

MARCH 2024 NEWSLETTER

WHY SALT INDEX OF FERTILIZERS MATTERS?

The salt index is a measure used in agriculture to assess the potential impact of fertilizers on soil salinity. It quantifies the relative salinity of a fertilizer compared to a standard, usually sodium nitrate or potassium nitrate. The salt index is expressed as a percentage.

The salt index indicates how much a fertilizer contributes to soil salinity when applied. Soil salinity refers to the concentration of soluble salts present in the soil. These salts primarily include ions such as sodium, chloride, calcium, magnesium, and sulfate. Soil salinity can occur naturally in arid and semi-arid regions where evaporation rates exceed precipitation, leading to the accumulation of salts in the soil over time. However, human activities such as irrigation with saline water, excessive fertilizer application, and poor drainage practices can also contribute to soil salinity. High levels of soil salinity can have detrimental effects on plant growth and soil health:

Soil Structure Degradation:

Salts can affect soil structure by causing clay particles to disperse and reducing aggregate stability. This can result in soil crusting, compaction, and decreased water infiltration and drainage.

Osmotic Stress: Excessive salt in the soil solution creates an osmotic imbalance, making it more difficult for plants to absorb water. This can lead to water stress and reduced growth, as plants must expend more energy to take up water against the osmotic gradient.

Microbial Activity: Soil salinity can inhibit the activity of soil microorganisms, which play essential roles in nutrient cycling, organic matter decomposition, and soil fertility maintenance.

Ion Toxicity: Some salt ions, such as sodium and chloride, can be toxic to plants at high concentrations. These ions can interfere with nutrient uptake and disrupt physiological processes, ultimately leading to plant damage or death.

Nutrient Imbalance: High soil salinity can alter the availability of essential nutrients such as potassium, calcium, and magnesium. Imbalances in nutrient uptake can further exacerbate plant stress and reduce crop productivity.

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TABLE 1. SALT INDEX VALUES OF FERTILIZER MATERIALS.

Material And Analysis	-----Salt Index-----	
	Per equal wts of materials	Per unit of Nutrients
Nitrogen/Sulfur		
Ammonia, 82%N	47.1	0.572
Ammonium Nitrate, 34%N	104.0	3.059
Ammonium Sulfate, 21%N 24%S	68.3	3.252
Ammonium Thiosulfate, 12%N 24%S	90.4	7.533
Urea, 46%N	74.4	1.618
UAN, 28%N (39% A.Nitrate, 31% Urea)	71.1	2.221
Phosphorus		
APP, 10%N 34% P ₂ O ₅	20.0	0.455
DAP, 18%N, 46% P ₂ O ₅	29.2	0.4556
MAP, 11%N, 52% P ₂ O ₅	26.7	0.405
Phosphoric Acid, 54% P ₂ O ₅		1.613 ^a
72% P ₂ O ₅		1.745 ^a
Potassium		
Monopotassium Phosphate, 52% P ₂ O ₅ , 35% K ₂ O	8.4	0.097
Potassium Chloride, 62% K ₂ O	120.1	1.936
Potassium Sulfate, 50% K ₂ O, 18% S	42.6	0.852
Potassium Thiosulfate, 25% K ₂ O 17% S	68.0	2.720
<hr/> <p>Salt Index per 100lbs of H₃PO₄ *One Unit Equals 20lbs.</p>		