

PART VIII

Fertilizers

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Composition of Principle Fertilizer Materials

	Nitrogen (N)	Phosphate (P ₂ O ₅)	Potash (K ₂ O)	Physical State
Material Supplying	%	%	%	
Nitrogen				
Ammonium nitrate	33-34	0	0	solid
Anhydrous ammonia	82	0	0	gas
Ammonium thiosulfate	12	-	26	liquid
Calcium nitrate	15	0	0	solid
Sodium nitrate	16	0	0	solid
Urea-ammonium nitrate	28-32	0	0	liquid
Ammonium sulfate	21	0	0	solid
Urea	45-46	0	0	solid
Phosphorus				
Ammonium polyphosphate (APP)	10	34-37	0	liquid
Diammonium phosphate (DAP)	18-21	46-53	0	solid
Ground bone (raw)	2.5 to 4	20-25	0	solid
Ground rock phosphate	0	25-40 (14-65% avail.)	0	solid
Monammonium phosphate (MAP)	11-13	48-62	0	solid
Steamed bone meal	1 to 2.5	22-30	0	solid
Superphosphate, normal	0	16-22	0	solid
Superphosphate, triple	0	44-53	0	solid
Potassium				
Muriate of potash (potassium chloride)	0	0	60-62	solid
Potassium nitrate	13	0	44	solid
Potassium sulfate	0	0	50-53	solid
Potassium thiosulfate	-	0	25	liquid
Potassium orthophosphate	-	30-50		
Potassium magnesium sulfate	0	0	22	solid

Sources of calcium, magnesium, sulfur, and micronutrients

Calcium sources		
Material	Chemical Formula	% Ca
Calcitic lime	CaCO ₃	31.7
Calcium nitrate	Ca(NO ₃) ₂	19.4
Dolomitic lime	CaCO ₃ +MgCO ₃	21.5
Gypsum	CaSO ₄ •2H ₂ O	22.5
Hydrated lime	Ca(OH) ₂	46.1
Marl	CaCO ₃	24.0
Superphosphate, normal	Ca(H ₂ PO ₄) ₂	20.4
Superphosphate, triple	Ca(H ₂ PO ₄) ₂	13.6
Sulfur sources		
Material	Chemical Formula	% S
Ammonium sulfate	(NH ₄) ₂ SO ₄	24
Gypsum	CaSO ₄ •2H ₂ O	16.8
K-Mg-sulfate	K ₂ SO ₄ •2MgSO ₄	22.0
Sulfur, elemental	S	32-33
Potassium thiosulfate	(NH ₄) ₂ S ₂ O ₃	17
Ammonium thiosulfate	K ₂ S ₂ O ₃	26
Boron sources		
Material	Chemical Formula	% B
Boron frits	Frit	10-17
Borax	Na ₂ B ₄ O ₇ •10H ₂ O	11
Boric acid	H ₃ BO ₃	17
Sodium pentaborate	Na ₂ B ₁₀ O ₁₆ •10H ₂ O	18
Sodium tetraborate		
Fert. borate-46	Na ₂ B ₄ O ₇ •5H ₂ O	14
Fert. borate-65	Na ₂ B ₄ O ₇	20
Solubor	Na ₂ B ₁₀ O ₁₆ •10H ₂ O + Na ₂ B ₄ O ₇ •5H ₂ O	20
Molybdenum sources		
Material	Chemical Formula	% Mo
Ammonium molybdate	(NH ₄) ₆ Mo ₇ O ₂₄ •2H ₂ O	54
Molybdenum trioxide	MoO ₃	66
Molybdenum frit	Frit	1-30
Sodium molybdate	Na ₂ MoO ₄ •2H ₂ O	39
Copper sources		
Material	Chemical Formula	% Cu
Copper ammonium phosphate	Cu(NH ₄)PO ₄ •H ₂ O	32
Copper chelates	Na ₂ CuEDTA NaCuHEDTA	13 9
Copper frits	Frit	40-50
Copper sulfate	CuSO ₄ •5H ₂ O	25
Magnesium sources		
Material	Chemical Formula	% Mg
Dolomitic lime	MgCO ₃ +CaCO ₃	11.4
Epsom salt	MgSO ₄ •7H ₂ O	9.6
Magnesia	MgO	55.0
Potassium- magnesium sulfate	K ₂ SO ₄ •2MgSO ₄	11.2
Manganese sources		
Material	Chemical Formula	% Mn
Manganese chelate	MnEDTA	12
Manganese sulfate	MnSO ₄ •4H ₂ O	26-28
Manganese frit	Frit	35
Manganese oxide	MnO	41-68
Zinc sources		
Material	Chemical Formula	% Zn
Zinc carbonate	ZnCO ₃	52
Zinc chelates	Na ₂ ZnEDTA NaZnHEDTA	14 9
Zinc oxide	ZnO	78
Zinc sulfate	ZnSO ₄ •H ₂ O	35
Iron sources		
Material	Chemical Formula	% Fe
Iron sulfate	FeSO ₄ •7H ₂ O	19
Iron ammonium phosphate	Fe(NH ₄)PO ₄ •H ₂ O	29
Iron ammonium polyphosphate	Fe(NH ₄)HP ₂ O ₇	22
Iron frits	Frit	30-40
Iron chelates	NaFeEDTA NaFeDTPA NaFeEDDHA	5-14 10 6

