

Vogel's Medium N salts: avoiding the need for ammonium nitrate

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Vogel's Medium N salts (Vogel, 1956 Microbiol. Genet. Bull. 13:42-43), supplemented with a carbon source, is widely used for the cultivation of *Neurospora* and many other fungi. The standard recipe includes ammonium nitrate. Because the ammonium ion is a reductant and nitrate ion is an oxidant, solid ammonium nitrate is potentially an explosive, as is well known from the disastrous 1947 Texas City accident and from more recent acts of terrorism such as the bombing of the Federal Building in Oklahoma City. Ammonium nitrate can explode without being deliberately detonated. Shipping it, therefore, presents some problems, and even declaring it in a lab inventory may do so in the future. The tendency of the dry salt to become caked in its container invites foolish actions to free up a sample, for example, banging the jar on the edge of a benchtop.

The following recipe yields an identical final composition to Vogel's Medium N, but employs potassium nitrate and ammonium phosphate. Since potassium ion is not a reductant and phosphate ion is not an oxidant, the dry ingredients can be regarded as harmless, as, of course, are the dissolved salts.

The following recipe is for 1 liter of 50X salts.

water	750 ml.
Na ₃ citrate · 2H ₂ O	130 g.
KNO ₃	126 g.
(NH ₄) ₂ H ₂ PO ₄	144 g.
KH ₂ PO ₄	80 g.
MgSO ₄ · 7 H ₂ O	10 g.
CaCl ₂ · 2H ₂ O	5 g. in 20 ml. water; add dropwise.

trace elements solution* 5 ml.
biotin solution, 0.1 mg/ml 2.5 ml.

chloroform to preserve: a few ml.

No adjustment of pH is necessary or desirable.

*Trace elements: several variants of the following have been published. The differences in these formulations are unlikely to be important.

water	95 ml
citric acid · H ₂ O	5 g.
ZnSO ₄ · 7H ₂ O	5 g.
Fe(NH ₄) ₂ (SO ₄) ₂ · 6H ₂ O	1 g.
CuSO ₄ · 5H ₂ O	250 mg.
MnSO ₄ · H ₂ O	50 mg.
H ₃ BO ₃	50 mg.
Na ₂ MoO ₄ · 2H ₂ O	50 mg.