

FERTILIZER SALT INDEX

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Avoid Crop Injury

In this article:

- Salt Index definition
- How salt injury occurs
- Conditions favoring salt injury
- Products prone to causing salt injury
- Avoiding salt injury
- Link to an article with further information plus instructions for calculating the Salt Index

Fertilizer salt index is a measure of salt concentration induced in a soil solution. Salt index is a numerical value expressed as a ratio in which the selected fertilizer product is compared to the same weight of sodium nitrate (NaNO₃), where sodium nitrate is assigned a value of 100. Sodium nitrate is used for comparison because it was widely available when the salt index was developed, and because it is 100 percent soluble in water.

Salt injury to plant tissue is caused when the salt is in close proximity to germinating seed or to growing plant tissue. The presence of the salt creates an osmotic imbalance in which water flows from regions of higher relative water concentration in the plant tissue to regions of lower relative water concentration, where the fertilizer salt is located. This loss of water from the plant tissue causes desiccation, often referred to as fertilizer burn. Salt injury can occur with soil applied fertilizer or with foliar fertilizer applications.

Salt index of a fertilizer product and crop injury are generally of relatively little concern, except under these conditions:

Table 1. Salt Index of Fertilizer Materials and Soil Amendments

Material and Analysis	Salt Index	Partial Salt Index *
Nitrogen:		
Anhydrous ammonia, 82% N	47.1 ✗	0.572
Ammonium nitrate, 34% N	104.0	3.059
Ammonium sulfate, 21% N, 24% S	88.3	3.252
Urea, 46% N	74.4 ✗	1.618
Urea-ammonium nitrate solution:		
28% N (39% ammonium nitrate, 31% urea)	63.0	2.250
32% N (44% ammonium nitrate, 35% urea)	71.1	2.221
Calcium nitrate, 15.5% N	65.0	4.194
Sodium nitrate, 16.5% N	100.0	6.080
Phosphorus:		
Ordinary superphosphate, 20% P ₂ O ₅	7.8	0.390
Triple superphosphate, 45% P ₂ O ₅	10.1	0.224
Monoammonium phosphate:		
11% N, 52% P ₂ O ₅	26.7 ✗	0.405
10% N, 50% P ₂ O ₅	24.3	0.405
Diammonium phosphate, 18% N, 46% P ₂ O ₅	29.2	0.456
Ammonium polyphosphate, 10% N, 34% P ₂ O ₅	20.0	0.455
Phosphoric acid, 54% P ₂ O ₅		1.613 **
Phosphoric acid, 72% P ₂ O ₅		1.754 **
Potassium:		
Potassium chloride, 60% K ₂ O	116.2 ✗	1.936
Potassium hydroxide, 83.6% K ₂ O		1.015
Potassium nitrate, 13% N, 44% K ₂ O	69.5	1.219
Potassium sulfate, 50% K ₂ O, 18% S	42.6	0.852
Sulfate of potash-magnesia, 22% K ₂ O, 11% Mg, 22% S	43.4	1.971
Monopotassium phosphate, 52.2% P ₂ O ₅ , 34.6% K ₂ O	8.4	0.097
Potassium thiosulfate, 25% K ₂ O, 17% S	68.0	2.720
Sulfur:		
Ammonium thiosulfate, 12% N, 26% S	90.4	7.533
Ammonium polysulfide, 20% N, 40% S	59.2 ✗	2.960
Gypsum, 23% Ca, 17% S	8.1	0.247
Magnesium oxide, 60% Mg	1.7	0.002
Magnesium sulfate, 10% Mg, 14% S	44.0	2.687
Miscellaneous:		
Calcium carbonate, lime, 35% Ca	4.7	0.083
Dolomite, 21.5% Ca, 11.5% Mg	0.8	0.042
Manure salts, 20%	112.7	4.636
Manure salts, 30%	91.9	3.067

* The salt index of a mixed fertilizer containing N, P and K is the sum of the partial salt index per unit (20 lbs) of plant nutrient times the number of units due to each component in the formulation.

** Per 100 lbs of H₃PO₄

TK10. SALT INDEX 17.3