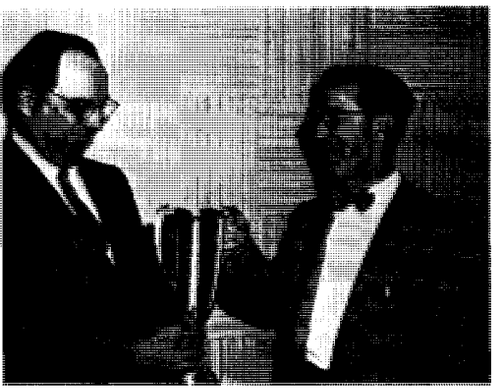

Paul D. Cretien, Texas Testing Laboratory, left, receives the AOCS Smalley Cup for the third year in a row from R. W. Bates, Smalley committee chairman (Armour & Co.)

beans, removing some hulls, conditioning the cracked meats, flaking to approximately 0.010-inch thickness, cooking for 20 to 30 minutes at temperatures up to 225° F. with initial moisture content of 15 to 17% and final content of 10 to 12%, evaporative cooling, and screening and reforming the "overs" fraction. Extracted meal contained less than 1% residual lipids. Miscella for oil recovery contained 20% oil and 0.3% fines. A good quality oil resulted.

Oil Content of Flaxseed. Rapid determination of the oil content of flaxseed was described by W. H. Hunt, Production and Marketing Administration, USDA. Samples are ground in a special grinder-extractor in an oil solvent, the mixture filtered, and the solvent-oil mixture placed in the cell of a high-frequency oscillator. Measurement of dielectric properties is converted to oil content by use of a conversion table, with results on a single sample possible in about 20 minutes. Heating of flaxseed samples by infrared heat before grinding shortens analysis time and gives improved uniformity and accuracy of results.

Trans Isomer Formation during Glyceride Oil Hydrogenation. Animal fats do not develop large amounts of trans isomers, but vegetable oils, particularly under conditions favoring selective hydrogenation, develop significant amounts of these high-melting, less digestible isomers. Studies by R. J. Sims, Swift and Co., indicate that trans isomer formation is promoted by increased temperature, decreased agitation, and low concentration of catalyst. Use of platinum, a very nonselective catalyst, results in development of only small amounts of trans isomers. Palladium is as selective at 40° C. as reduced nickel catalysts are at 200° C., and while use of palladium catalysts above 40° C. does not increase selective action, it does increase tendency toward trans isomer formation. During hydrogenation the trans content of oils (increasing with higher initial iodine values) increases to a maximum and then drops to zero as the fat approaches complete saturation.

Rapid Treatment of Meat-Packers' Wastes for B.O.D. Reduction

Triple-effect evaporation of antibiotic spent beers offers lower costs and flexibility for adapting to fluctuating antibiotic production

WEST LAFAYETTE, IND.—Probably no paper at the eighth industrial waste conference held here at Purdue University last week excited more intense interest than the description of a pilot plant for accelerated—and more economical—treatment of packing-house wastes. The first pilot plant of this type was built about three years ago at the Austin, Minn., plant of Geo. A. Hormel & Co., and has been operated successfully in the treatment—by anaerobic decomposition—of 10,000 gallons per day of packing plant wastes. (In the absence of the authors, W. A. Fullen of Hormel and G. J. Schroepfer of the University of Minnesota, the paper was presented by A. J. Steffen of Wilson & Co. Wilson has recently set up its own pilot plant of a similar nature at Albert Lea, Minn.; a third installation is reportedly under development at Auckland, New Zealand.)

Crux of the new process is anaerobic digestion at elevated temperature, carefully controlled at 95° F. Anaerobic processes had previously been applied to the treatment of relatively strong wastes, containing 10,000 parts per million or more of volatile solids, but the Hormel adaptation permits treatment of wastes containing as little as 1000 to 2000 parts per million solids.

Raw wastes for the pilot plant feed are taken from a simple pretreating plant where grease and large solid particles are mechanically removed. The wastes are transferred to the digester, where they are agitated by continuous circulation at the rate of 20,000 gallons per day. Digestion temperature is maintained at 95° F. by circulating the digester liquor through an automatically controlled external heat exchanger. Evolved gas is collected at the digester's domed top, and metered out of the system at a controlled rate.

As the digestion is completed, the waste stream is passed through an evacuator; degassing of the liquor at this point eliminates troublesome flotation of part of the sludge by gas-lifting. Following evacuation, the waste is transferred to a sedimentation tank for the settling of the sludge. The settling rate can be greatly accelerated by the addition of fly ash, in an amount equal to the dry weight of the suspended sewage solids.

Removal of more than 95% of the waste stream's B.O.D. is common in this system, with loadings as high as 0.20 pound B.O.D. per cubic foot of digester tank volume per day, and with digester detention times as low as 10 to 12 hours. For equivalent B.O.D. removals, conventional aerobic processes (activated sludge and trickling filters) are restricted to much lower loadings.

The new anaerobic process has been demonstrated to be very rugged; it is able to withstand long periods of zero or greatly reduced feed rates, for instance, with no observable detrimental effect when full operation is resumed. And one of the system's chief advantages lies in its economic potential. According to a calculated estimate contributed by Wilson's Steffen, a plant for the treatment of 1.5 million gallons of waste per day, using this anaerobic system followed by a finishing trickling filter, would cost about $200,000 less than a conventional two-stage aerobic plant consisting of one large "rough" trickling filter and one light polishing filter.

Antibiotic Wastes. An entirely different approach to waste processing, embodying a triple-effect evaporator for the treatment of antibiotic spent beers, was described by K. H. Edmondson of the Upjohn Co. The deep vat fermentation of penicillin-type antibiotics, said Edmondson, yields a high B.O.D. waste containing up to 8000 to 12,000 parts per million. An economic comparison between evaporation and biological treatment was found to favor evaporation, since it offers lower stand-by costs, and provides flexibility that permits adaptation to fluctuating antibiotic production. In addition, waste beers from some antibiotics contain materials that are toxic to the microorganisms in trickling filters; efficiency of the biological treatment of such beers would naturally be limited. In the evaporative treatment, these toxic materials are destroyed, and give no further trouble in polishing filters.

The Upjohn system consists of a triple-effect evaporator abetted by a trickling filter; waste feed enters the evaporator's second stage, progresses successively through the third and first stages, and is discharged. Pressure is progressively reduced from the first to the third stages, so that the temperature is highest in the first stage where the waste stream tends to be most viscous. The higher temperature in the first stage aids materially in maintaining fluid flow of the concentrated waste stream.