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Almond Moisture, Concealed Damage and Molds

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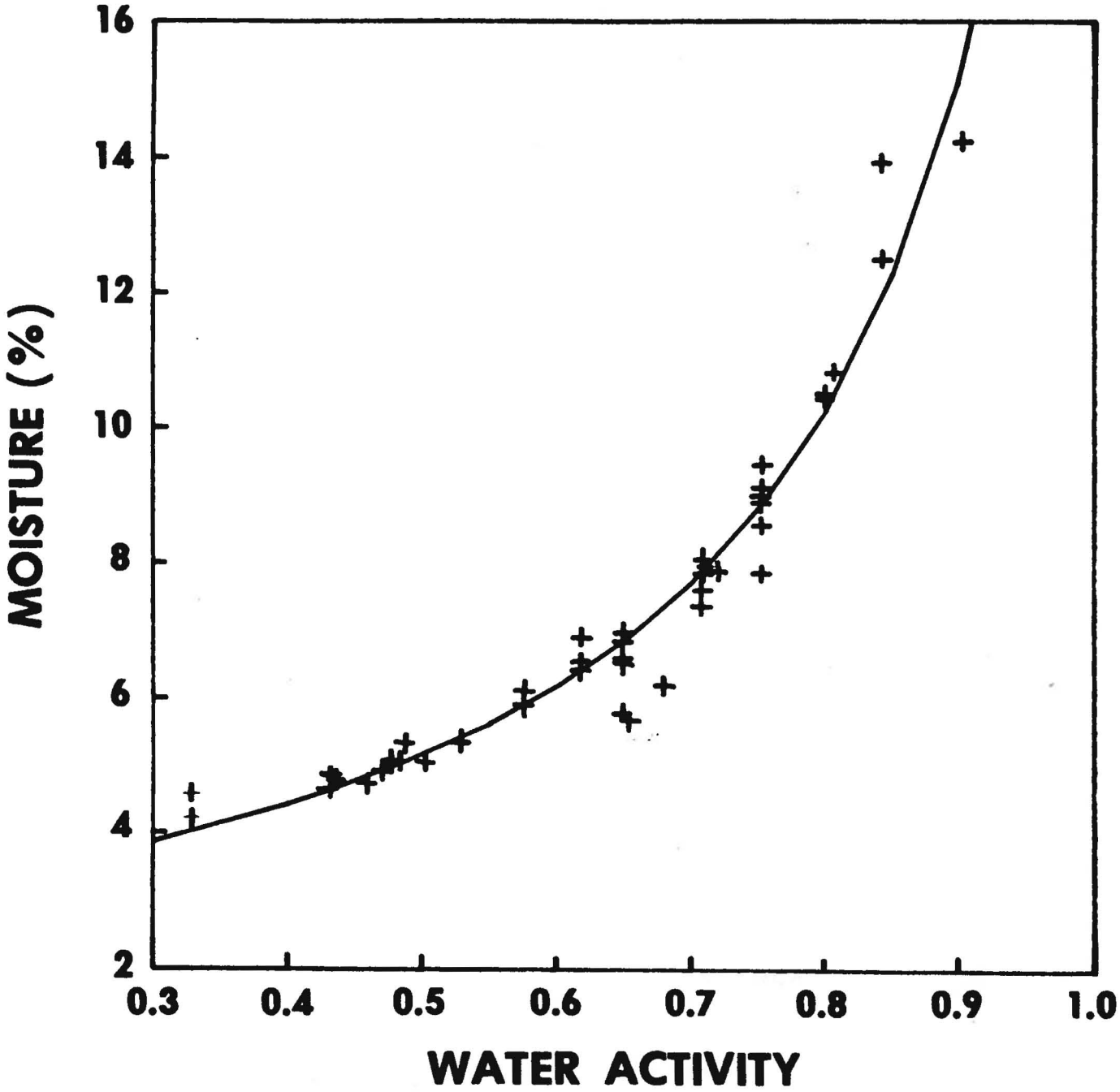
Moisture in almonds was mathematically related directly to water activity (Aw) (a measure of relative humidity), reducing sugars and free fatty acids and inversely to total crude fat. Almond seed metabolism increases with increased kernel moisture and appears to relate to concealed damage, a defect of heated almonds indicated by brown centers. An almond moisture sorption isotherm was developed, relating Aw and moisture by a mathematical equation (see figure). Microbial growth occurred at Aw 0.75 and above (equivalent to about 9% moisture) but not below. Time for visible mold growth was also related to Aw and moisture. The static mold flora did not change at Aw of 0.70 and below. At Aw 0.75-0.80, the Aspergillus glaucus group of fungi was most frequently isolated, while other storage fungi, e.g. Aspergillus flavus, the mold that produces aflatoxins, were found more frequently as Aw increased to 0.9. Aspergillus niger was the most frequent isolate.

This work shows that a low water activity (< 0.75) is extremely important to prevent both metabolic activity leading to the phenomenon of "concealed damage" and mold growth.

MOISTURE SORPTION ISOTHERM FOR NONPARIEL ALMOND NUTMEATS



This curve was fitted to experimental data by the formula - moisture = (0.340 + (-0,299 x Aw)).