extension
ALABAMA A&M & AUBURN UNIVERSITIES

Nutrient Content of Fertilizer Materials

► This is a quick reference guide to the nutrient contents of fertilizer materials, broken down by primary and secondary nutrient sources (nitrogen, phosphorus, potassium, calcium, magnesium, and sulfur), as well as micronutrient materials. Also included are comments for pertinent materials that will further help you.

The following tables can be used as quick reference guides to fertilizer materials. These materials may be used alone or blended with other fertilizer materials to form a multinutrient fertilizer.

The actual nutrient content may vary from what is listed, depending upon the manufacturer, the purity of the product, or other materials blended with the product. Most values are for the fertilizer-grade product and not the pure chemical. The chemical formulas given are for the primary active compound.

Primary and Secondary Nutrient Sources

Material	Percentage						Approx. $CaCO_3$ Equiv./100 lb.†	Comments
	N	P_2O_5	K_20	Ca	Mg	S		
Nitrogen Materials								
Ammonium nitrate‡ NH_4NO_3	34	0	0	0	0	0	-61	
Ammonium nitrate limestone NH_4NO_3 + ($CaCO_3$ + $MgCO_3$)	20	0	0	6	4	0	0	Ca and Mg depend on limestone used
Ammonium nitrate sulfate NH_4NO_3 + $(NH_4)_2SO_4$	30	0	0	0	0	5	-71	
Ammonium sulfate‡ $(NH_4)_2SO_4$	21	0	0	0	0	24	-110	
Anhydrous ammonia‡ NH_3	82	0	0	0	0	0	-148	Pressurized gas
Aqua ammonia NH_4OH	16-25	0	0	0	0	0	-36 to -54	
Calcium cyanamide $CaCN_2$	21	0	0	11	0	0	+63	Most alkaline N material
Calcium nitrate $Ca(NO_3)_2.4H_2O$	15	0	0	21	0	0	+20	
Calcium nitrate/urea (Calurea) $Ca(NO_3)_2$ + $4CO(NH_2)_2$	34	0	0	10	0	0	-36	Don't blend with superphosphate
Crotonylidene diurea (CDU)	32	0	0	0	0	0	NA	Slow-release
Isobutylidene diurea (IBDU)	31	0	0	0	0	0	NA	Slow-release
Nitrogen solutions (N-SOL or UAN solutions)‡ (urea/ammonium nitrate):								Solutions code:
32% UAN (35% urea + 45% A.N.)	32	0	0	0	0	0	-55	320(0-45-35)
30% UAN (33% urea + 42% A.N.)	30	0	0	0	0	0	-52	300(0-42-33)
28% UAN (30% urea + 40% A.N.)	28	0	0	0	0	0	-49	280(0-40-30)
21% AN (60% A.N. + 40% water)	21	0	0	0	0	0	-37	210(0-60-0)
19% AN (54% A.N. + 46% water)	19	0	0	0	0	0	-33	190(0-54-0)
Potassium nitrate KNO_3	13	0	44	0	0	0	+26	
Sodium nitrate (nitrate of soda) $NaNO_3$	16	0	0	0	0	0	+29	
Urea‡ $CO(NH_2)_2$	46	0	0	0	0	0	-81	
Urea (sulfur coated) $CO(NH_2)_2$+S	36-38	0	0	0	0	13-16	-118	N release depends on S coating
Ureaform (urea + formaldehyde)	38	0	0	0	0	0	-68	Slow-release

