

Part 3: Operating a Blending Facility

Session 3.1 Selecting and Sourcing of Raw Materials

Selecting the raw materials required

You need to know:

1. Which **ingredients** (type of raw materials) you need
2. The **quantities** you need of each raw material
3. The **chemical and physical compatibility** of the raw materials



Urea



DAP

Selecting your ingredients

- Each fertilizer formula consists of certain **nutrients**
- The same nutrients can be found in **different ingredients** (raw materials)

Periodic Table of Elements

1	2											3	4	5	6	7	8	9	10					
1	H																	He						
2	3	4											5	6	7	8	9	10						
	Li	Be																	B	C	N	O	F	Ne
3	11	12											13	14	15	16	17	18						
	Na	Mg																	Al	Si	P	S	Cl	Ar
4	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36						
	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr						
5	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54						
	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe						
6	55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86						
	Cs	Ba	*La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn						
7	87	88	89	104	105	106	107	108	109	110														
	Fr	Ra	+Ac	Rf	Ha	106	107	108	109	110														

58	59	60	61	62	63	64	65	66	67	68	69	70	71
Ce	Pr	Nd		Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
90	91	92	93	94	95	96	97	98	99	100	101	102	103
Th	Pa	U											

Selecting your ingredients

For example: NPK consists of



Sulfate of potash

- **Nitrogen N** >>

Ammonium nitrate, Urea, Calcium ammonium nitrate (CAN), Yara Amidas, Ammonium sulfate, Diammonium phosphate (DAP), Monoammonium phosphate (MAP)

- **Phosphate P₂O₅** >>

Diammonium phosphate (DAP), Monoammonium phosphate (MAP), Triple superphosphate (TSP), Single superphosphate (SSP)

- **Potash K₂O** >>

Muriate of potash (also KCl, MOP), Sulfate of potash (SOP), Polyhalite (Polysulfate®, POLY4)

Nutrient concentration - Nitrogen N

- Ammonium nitrate 34%
- Urea 46%
- Calcium ammonium nitrate (CAN) 26-28%
- Yara Amidas 40%
- Ammonium sulfate 21%
- Diammonium phosphate (DAP) 18%
- Monoammonium phosphate (MAP) 11%



Ammonium sulfate



Monoammonium phosphate

Nutrient concentration - Phosphate P_2O_5

- Diammonium phosphate (DAP) 46%
- Monoammonium phosphate (MAP) 52%
- Phosphate rock (PR) 27-29%
- Triple superphosphate (TSP) 45-46%
- Single superphosphate (SSP) 16-20%



Diammonium phosphate



Phosphate rock



Single superphosphate

Nutrient concentration - Potash K_2O

- Muriate of potash (also KCl, MOP) 60%
- Sulfate of potash (SOP) 50%
- Polyhalite (Polysulfate®, POLY4) 14%



Muriate of potash



Sulfate of potash



Polyhalite

Nutrient concentration



Ammonium nitrate

- **Nutrient concentration** is the proportion of nutrient (percentage) contained in every granule of a fertilizer raw material. See Annex 1 in your workbook.
 - Get an **analysis report** showing nutrient concentrations and other characteristics of materials from the supplier.
 - Carry out your **own analysis**.
- >> **Consequences:** concentrations below specifications will lead to poor quality blends.

Nutrient	Raw material	Where to find
Nitrogen	Urea and Ammonium sulfate	Nigeria (Notore, Indorama, Dangote)
Phosphate	(natural deposit) rock phosphate	Burkina (SEPB) Mali (Toguna) Senegal (ICS, SOMIVA) Togo (SNPT)
	Granular phosphate	Senegal (ICS)
Potash	Imported	China, Russia, Ukraine, Israel, Jordan, Canada, US

Selecting suppliers of raw materials

Select (a) supplier(s) of raw materials. Look at:

- **Availability** of the raw materials
- **Costs** of the raw materials (without transport)
- **Transport costs** to get the materials to your blending facility
- **Continuous supply**, especially when you want to produce large quantities over a longer period



Yara Amidas



Calcium ammonium nitrate

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