Correct Project Number 76-O3

PROJECT 75-O

Title: Consulting and Moisture Studies

Prepared by: G. Fuller and A. D. King, Jr.
USDA, ARS, WRRC

Objectives: 1. To determine physical and chemical changes in almonds having concealed damage. 2. To continue to provide statistical analysis to industry concerning incidence of aflatoxin in the California almond crop. 3. To explain the relationship between water activity and moisture content in relation to the FDA Good Manufacturing Practices for processing tree nuts.

Interpretive Summary: There has been recent concern about higher incidence of concealed damage in almonds. "Concealed damage" is manifested by a brown center in the almond kernel the size and intensity(?) of which is greatly accentuated if the kernel is roasted. This color defect is accompanied by off flavors. As the name, "concealed damage", implies damaged kernels cannot be readily removed from good almonds by ordinary sorting procedures. There is a high correlation of damage with high moisture content in the kernels and with unusually high temperatures (100°F and above). The conditions which appear to produce concealed damage were prevalant during the 1976 harvest season, with early rains catching many almonds on the ground. High temperatures followed before many of the kernels were dried. Preliminary observations indicate that the concealed damage results from enzymatic reactions occurring at higher than normal moisture levels. We will attempt to confirm this belief.

Analytical results of aflatoxin determinations have not yet come to us. However, conditions at harvest time suggest that mold contamination in the 1976 crop is considerably higher than normal.

A summary explaining the relationship of moisture content to water activity was prepared and distributed to the industry.

Experimental Procedure, Results and Discussion: Work on aflatoxin at this laboratory and moisture studies are essentially complete and have been reported. The work on concealed damage is still in its early stages. What we are attempting is to correlate the levels of reducing and non-reducing sugars with the temperature-moisture history of the kernels and with the incidence of concealed damage.

Publications

1. J. E. Schade, K. McGreevy, A. D. King, Jr., B. E. Mackey and G. Fuller, Applied Microbiol. 29, 48-53 (1975)

2. G. Fuller, W. W. Spooncer, A. D. King, Jr., J. Schade and B. Mackey. J. Am Oil Chemists Soc. (In Press).

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
WESTERN REGIONAL RESEARCH LABORATORY
BERKELEY, CALIFORNIA 94710

76-03

January 14, 1977

Mr. Dale Morrison
Almond Board of California
P. O. Box 15920
Sacramento, California 95813

Dear Dale:

Enclosed is our research report for 1976. This letter will also describe our plans for 1977.

We propose the following:

1. Continuance of moisture studies to determine moisture in almonds necessary to comply with the FDA Good Manufacturing Practices.

2. Continuing study of the relation between conditions of temperature and humidity and concealed damage in almonds.

If our hypotheses prove correct we would be happy to collaborate with Dr. Labavitch of U.C., Davis, in any work he wishes to do on enzymes.

We suggest budgeting $1000 if you want us to continue working with you. That should more than cover cost of samples and of travel (subject to approval of a cooperative agreement). We will continue to show the same restraint in spending which we have in the past.

Sincerely,

Glenn Fuller

Glenn Fuller
Research Leader
Fruit & Vegetable Chemistry

Enclosure