Material	Percentage N	P_2O_5	K_20	Ca	Mg	S	Approx. $CaCO_3$ Equiv./100 lb.†	Comments
Phosphorus Materials								
Ammoniated superphosphate	12-17	22-35	0	*	0	*	-7	
Ammonium phosphate‡								
Diammonium phosphate (DAP) $(NH_4)_2H_2PO_4$	18	46	0	0	0	0	-70	
Monoammonium phosphate (MAP) NH_4HPO_4	11	48	0	1	0	0	-65	
Ammonium phosphate nitrate $NH_4H_2PO_4.NH_4NO_3$	30	10	0	0	0	0	-54	
Ammonium phosphate sulfate $4NH_4H_2PO_4$ x $(NH_4)_2SO_4$	16	20	0	0	0	15	-76 to -113	Mixture
Ammonium polyphosphate‡ $(NH_4)HP_2O_7 + (NH_4)_5P_3O_{10}$	10	34	0	0	0	0	—	Liquid
Basic Slag	0	0-6	*	3-29	*	*	+70	Analysis variable
Bone meal (steamed) $Ca_3(PO_4)_2 + CaCO_3$	0-2	10-20	0	19-25	0	0	+20	
Concentrated superphosphate‡ (triple superphosphate) $Ca(H_2PO_4)_2$ x H_2O	0	46	0	14	0	2	0	
Nitric phosphate	12-17	22-35	0	*	0	*	-20	
Normal superphosphate $Ca(H_2PO_4)_2$ x $H_2O + CaSO_4$	0	20	0	21	0	11	0	
Phosphate rock	0	2-35	0	*	*	0	+10	Total P_2O_5 relatively unavailable
Phosphoric acid‡ H_3PO_4								Liquid
Wet-process acid	0	30	0	0	0	0	-63	
Concentrated wet-process acid	0	40-54	0	0	0	0	-84 to -113	
Superphosphoric acid	0	76	0	0	0	0	-110	
Urea-ammonium phosphate	25	35	0	0	0	0		Research mixture
Urea phosphate $CO(NH_2)_2 + H_3PO_4$	17	44	0	0	0	0	-82	Research
Potassium Materials								
Greensand	0	1	6	0	0	0		Natural low-grade, mineral
Potassium carbonate								
K_2CO_3 solid	0	0	48	0	0	0	+70	
K_2CO_3 liquid	0	0	34	0	0	0	+50	
Potassium chloride‡ KCl(muriate of potash)	0	0	60	0	0	0	0	Most widely used, single fertilizer material
Potassium magnesium sulfate‡ (sulfate of potash magnesia) $K_2SO_4 2MgSO_4$ or $MgSO_4.K_2SO_4.6H_2O$	0	0	21	0	11	23	0	
Potassium metaphosphate KPO_3	0	59	39	0	0	0	*	
Potassium nitrate (nitrate of potash) KNO_3	13	0	44	0	0	0	+26	
Potassium sulfate (sulfate of potash) K_2SO_4	0	0	52	0	0	16	0	
Calcium Materials								
Calcium chloride $CaCl_2$	0	0	0	36	0	0	0	Water soluble
Burned lime CaO	0	0	0	70	0	0	+178	
Calcitic limestone‡ (ground) $CaCO_3$	0	0	0	36	0	0	+95 to 100	
Dolomitic limestone‡ (ground) $CaCO_3 + MgCO_3$	0	0	0	24-30	6-12	0	+95 to 108	
Selma chalk	0	0	0	32	0	0	+80	
Gypsum‡ $CaSO_4 2H_2O$	0	0	0	22	0	18	0	Solubility = 0.02 lb./gal.
Hydrated lime $Ca(OH)_2$	0	0	0	50	0	0	+134	Solubility = 0.01 lb./gal.

