Environmental Control Committee Asks Help of AOCS Members

The AOCS Environmental Control Committee is attempting to collect information on environmental control processes and techniques being applied by companies represented by members of the Society. To accomplish this, a letter was distributed in late August to these companies, and some 30 days later a second letter was mailed, specifying the format of the desired information. Cooperation of members in obtaining information from their organizations would be appreciated. The guideline is reprinted below:

I. Name and address of your company.
II. Name and title of person from whom further information can be obtained.
III. Industry classification(s), i.e., tall oil, vegetable oil refining, etc.
IV. Pollution category, i.e., air, liquid, solid waste.
V. Abstract defining the environmental problem encountered and successful and unsuccessful efforts toward solutions or anticipated efforts in that direction.
VI. Names and addresses of consultants you have used, if any, in your attempts to solve the problem.

As information is received by the AOCS, it will be reviewed and filed in the library at the Champaign office for the benefit of Society members.

• *New Markets for Tallow . . .*

(Continued from page 468A)

TABLE III
The Influence of a Fat-Containing Admixture on the Plasticity of a Mortar Mix and Strength and Water Repellency of Mortar Cubes

	No admixture	Admixture
Flow, %	48.0	68.0
Compressive strength, psi		
3 days	2284	1920
21 days	3715	4232
28 days	4498	4292
Water absorption, %		
1 day	6.3	4.0
3 days	6.5	4.5
7 days	6.5	5.0

Water Repellent Coating for Concrete

Trichlorosilanated tallow (TCST) imparts a high degree of water resistance to concrete and mortar products when applied to dry surfaces in a 15% solution of mineral spirits at a level of 3 g TCST/sq ft. The research on production and evaluation of the product has been previously described (2) and was presented at the 1966 AOCS Fall Meeting. The composition and use of TCST as a water repellent is covered by a U.S. patent (3) and a number of foreign patents. TCST can be produced by reacting tallow with trichlorosilane using UV or ionizing radiations as a free-radical inducing catalyst. The product is an excellent water repellent (Table II) and resists weathering because it bonds to the masonry surface. Solutions of TCST in mineral spirits are somewhat sensitive to water which necessitates the use of a scavenger to react with the HCl formed. Similar products can be produced from other unsaturated fats or fatty acids but their water repellent properties are not as good as those of the product produced from tallow. The estimated potential market for the product is at least eight million pounds annually in the U.S. Estimated production costs are substantially less than those for the silicone water repellent coating materials now commercially available.

Fat-Containing Admixture for Concrete

Many attempts have been made to increase the water resistance of concrete products by adding fat or fat derivatives to the cement mix. This has almost universally resulted in a loss of strength in the finished concrete products. Through research supported by the FPRF a fat-containing emulsion has been developed which can be added to the wet cement mixture to improve the workability of the mix and water resistance of the finished concrete products (Table III). The composition of the admixture is covered by a U.S. patent (4) and applications for a number of foreign patents have been filed. If the emulsion were used in 10% of the Portland cement products in the U.S., 100–200 million pounds of animal fat would be required annually depending on the emulsion concentration in the cement mixture. It is estimated that the emulsion could be produced, distributed and incorporated into Portland cement mixes at a cost of two dollars per cubic yard of concrete or other similar products.

TABLE IV
Influence of Fat Coating Urea on Rumen Ammonia and Blood Urea

	Uncoated	Coated
Rumen ammonia		
Peak time, hr	3	2.5
Concentration, mg/100 g	85	70
Blood urea		
Peak time, hr	6	4
Concentration, mg/100 g	.22	.18

Fat-Coated Urea for Ruminant Feeds

Approximately 355,000 tons of urea is used currently as a source of nitrogen (protein) in ruminant feeds in the United States. More would be used, particularly in dairy cattle feeds, if the rate of ammonia formation in the rumen could be reduced. Research sponsored by FPRF at Battelle demonstrated that urea prills could be uniformly coated with hydrogenated tallow to any desired level by using a fluidized bed technique for coating. The effects of the coating on the ammonia and urea concentrations in the rumen and blood of sheep have been reported by Tyznik and Kunkle (5). Coating urea to a level of 24% significantly reduced the concentration of rumen ammonia and blood urea in sheep (Table IV). A survey to estimate the potential market for tallow-coated urea indicates that 345,000–445,000 tons might be used by 1980. This would require 200 million pounds of tallow for coating. This estimate is conservative but is dependent upon expected favorable results from additional technical research on the production and testing of tallow-coated urea. Preliminary estimates for manufacturing tallow-coated urea indicate a cost of $5–$15 per ton of coated product depending on the proportion of hydrogenated tallow required for coating. We are now ready for pilot scale production and extensive testing of the product.

REFERENCES

1. Doty, D.M., "The Renderers Yearbook, 1970," The National Renderers Association, Des Plaines, Illinois, p. 45.
2. Sheppard, W., M.J. Snyder and R.L. Foltz, Presented at AOCS Meeting, Philadelphia, October 1966.
3. Snyder, M.J., E.S. Lipinsky and J.E. Burch, U.S. Patent 3,424,598 (1969).
4. Johnson, R.L., U.S. Patent 3,547,665 (1970).
5. Tyznik, W., and W.E. Kunkle. Feedstuffs 1971: 52.

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