NEWS

JOURNAL OF
Agricultural and Food Chemistry

- Nutrition
- Food Processing
- Fermentation
- Pesticides
- Plant Foods and Regulators

Liquid Fertilizers Lead in New Applications of Fish By-Products

Use of spray irrigation to dispose of cannery wastes catching on

PULLMAN, WASH.—Prime example of an industry on the come-back trail through economic utilization of by-products which threatened to become waste is the fish industry. How it and other industries are talking, "economic utilization, not waste," was the theme of paper after paper at the Fifth Annual Pacific Northwest Industrial Waste Conference sponsored by Washington State Institute of Technology here April 16 and 17.

The fish industry has suffered some heavy blows from technological progress chalked up by other products. For instance: synthetic detergents have knocked the bottom out of the fish oil market; soybean meal is the heavy contender for the animal feed market, supplanting fish meal; antibiotic fortification has played havoc with "fish solubles," a product remaining after fish have been processed for oil and meal and which formerly was a fine source of vitamin B_{12} for feed supplementation.

Fertilizers. R. W. Simmons, Bellingham consultant, reporting on some newcomers to the fish industry by-products scene, says newer and greater markets can be expected for liquid fertilizers from fish. Current types of fertilizers are: A 50% solids product (fish solubles) which has an N-P-K analysis of 5-2-2; an enzymatic hydrolyzate of tuna viscera analyzing 2-1-1 (California citrus growers are using this one to help restore the soil microflora killed off in recent years by too enthusiastic injection of anhydrous ammonia); and chemically hydrolyzed fish offal analyzing 10-6-5 when built with urea and potassium phosphate.

Simmons says he feels qualitative evidence shows growths with these liquid products are much above what would be expected on a strict N-P-K basis, despite the fact that there is some university opinion to the effect that they can be no better than their analyses when compared to inorganic fertilizers. Perhaps the controversy will be resolved when quantitative experiments now underway in Canada are finished in the near future.

Speculating as to the reason for this apparently enhanced growth, Simmons wonders if there is not the possibility that these "natural" products have just the right trace element ratio for optimum growth. In addition, he notes that all the nitrogen is linked to carbon in contrast to nitrate nitrogen. Thermodynamics of the two reactions ("natural" *vs.* inorganic product) indicate that more plant energy is required to utilize the inorganic product, thus reducing growth despite a higher nitrogen content on a pounds-per-acre basis.

Be that as it may, steady market growth seems assured for the fertilizers. With only three years of commercial development, production has risen from a few thousand tons to several hundred thousand tons.

Fish Solubles as Cattle Feed. Fish solubles are also finding a new role in winter range feeding of cattle in Canada. The Canadians have combined fish solubles with molasses and screenings from flour mills to give an extrudable product. Chopped into pellets, the material is serving admirably for feeding cattle from the air during winter months, Simmons reports.

Canners' Waste. Screening, chemical precipitation, biological filtration, soil adsorption, impounding lagoons—these are some of the methods canners have used to dispose of the enormous volumes of waste processing water. In 1947 canners first used spray irrigation as a method of disposing of wastes, despite the fact that spray watering of crops had been used for many years. Somewhat slow to catch on (only one canner and one frozen food processor were using spray irrigation by 1950), the number of canners, dairies, and frozen food processors using spray irrigation for waste disposal had risen to over 40 by last year.

N. H. Sanborn, National Canners Association, demonstrates quick couplers used in systems for spray irrigation using cannery wastes

Here are some of the facts that have been brought to light during these five years of experience, according to N. H. Sanborn, National Canners Association. First, it is best to design the system primarily for waste disposal and not put too much emphasis on irrigation. Early efforts were on irrigation per se on such crops as peas, corn, and small grains. Experience showed that there was just too much water—the crops were drowned out. The wastes can be used for crop irrigation, if necessary, but if they are, extra land must be available to take care of the excess water.

Improper screening gives more trouble than any other single step (spray nozzles are soon clogged by improperly screened waste). A good solution, in addition to adequate screening in the plant, is to have one or more auxiliary, stationary screens in the sump pit on the suction line for the distribution pump.

