



The flowsheet for DAP manufacture is very similar to that for ammonium sulfate

value unit of 10-20-0. At \$162 per ton, DAP's common value unit cost is \$1.88.

Related Products May Help

DAP is new and will doubtless need some educational backing, but older, related products may have at least prepared the way. Consolidated Mining & Smelting began making monoammonium phosphate (11-48-0) and ammonium phosphate sulfate (16-20-0) at Trail, B. C., in 1936. CM&S markets both products widely in the western and north-midwestern U. S. Stauffer at Tacoma, Wash., and Mathieson at Pasadena, Tex., has made ammonium phosphate sulfate for some years; Stauffer also makes monoammonium phosphate at Tacoma and at Garfield, Utah. Missouri Farmers Association at Joplin, Mo., got under way last year with both 11-48-0 and 16-20-0.

One noteworthy trend is toward a nitrogen-phosphate ratio of 1:1 or higher. Phosphate sulfate was a move in this direction. Stauffer came out last year with an 8-12-0 and is toying with a 12-8-0; CM&S is introducing a 27-14-0 this season. Should this continue, DAP might look better for high analysis mixes than as a simple.

Until recently, wet process phosphoric acid's impurities have made it an impractical raw material for diammonium phosphate. TVA, however, recently announced a wet process acid method (not suitable for coke oven conversion) and reports brisk interest; at least six firms have requested process economics data. Monsanto, meanwhile, reports two imminent prospects for the furnace acid process. And yet a third route to higher

analyses is nitric acidulation of phosphate rock, used by Allied at South Point, Ohio, and Associated Cooperatives at Sheffield, Ala. (Nitric acidulation becomes more economical when sulfuric acid is in short supply.) Perhaps all that can be said for certain is that the technical advance goes on.

Indirect Insect Control

There may be a future for compounds that slow growth—they may even solve resistance problem

THE INDIRECT APPROACH to insect control is being explored by a research group at the USDA's research Center in Beltsville, Md. A group of insect physiologists has been investigating nontoxic chemicals that affect the development of insects. Traditionally, screening of chemical compounds for insect control has been directed to finding materials which would kill bugs at low concentrations. The physiologists, however, are interested in the effects of low levels of chemicals which don't kill the insects but do affect their development.

The project has evolved from one aimed at investigating the normal growth rate of insects. These normal development studies have now been expanded to include screening of compounds which affect development, es-

pecially in insect larvae. A wide variety of compounds has been found to affect development; colchicine and aminopterin prevent normal cell division and growth; sulfanilamide and coumarin seem to slow down the metabolism.

The insecticide synergist, piperonyl butoxide, is usually considered nontoxic to insects. It is added to insecticide formulations to increase the effectiveness of active insecticides. When added to the medium on which housefly larvae are grown, piperonyl butoxide has been found to slow down the development of the larvae, in some cases preventing them from becoming adults.

Added at a level of about 0.1% by weight to the larval-rearing medium, it allowed only about a quarter of the flies to develop into normal adults, and their development took two days longer than that of normal flies. Increasing piperonyl butoxide levels to about 0.25% prevented adult development of nearly all larvae. One interesting note turned up by the studies: piperonyl butoxide seemed to affect DDT-resistant flies more than normal flies.

The studies of DDT-resistant flies are considered to be particularly important, for in many areas the effectiveness of DDT as a control of houseflies has decreased to the point where it is nearly worthless. The physiologists are investigating the metabolic background for this DDT resistance with the aim of finding spots in the metabolism of the DDT resistant flies which might be susceptible to chemical attack. The attack from the physiologists' point of view would not necessarily have to kill the flies immediately but a long term poison of the anti-metabolite type might be the right thing.

As yet the researchers see no immediate practical application of the work on growth or development inhibitors; in the long run they may be opening up a new approach to insect control.

Forest Insects

Insects now epidemic in most western forests, and losses exceed 5 billion feet/year; chemicals halt some but improvement vital

ASK WESTERN forest industry men about forest insects and their estimates can only be classified as "bunyon-esque" in true forest industry tradition: Millions of infested acres require millions of dollars for control efforts. The goal: saving all or most of well over 5 billion