Material	Percentage N	P_2O_5	K_2O	Ca	Mg	S	Approx. $CaCO_3$ Equiv./100 lb.†	Comments
Magnesium Materials								
Dolomitic limestone‡ (ground) $CaCO_3 + MgCO_3$	0	0	0	24-30	6-12	0	+95 to +108	Analysis variable; must contain at least 6% Mg
Magnesium ammonium phosphate $MgNH_4PO_4.6H_2O$	8	40	0	0	15	0		Solubility = 0.001 lb./gal.
Magnesium oxide MgO	0	0	0	0	45	0	+250	Solubility = 0.00062 g/100 g 0.001 oz./gal.
Magnesium sulfate‡ (Epsom salt) $MgSO_4.7H_2O$	0	0	0	0	10	13	0	Solubility = 7.6 lb./gal.
Magnesium sulfate (Kieserite) $MgSO_4.H_2O$	0	0	0	0	17	23	0	Solubility = 5.7 lb./gal.
Potassium magnesium sulfate‡ (sulfate of potash magnesia) $K_2SO_4.2MgSO_4$	0	0	21	0	11	23	0	Soluble
Sulfur Materials								
Ammonium sulfate‡ $(NH_4)_2SO_4$	21	0	0	0	0	24	-110	Available in prilled or water-soluble crystals
Ammonium thiosulfate‡ (60% solution) $(NH_4)_2S_2O_3$	12	0	0	0	0	26		Liquid; reacts with alkaline materials
Elemental sulfur (S):								Elemental S must be oxidized to sulfate before available to plants
Wettable S	0	0	0	0	0	90-100	-312	
Flowable S	0	0	0	0	0	52-70	-218	
Flowers of S	0	0	0	0	0	90-100	-312	
Gypsum‡ $CaSO_4.2H_2O$	0	0	0	22	0	18	0	
Magnesium sulfate (Epsom salt) $MgSO_4.7H_2O$	0	0	0	0	10	13	0	Soluble
Potassium magnesium sulfate‡	0	0	21	0	11	23	0	
Potassium sulfate K_2SO_4	0	0	52	0	0	16	0	Soluble
Sulfuric acid H_2SO_4	0	0	0	0	0	20-26	-62 to -81	Liquid; highly reactive

†Negative value indicates net acidifying effect on soil; positive value indicates net basic reaction in soil.
‡Commonly available materials
*Present in undetermined amounts
Symbol key: N = Nitrogen; P_2O_5 = Phosphate; K_2O = Potash; Ca = Calcium; Mg = Magnesium; S = Sulfur; $CaCO_3$ = Calcitic Limestone

Micronutrient Materials

Materials	Nutrient Content
Copper (Cu)	
Chelated Cu*:	
Cu EDTA	13% Cu
Cu HEDTA	9% Cu
Cupric ammonium phosphate $Cu(NH_4)PO_4.H_2O$	30% Cu
Cupric oxide (CuO)	60-80% Cu
Copper sulfate*:	
$CuSO_4.H_2O$	35% Cu
$CuSO_4.5H_2O$	25% Cu
$CuSO_4.3Cu(OH)_2$	13-53% Cu
Copper frits	40-50% Cu
Copper polyflavonoid	6% Cu
Boron (B)	
Borax (sodium tetraborate decahydrate) $Na_2B_4O_7.10H_2O$	11% B
Boric acid (H_3BO_3)	17% B
Boron frit/sodium borosilicate	6% B
Calcium borate (colemanite) $Ca_2B_6O_{11}5H_2O$	10% B
Fertilizer borate* (sodium tetraborate)	
Borate Granular ($Na_2B_4O_7.5H_2O$)	14% B
Borate 48	15% B 48 refers to percentage B_2O_3

Materials	Nutrient Content
Boron (B)	
Solubor* $Na_2B_4O_7$	20% B 66% B_2O_3
Magnesium borate (boracite) $2Mg_3B_8O_{15}.MgCl_2$	21% B
Iron (Fe)	
Basic slag	10-13% Fe
Ferric sulfate $Fe_2(SO_4)_3.4H_2O$	20% Fe
Ferrous sulfate* $FeSO_4.7H_2O$	20% Fe
Ferrous ammonium sulfate $(NH_4)_2SO_4.FeSO_4.6H_2O$	14% Fe
Ferrous ammonium phosphate $Fe(NH_4)PO_4.H_2O$	29% Fe
Ferrous oxalate $FeC_2O_4.2H_2O$	30% Fe
Ferrous carbonate $FeCO_3.H_2O$	42% Fe
Iron chelates*:	
Fe DTPA	10% Fe
Fe EDTA	9-12% Fe
Fe EDDHA	6% Fe
Fe HEDTA	5-9% Fe
Iron ligninsulfonate	5-11% Fe
Iron polyflavonoid	6-10% Fe
Iron Frits	40% Fe

