



Lime

Boon for Acidic Soil

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Introduction

In India population is increasing at an alarming rate. Due to continuous urbanization and industrialization cultivable land is decreasing day by day.

In India approx. 315 million tons of food grains is required by 2025. That is why it is necessary to extend the assembly of food grains by 5-6 million tons every year.

Hence, the less fertile and problematic soil should be managed and reclaimed to extend the assembly and productivity of crops. Acidic soil is such a type of problematic soil that may be ameliorated by liming and productivity can be increased up to a certain level.

In India approximately 490 lakh hectares of agricultural lands are acidic and about 259 lakh hectares of land with pH below 5.5 and approx. 130 lakh hectares of land with pH between 5.6 and 6.5.

In India Acidic soils occurs in Orrisa, Meghalaya, Assam, Tripura, Manipur, Sikkim, Mizoram, Jharkhand, Arunachal Pradesh, Himachal Pradesh, M.P, Nagaland, Uttar Pradesh, Kerala, Karnataka, Maharashtra and a few parts of Jammu & Kashmir.

Gujarat, Haryana, Rajasthan & Punjab are the only states in India where acid soils do not occur.



The reason behind Acidic Soil

Various factors are responsible for the origin of Acidic soils. However, acidity in

the soil is a natural phenomenon that affects the crops' yield. In India where more

rainfall occurs and due to high rainfall, the basic elements leached with the percolating water and results in acidity in the soil.

In temperate & hilly regions foliage of plants and litter on the ground is

decomposed and organic acid is released which gradually makes the soil acidic. Soils developed from acidic parental rocks are acidic.

Types of Acid Soils		
	Class	pH Range
1.	Slightly Acidic	(6.6 – 6.1)
2.	Medium	(6.0 – 5.6)
3.	Strongly Acidic	(5.5 - 5.1)
4.	Very strong Acidic	(5.0 – 4.6)
5.	Extremely strong Acidic	(4.5 or lower)

Problems of Acidic Soil

- Due to excess Hydrogen and Aluminium in acidic soil leads to stunted root growth.
- Due to excess Manganese and the iron plant becomes susceptible to disease.
- Beneficial activities of soil micro-organisms are adversely affected.
- Due to acidity Phosphorus & Molybdenum availability is reduced.
- Deficiency of Calcium, Magnesium and Boron occurs due to acidity.
- Imbalance between basic and acid constituents through roots which reduces production.

Amelioration of Acid Soil

Soil acidity is the result of the excessive accumulation of H^+ ions over OH^- ions in the soil solution. Strong acidic soils are not much productive. Owing to a high degree

of acidity the soils are less productive which can be made more productive by liming (application of lime).

Effect of lime on Soil

Lime ameliorates the chemical, physical & biological characters of soil and helps in increasing production. The influences of lime are-

A. Chemical Influence

1. Reduces Hydrogen accumulation and increase pH.
2. Reduces the solubility of Aluminium, Iron and Manganese.
3. Increases the availability of Phosphorus & Molybdenum.

4. Increases Calcium, Magnesium and Potassium in soil.

B. Physical Influence

1. Application of lime improves soil structure.
2. Helps in the development of root growth.

C. Biological Influence

1. Application of lime increases beneficial microbes which help in nitrogen fixation.

2. Influence the activities of micro-organisms which promotes decomposition of organic matter and mineralization.

3. Application of lime also destroys harmful microbes.

Conclusion

Application of lime in acidic soil reclaims acidity and can increase yield capacity. Lime has been recognized as an effective soil ameliorant as it reduces Aluminium, Iron and Manganese toxicity, increases base saturation, Phosphorus and Molybdenum availability in acid soil. Liming also increases atmospheric Nitrogen fixation as well as Nitrogen mineralization in acid soils through enhanced microbial activity. When the pH of the soil is 5.5 or below then the rate of

lime application is determined after soil testing. The application of lime provides calcium to the soil, improves fertilizer or herbicide use efficiency, increases nutrient uptake in roots, reduces toxicity level by neutralizing soil acidity all these phenomena are beneficial and lead to higher crop production and productivity which provides a return on investment and are profitable to farmers and it'll increase farmers income.