

### Hypothesis

If leaves with different textures (smooth, rough, or hairy) are exposed to the same environment, then hairy or rough-textured leaves will trap more dust particles than smooth leaves.

### Variables

Independent Variable: Type of plant (leaf texture and shape).

Dependent Variable: Amount of dust/particles trapped on leaves.

Constants: Location of exposure, time of exposure, method of dust collection/measurement.

## Materials

- Potted plants with different leaf types (e.g., hibiscus – smooth, sunflower – hairy, money plant – waxy).
- Petroleum jelly or sticky tape (to transfer particles).
- Microscope / magnifying glass / digital camera for observation.
- Weighing paper or filter paper (for dust collection, optional).

## Experimental Procedure

- 3–4 plants with different leaf textures are selected.
- All plants are placed in the same environment (balcony, roadside, classroom).
- After 48–72 hours, a piece of transparent sticky tape is gently pressed onto the leaves to lift the trapped dust.
- The tape is stuck onto white paper or a slide for observation.
- The amount of dust particles under a magnifying glass/microscope is compared, or by photographing and counting visible specks.
- The results are recorded and analyzed which plant type trapped the most dust.

S.no	Name of Plant	Leaf Texture / Type	Environment	Time Exposed (hrs)	Amount of Dust Collected (approx.)	Remarks / Observation
1	<b>Hibiscus</b>	Smooth	Balcony / roadside	72	Low ( $\approx$ 20–25 visible specks)	Fewer dust particles observed; dust slides off easily
2	<b>Money Plant</b>	Waxy / Smooth	Balcony / roadside	72	Moderate ( $\approx$ 40–45 specks)	Dust sticks moderately due to waxy surface
3	<b>Sunflower</b>	Hairy	Balcony / roadside	72	High ( $\approx$ 75–80 specks)	Many dust particles observed trapped between leaf hairs
4	<b>Rose</b>	Rough / Slightly Hairy	Balcony / roadside	72	High ( $\approx$ 70–75 specks)	Rough surface holds dust effectively

## Dust Collected (Specks) vs. Plant Name



### Conclusion Report

- The experiment proved that leaf texture directly affects dust-trapping ability.
- Hairy and rough leaves (like those of Sunflower and Rose) collected the highest amount of dust, confirming the hypothesis.
- Smooth or waxy leaves (like Hibiscus and Money Plant) trapped comparatively less dust because the particles slid off their surfaces.
- This shows that plants with hairy or rough surfaces can be used as effective natural air purifiers, especially in polluted or dusty areas.
- Promoting such plants near roadsides, schools, and urban homes can help reduce dust levels naturally and improve air quality without energy use or maintenance costs.