Materials	Nutrient Content
Manganese (Mn)	
Basic slag	1-3% Mn
Manganese frits	10-25% Mn
Manganese chloride $MnCl_2$	17% Mn
Manganese carbonate $MnCO_3$	31% Mn
Manganese oxide MnO	68-70% Mn
Manganese sulfate* $MnSO_4.4H_2O$	24% Mn
Manganese chelate* Mn EDTA	12% Mn
Manganese ammonium phosphate $Mn(NH_4)PO_4.H_2O$	28% Mn
Manganese polyflavonoid	8% Mn
Molybdenum (Mo)	
Ammonium molybdate $(NH_4)_6Mo_7O_{24}.2H_2O$	up to 54% Mo

Materials	Nutrient Content
Molybdenum (Mo)	
Sodium molybdate* $Na_2MoO_4.2H_2O$	38-46% Mo
Molybdenum frit	30% Mo
Superphosphate	trace as impurity
Zinc (Zn)	
Zinc chelate* Na_2Zn EDTA	9-14% Zn
Zinc ammonium phosphate $Zn(NH_4)PO_4.H_2O$	34% Zn
Zinc sulfate* $ZnSO_4.H_2O$	22-36% Nn
Zinc sulfide (sphalerite)	61% Zn
Zinc oxide ZnO	78-80% Zn
Zinc ligninsulfonate	5-12% Zn
Zinc polyflavonoid	7-10% Zn

*Commonly used materials

Organic Fertilizer Materials (Approximate Values)

Material	N	P_2O_5	K_2O	Ca	Mg	S	Micro-nutrients	Acidic (-) Neutral (0) Alkaline (+)	Comments
Blood (dried)	12-15	3	1	*	*	*	*	-	
Blood meal	15	1	1	*	*	*	*	-	
Bone meal (steamed)	0-2	10-20	0	19-25	0	0		+	
Compost (garden)	Variable depending upon components and amendments								
Cottonseed meal	6-7	2.5	1.5	*	*	*	*	-	
Cottonseed hull ash	0		27	*	*			+	
Cotton motes (composted gin wastes)	2	0.5	3	4	0.7	0.6	*	-	May contain weed seed
Fish scrap (acidulated)	7-10	1-2	0	*	*	2		-	Traces of I and Hg
Fish scrap (dried fish meal)	9	3		6	*	*	*		
Hay:									
Legume	3.0	1.0	2.4	1.2	0.2	0.3	*	-	
Grass	1.5	0.5	1.9	0.8	0.2	0.2	*	-	
Manure: (dried)									
Cattle	1.5	1.5	1.2	1.1	0.3	*	*	-	Feedlot manure usually
Horse	0.4	0.2	0.3	*	*	*	*	-	contains 60-70% water
Poultry									
Broiler litter	3.0	3.0	2.0	1.8	0.4	0.3	*	+	Average moisture (houses) = 20%
Hen-caged layers	1.5	1.3	0.5	6	0.4	0.3	*	+	Average moisture = 70%
Hen-litter	1.8	2.8	1.4	*	*	*	*	+	Average moisture = 37%
Sheep	0.6	0.3	0.2	*	*	*	*	-	
Swine	0.6	0.4	0.1	*	*	*	*	-	
Peat/Muck	2.3	0.5	0.7		*	*			
Sawdust (mixed soft + hardwoods)	0.2	0	0.2					-	High C:N ratio; needs N fert.
Seaweed (dried)	0.7	0.8	5.0	*	*	*	*	+, -	
Sewage sludge (dried, municipal)	5	6	0.5	3	1	1		+	Depending upon source, may contain heavy metals. Use only on nonfood-producing areas.
Tankage	7	1.5	3-10	*	*	*	*	-, +	
Wood ashes	0	2	6	20	1		*	+	70% $CaCO_3$ equivalent

*Present in undetermined amounts Symbol key: N = Nitrogen; P_2O_5 = Phosphorus; K_2O = Potassium; Ca = Calcium; Mg = Magnesium; S = Sulfur

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