

Sealed Silos Tried for Damp Grain

Bigger volume of damp grains created by modern harvesting methods is storage problem

OMAHA.—An important problem raised by modern, mechanized harvesting methods is the higher incidence of grains too damp to be stored safely for very long. Mechanical drying is one possible solution that has gotten a lot of attention in the U. S. Hermetically sealed storage has also been looked into, particularly in France, and with generally positive results. The latter approach has now been tried at Purdue by R. L. Whistler and coworkers who used common yellow dent corn with different moisture contents between 12 and 27%. Whistler analyzed his results recently at the 16th Midwest Regional Meeting of the ACS.

The corn was stored in glass lined silos, 14 feet by 14 feet, holding about 1200 bushels. Special sampling ports and thermocouples placed to measure internal temperatures were provided. Corn with 12% and 13.5% moisture stored in these silos showed no deterioration after nine months. Mold and increased fat acidity did not show up in 18% moisture corn until after 14 to 15 months, although color darkened and viability fell to zero. Corn with 23% and 27% moisture showed mold within six weeks, fat acidity rose sharply, and germination dropped to zero.

There was no spontaneous temperature rise in the silos, says Whistler, except during a short period immediately after they were sealed. The silos remained free of insects. Corn above about 18% moisture content was difficult to handle, and also was quite susceptible to physical damage. Limited hog feeding tests were made with 28% moisture corn after two seasons in storage; there was no sign of ill effects or that feeding value had declined.

Aldrin-Fertilizer Mixes. Long term storage of aldrin-solid fertilizer mixes may cause 5 to 15% loss of aldrin, according to F. B. Folckemer and coworkers, Shell Chemical. The loss is by volatilization rather than chemical action and is of only minor significance from a practical viewpoint. Nevertheless, Folckemer believes that storage of such mixtures for a year or more should be avoided.

Impregnation with 40% aldrin solution is the preferred method for mixing with pelletized fertilizers, says Folckemer. Uniform mixtures can be made with 20% aldrin granules (30 to 40 mesh) but there is a distinct possibility of stratification, particularly if the mixture is relatively

free of fines. Stratification danger can be greatly reduced by using 15 to 30 mesh aldrin granules, but insect control field test data on the larger granules are not yet available; some state agencies, therefore, do not yet recommend them.

Corn Sirup Analysis. A routine analysis for the kinds and amounts of carbohydrates present in commercial corn sirups has been developed by E. C. Snyder and E. R. Kooi, Corn Products Refining Co. Descending paper strip

chromatography separates glucose and its polymers from a 6:1:3 *n*-propanol-ethyl acetate-water solvent system. Sugars of up to eight glucose units are effectively separated in a flow time of 40 hours.

Separated sugars are located on the paper, says Kooi, by spraying with a diphenylamine-aniline-phosphoric acid mixture, and heating to 90–100°. Sugars are then eluted with distilled water and quantitatively estimated by a phenol-sulfuric acid colorimetric technique.

Analysis results for commercial corn sirups are somewhat lower than calculated values, Kooi says, except for monose, which is the other way around. Agreement improves as the degree of polymerization increases, and there is some indication that velocity constants increase too under commercial conditions.

Many Answers Still Needed On Fall Fertilizer Application

ST. PAUL, MINN.—Any leveling off of the highly seasonal fertilizer business would be of great benefit to the manufacturer who would in turn pass his lower costs on to farmers. The farmer would also benefit by getting better cured goods, a complete choice of grades, and dependable delivery service, said William F. Price, Swift & Co., at the 46th annual meeting of the American Society of Agronomy here Nov. 8 to 12.

"Normal" plant food movement is 70% in the first six months of the calendar year and 30% in the last six months. Changing the ratio even to 60/40 by increasing fall application would be a great help to the manufacturer. Fertilizer plants, which now operate only four to seven months of the year could utilize their capacities much more efficiently. Sales expenses could also be reduced.

Fine work has been done on fall application in such states as Wisconsin, Minnesota, Iowa, and Missouri, but a lot of questions are as yet unanswered. For example, is it suitable for all the area north of the Ohio River and east of the plain states? Is it suitable on sandier soils in the northern tier of states, or is it economical only on heavier soils in any latitude? It has already been established that fall application is profitable for legumes, pastures, and winter grains. From the fertilizer manufacturer's viewpoint it would be most desirable if research proved that corn also can be pre-fertilized in the fall over a large area, said Price.

Fall application does not seem to be practical in the Southeast, according to W. B. Andrews, Mississippi Agricultural Experiment Station. Phosphate should

be applied at planting time for small grains planted in the fall, but nitrogen is more effective when applied in the spring. Anhydrous application is permissible in the fall, however, if soil pH is less than 5.0. Only on soils with an impermeable pan will there be any carry-over from material placed in the fall to spring-seeded crops.

In the Midwest fall application is more promising. Oats and corn both showed good response to 10-10-10 application in the fall with no significant difference from spring application, according to a report by Clifton Halsey and John M. MacGregor, University of Minnesota. Legumes seem to respond better to summer application, but there is less difference between seasonal applications on plowed land than was previously supposed.

In Missouri farmers are beginning to apply fertilizer to raise the soil nutrient level rather than to stimulate any particular crop, said G. E. Smith, University of Missouri. Mineral treatment may be at any time of year, but on sandy soils nitrogen should be applied only while the plants are actively growing.

Differences in effectiveness of fall application in different locations is tied in with the amount of leaching of soil nutrients. Lysimeter tests show that nitrogen is most susceptible to leaching; phosphorus is very slightly affected; and potassium leaches, but after a considerable lag phase, stated L. B. Nelson, USDA.

Geographical variation in suitability for fall application can be correlated with climatic factors which affect leaching.