Conversion factors

Converting the percentage of one material to percentage of another may be done easily with a conversion factor, some of which are listed below. For example, to convert the percentage of K to K_2O , multiply the percentage of K by 1.2051; in like manner, the percentage of K_2O may be converted to K by multiplying the percentage of K_2O by 0.8301.

K to K_2O	multiply K	by 1.2051
K_2O to K	multiply K_2O	by 0.8301
KCl to K	multiply KCl	by 0.5244
KCl to Cl	multiply KCl	by 0.4756
K_2SO_4 to K	multiply K_2SO_4	by 0.4487
Mg to MgO	multiply Mg	by 1.6578
MgO to Mg	multiply MgO	by 0.6032
$MgCO_3$ to MgO	multiply $MgCO_3$	by 0.4782
MgO to $MgCO_3$	multiply MgO	by 2.0913
$MgSO_4$ to Mg	multiply $MgSO_4$	by 0.2020
$MgCO_3$ to $CaCO_3$	multiply $MgCO_3$	by 1.1867
CaO to Ca	multiply CaO	by 0.7147
Ca to CaO	multiply Ca	by 1.3992
$CaCO_3$ to $MgCO_3$	multiply $CaCO_3$	by 0.8426
$CaCO_3$ to CaO	multiply $CaCO_3$	by 0.5603
K_2SO_4 to S	multiply K_2SO_4	by 0.1840
$CaSO_4$ to Ca	multiply $CaSO_4$	by 0.2938
$CaSO_4$ to S	multiply $CaSO_4$	by 0.2350
SO_4 to S	multiply SO_4	by 0.3339
S to SO_4	multiply S	by 2.9963
NaCl to Cl	multiply NaCl	by 0.6066
N to NH_3	multiply N	by 1.2158
N to KNO_3	multiply N	by 7.2162
NH_3 to N	multiply NH_3	by 0.8225
N to $(NH_4)_2SO_4$	multiply N	by 4.7160
$(NH_4)_2SO_4$ to N	multiply $(NH_4)_2SO_4$	by 0.2120
$(NH_4)_2SO_4$ to S	multiply $(NH_4)_2SO_4$	by 0.2427
N to NH_4NO_3	multiply N	by 2.8571
NH_4NO_3 to N	multiply NH_4NO_3	by 0.3500
P to P_2O_5	multiply P	by 2.2910
P_2O_5 to P	multiply P_2O_5	by 0.4365