Main distribution lines are generally 4- to 10-inch aluminum or cast iron fairly permanently placed. Distributor lines are usually 3- to 6-inch aluminum, which gives a line that has sections light enough to be moved by one man.

Spraying directly on bare ground or ground with poor cover is not possible, because such ground will soon not absorb water. The best type of cover is believed to be a good pasture crop, though there is no exact data to date. Forested lands are also suitable.

If waste disposal is the key element in spray irrigation with cannery wastes, how the cannery can combine waste disposal with another "crop" is indicated by operations of Lamb-Weston, Inc., Weston, Ore. Paul Lamb told those attending the conference that his company plans to combine cattle raising and spray irrigation of pea cannery wastes. Not only will cull peas and pea vines from the cannery serve as cattle feed, but spraying gives an excellent pasture for the cattle.

Where a cannery has no other way for disposal than some form of treatment, a more economical waste treatment should result by segregating various process step wastes and treating them according to their waste content. State College of Washington's Gene V. Leete says that a study of the Dayton, Wash., pea cannery of Green Giant Co. last year shows that much of the waste has a B.O.D. of about 500 p.p.m., a level which can generally be safely discharged to city systems. Leete found that blancher overflow and waste from spray reels account for about 5% of the volume of plant waste but actually account for 67% of the B.O.D. load. Separate treatment of these concentrated wastes could do much toward reducing the large volumes of wastes that need to be handled.

Detergent Insecticide. A fraction of a per cent of detergent in berry wash water may be the answer to thrip infestations (thrips are small winged insects about 0.04 inch long which plague both growers and processors of various cane berries). Such are the indications from a progress report given by J. E. Brekke, USDA's Bureau of Agricultural and Industrial Chemistry at Puyallup, Wash.

The apparatus consists of a tank for the detergent solution and an endless belt, one end of which is near the bottom of the tank and the other end of which rises out of the tank in such a way as to drop the berries into a regular shaker washer. Berries normally float, but the detergent causes them to become wet and fall to the tank bottom, where the belt picks them up and conveys them to the regular shaker washer containing clean water.

Food Packages Hold First Place as Subject for Improvement

Application of antioxidants to packaging materials prevents deterioration of packaged foods

CHICAGO.—A full two miles of exhibits, requiring the entire capacity of the Navy Pier, made this year's American Management Association's National Packaging Exposition the largest packaging show in history. Total attendance reached 27,700 by closing time on the fourth and final day, April 23, having exceeded preliminary estimates of 25,000 by late afternoon of the third day.

Probably in no other area is packaging more important than in the food field; aside from considerations of eye appeal to improve sales, packaging methods and materials applied to foods must meet rigid standards of cleanliness and nontoxicity and often must perform extra duties in the preservation of freshness and even of nutritive value.

It was no cause for wonderment, then, that a large proportion of the 350 packaging displays should have been devoted to equipment and materials for improving the packaging of food products. From preservatives and processes to gadgets and gimmicks, every phase of food packaging was treated.

Antioxidants and Strippable Coatings. Two food packaging techniques of strong interest were presented by Eastman Chemical Products, in the use of antioxidants in wrapping materials, and the development of food-grade strippable plastic coatings.

The food-grade antioxidant, Eastman's Tenox, had been used for some time in such products as lard, vegetable oils, and potato chips, but its use in the material in which such foods are packaged has only recently become commercially practical. The antioxidant is applied as a stable emulsion to paperboard, vegetable parchment, glassine, or other papers or plastics, and thereafter serves as an oxygen trap to prevent degeneration of the packaged materials.

Eastman's strippable plastic coating is a pure form of its well-known butyrate. Eastman displayed hams which had been coated with the butyrate to afford protection while leaving the meat easily visible for inspection. Removal of the

Strippable transparent coatings move into food protection service. Right. All the way from Italy came GD'S high speed candy wrapping machines to attract confectioners with their capacity