CEREAL CELLULOSE, A ROUGHAGE MATERIAL SUITABLE FOR EXPERIMENTAL ANIMAL DIETS

MANY animal diets are deficient in material that supplies bulk or roughage and carries moisture through the intestines. It has become a rather common practice of nutritionists to add agar to basal diets for its laxative value. Because of its indigestibility and its gel-forming properties it is effective in furnishing bulk and carrying moisture. Lately, however, it has been observed that agar is not nutritionally inert, particularly in that it carries significant amounts of biotin and possibly other factors. The main supply of agar comes from Japan and hence a serious shortage is imminent. Because agar is important for bacteriological work in hospitals and food manufacture and for research it is desirable to conserve it for these most essential uses.

The use of cellulose for dietary roughage is of course well known, as it is a normal constituent of herbivorous and omnivorous animal diets. For experimental diets it must be available in a substantially pure state and in a desirable physical form. For a number of years a cereal cellulose of high purity from the nutritional standpoint has been used to supply roughage in a commercial breakfast cereal, namely, a flaked rice. This cereal cellulose has been in use for many years in the animal diets used for nutritional studies at Mellon Institute and at the University of Pittsburgh. It has also been utilized similarly in the research laboratories of several medical schools. The material, where used to the extent of about 5 per cent. in the diet, has been found very effective in preventing constipation. There has been no evidence of its furnishing any nutritional factors.

This special cellulose is derived from rice hulls by a series of chemical processes that remove practically all the non-cellulosic ingredients except a little coloring matter and less than 1 per cent. of a siliceous ash. It is in the form of a very light brown fluffy meal of a particle size that will pass a standard 40-mesh screen. The following are some of the analytical data for the product:

	Percentage
Nitrogen	0.043
Ash	0.71
Calcium	0.022
Phosphorus	nil
Iron	0.001
Aluminum	0.016
Silica	0.42

The product contains no protein or fat. It is so low in calcium and phosphorus that it is quite suitable for all ordinary studies on these elements. As the material is dried in a steel rotary dryer the small amount of iron contained may make it unsuitable for use in diets designed to study iron availability. A thiochrome test for thiamine gave a negative result. It has been used for years in basal diets for thiamine and riboflavin assays with the negative control diets showing growth responses indicating complete absence of these vitamins. The high-pressure chemical process of treatment together with the extensive washing of the material assures destruction or removal of all vitamins.

The cellulosic ingredients of the product include about 70 per cent. of alpha-cellulose with the rest made up of simpler celluloses and hydro-celluloses. The digestibility of the material for different animal species has not been determined, but it is believed it is largely indigestible, particularly in the white rat, in the diet of which it has proved an effective roughage material.

The cereal cellulose has been supplied gratis by the manufacturer to a few research laboratories that have requested it. Plans are under way, however, for one of the larger scientific supply houses to furnish it to all interested research organizations.

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