

Solubility of Selected Fertilizer Materials

(taken from the 2010 N.C. Agricultural Chemicals Manual, Chapter IV—Fertilizer Use, p. 65
<http://ipm.ncsu.edu/agchem/4-toc.pdf>)

To be available to plants, at least some of a nutrient must be slightly soluble in the soil solution. The amount of substance that will dissolve at a given temperature in water is known as its solubility. Solubility of most chemicals is slightly higher at higher temperatures; that of others, especially ammonium and potassium nitrates, increases rapidly with temperature. The presence of other substances in the solution may either increase or decrease solubility.

The solubility of selected pure fertilizer materials in water at 32 °F is shown in Table 4-12.

TABLE 4-12. SOLUBILITY OF SELECTED FERTILIZER MATERIALS

Fertilizer Material	Chemical Formula	Solubility (lb/100 gal)	Salt Index (relative effect on the soil solution)
Ammonia	NH ₃	750	47.1
Ammonium nitrate	NH ₄ NO ₃	983	104.7
Ammonium sulfate	(NH ₄) ₂ SO ₄	592	69.0
Borax	Na ₂ B ₄ O ₇ •10H ₂ O	25	
Calcium carbonate (limestone)	CaCO ₃	0.050	4.7
Calcium metaphosphate	Ca(PO ₃) ₂	0.008	
Calcium nitrate	Ca(NO ₃) ₂ •4H ₂ O	1,117	52.5
Calcium sulfate	CaSO ₄ •2H ₂ O	2	8.1
Copper sulfate	CuSO ₄ •5H ₂ O	267	
Diammonium phosphate	(NH ₄) ₂ HPO ₄	209	29.9
Dicalcium phosphate	CaHPO ₄ •2H ₂ O	0.168	8
Magnesia	MgO	0.005	1.4
Magnesium sulfate	MgSO ₄ •7H ₂ O	709	44
Manganese sulfate	MnSO ₄ •4H ₂ O	875	
Monoammonium phosphate	NH ₄ H ₂ PO ₄	358	34.2
Monocalcium phosphate	CaH ₄ (PO ₄) ₂ • H ₂ O *	15.4	
Potassium chloride	KCl	233	116.3
Potassium nitrate	KNO ₃	108	73.6
Potassium sulfate	K ₂ SO ₄	67	46.1
Sodium nitrate	NaNO ₃	608	100.0
Urea	CO(NH ₂) ₂	559	75.4
Zinc sulfate	ZnSO ₄ •6H ₂ O	584	

* It decomposes with a small amount of water and is soluble in a large amount. The solubility varies with the conditions.