

FUNGUS DETERIORATION OF GRAIN: EFFECT OF FUNGUS INFECTION ON AMINO
ACIDS AND VITAMINS IN WHOLE WHEAT

by 632

CHUAN KAO

B. S., National Taiwan University (Formosa), 1967

A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE
Food Science

Department of Grain
Science and Industry

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1970

approved by:


Major Professor

LD
2668
T4
1970
K35
C.2

TABLE OF CONTENTS

INTRODUCTION. 1

LITERATURE REVIEW 3

 Aflatoxin 3

 Fungi and Stored Grains 12

 Nutritive Value of Cereals. 16

MATERIALS AND METHODS 19

 Materials 19

 Methods 21

RESULTS AND DISCUSSION. 30

 Effect of Mold Damage on the Composition of Amino Acids
 of Wheat Samples. 30

 Effect of Mold Damage on the vitamin Content of Wheat
 Samples 35

 Effect of Mold Damage on Aflatoxin Content of Wheat
 and Corn. 48

SUMMARY AND CONCLUSION. 53

ACKNOWLEDGMENT. 55

LITERATURE CITED. 56

**THIS BOOK
CONTAINS
NUMEROUS PAGES
WITH DIAGRAMS
THAT ARE CROOKED
COMPARED TO THE
REST OF THE
INFORMATION ON
THE PAGE.**

**THIS IS AS
RECEIVED FROM
CUSTOMER.**

INTRODUCTION

Some fungi produce mycotoxins. Mycotoxins are metabolites of molds which can produce pathological or undesirable physiological responses in man and animals. These metabolites are occasionally ingested as contaminants in foods which have previously been attacked by molds and may cause outbreaks of disease.

Mycotoxicoses are diseases of animals and humans caused by toxins produced by fungi that have been grown on feeds or foods. Little attention has been focused on mycotoxicoses until recent years. Forgacs (1) in a review article accurately described mycotoxicoses as the neglected diseases.

According to Mirocha et al. (2) about 50% of the isolates of genera Aspergillus, Penicillium, and Fusarium can produce mycotoxins. Some of these toxins are lethal to cattle, swine, sheep, and poultry. These molds are often found in feeds and stored grains. Every year the loss from this "neglected disease" is appreciable. In 1934 veterinarians in Illinois estimated that, in the central part of that state alone, in the winter of 1933-34, 5000 horses died of "moldy corn disease" (3). Sippel et al. (4) reported the poisoning of 1000 swine by eating molded corn in the southwestern United States in 1952.

The recent discovery of an extremely potent carcinogen, aflatoxin, produced by Aspergillus flavus has dramatically changed the status of mycotoxin research. The recognition of aflatoxin

poisoning of turkeys in 1960 (5), the successful isolation of the toxin from cultures of A. flavus (6), the characterization of the aflatoxins B₁, B₂, G₁, and G₂ (7, 8, 9), and studies on the biological effects of these poisons (10, 11, 12, 13, 14, 15, 16) have been well developed.

Hundreds of papers published have discussed the detection, isolation, and description of the mycotoxin produced in foodstuffs. Very few have discussed the nutritional status of the food after mold damage. The object of this research was to investigate the nutritional changes of wheat that had been damaged by the mold Aspergillus flavus. The nutrients studied were amino acids and B-group vitamins. The distribution of aflatoxin in milling products of moldy wheat and moldy corn was also studied.