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Effect of the Method of Process on the Control of Microbial Growth By Water Activity in Foods

Intermediate moisture foods (IMF) must have a low enough water content to inhibit the growth of food spoilage microorganisms. At the same time, they should be moist enough to be acceptable to the consumer.

It has previously been shown that the growth of microorganisms in food is dependent upon the water activity (a_w) more than the total water content of the system. Examination of two food systems, pork and bananas, has indicated some exception to this general principle.

Two methods of preparing the study samples were used, a water desorption and a water absorption technique. In the desorption technique (direct mix), foods were cooked to the desired water activity level, while in the absorption technique the foods were cooked, freeze-dried, and rehumidified back to the desired a_w . Of the two methods, the rehumidified system produced foods with a lower total water content than the direct mix food, even though the water activities were identical.

Tests with a variety of microorganisms showed that the a_w level at which microbial growth was at a minimum, differed for the two systems. For direct mix preparations, minimum growth occurred when a_w was between 0.68 and 0.84, depending on the particular food and organism. For the freeze-dried food, the minimum growth a_w was, in all cases, above 0.9.

Thus, a_w does not control microbial growth by itself in these systems under these conditions. The total water content also plays an important role. This suggests that shelf stability of IMF systems might be enhanced by preparing the foods by rehumidifying dehy-

drated foods to reach an optimum a_w as compared to drying food to reduce the a_w to the same level. It also suggests that reduction of a_w cannot be relied upon as an independent measure of the ability of the system to support microbial growth.

Notes:

1. Reference: T. P. Labuzu, S. Cassil, and A. J. Sinsky, 1972. Stability of Intermediate Moisture Foods. *J. Food Sci.* 37:160.
2. No further documentation is available. Specific questions, however, may be directed to:
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Manned Spacecraft Center
Code JM7
Houston, Texas 77058
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Patent status:

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Patent Counsel
Manned Spacecraft Center
Code AM
Houston, Texas 77058

Source: Theodore P. Labuzu of
Massachusetts Institute of Technology
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