A Method for Curing Farm Products by the Use of Drying Agents

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Farmers the world over have difficulty in curing their grain and hay. Not infrequently, these curing and storage difficulties influence or determine the whole course of the local agricultural practice. The problem, then, is widespread and well-recognized.

In several previous papers, the aqueous vapor pressures of various farm products and their moisture equilibria at various relative humidities have been discussed (1, 2, 3, 4). On some phases of this problem, the literature is abundant. Briefly, it has been shown that, at any given temperature, the moisture contents of many materials reach equilibrium values when the materials are stored at any specific relative humidity. It has been shown that the molding and the respiration of the various products are more or less definitely a function of the relative humidity of the surrounding atmosphere (5). These percentages of moisture and degrees of molding vary somewhat with the material and with the temperature of storage, as well as with the relative humidity (4, 5).

A point insufficiently emphasized in agricultural literature is the converse of this proposition, namely, that the relative humidity of the atmosphere surrounding these various materials reaches a relative humidity that is determined, under conditions of slight ventilation, by the moisture content of the materials. To a physical chemist, there would appear to be no difference between the two statements. If, then, we keep the relative humidity surrounding somewhat dry popcorn kernels at about 75% relative humidity at ordinary room temperatures, the grain takes up enough moisture to pop excellently. The atmosphere surrounding drier popcorn is less humid; that surrounding moister popcorn, more humid.

In bringing the popcorn to the desired moisture content (1) it was proposed that porous materials be soaked in a solution with a suitable, constant vapor pressure—in this case, saturated sodium chloride solution—and mixed with the corn. Blotters, blocks of wood, etc., were employed for the purpose. By reversing this general process, it is apparent that we might well take moisture out of the interstitial air by mixing suitable materials with damp grain, hay, etc., which, due to their high vapor pressures, were tending to maintain a high relative humidity in this air. Thus, silica gel, for example, will take up considerable amounts of moisture from humid air.

Some of the materials which might be used are relatively expensive or poisonous, perhaps too expensive or too dangerous for general use in drying hay or grain. The following discussion will describe experiments and outline a procedure for preparing an inexpensive material.

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3 Figures in parenthesis refer to "Literature Cited", p. 78.