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CHEMICAL AND PHYSICAL STUDIES ON THE
CHARACTERISTICS OF BALADY BREAD

BY

ATIA ABD EL FATTAH EL SAYED YASEEN

B.Sc. (Food Science), 1979
Fac. of Agric. Ain Shams Univ.

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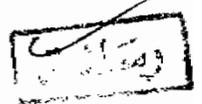
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Title : Chemical and Physical Studies on the Characteristics of Balady Bread.

Name : Atia Abd El Fattah El Sayed Yaseen.

This Thesis has been approved by:

Prof. Dr. -----

Prof. Dr. -----

Prof. Dr. -----

Committee in Charge

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INTRODUCTION

Bread is considered as one of the fundamental stable foods for many countries especially the developing ones. It is well known that in these developing countries bread represented about 72 percent of the total calorific values and about 70 percent of the total protein intake.

Wheat is the major cereal for bread making all over the world and unfortunately its production in Egypt was faced with many problems that influenced its quantity to be far below domestic consumption. This is an adverse economic factor because the gap between supply and demand should be fulfilled through importation. Other possible way to overcome this problem is to search for the native cereal sources which could be used as supplement with wheat flour for bread making. This way of tackling the problem will lead to reduce the imported quantities of wheat with a quantity equivalent to what to be supplemented. Subsequently sorghum, millet and defatted soy flours were used with different levels for manufacturing balady bread.

Millet and sorghum were chosen because of their lower price as compared with wheat; besides the possibility

of cultivation of these crops in sandy and weak soils. On the other hand the defatted soy flour was chosen to raise the protein content of the produced bread.

AIM OF THIS INVESTIGATION:-

The present work was undertaken to study:

- (1) The chemical composition of different flours (that could be used for wheat flour as partial substitution for wheat flour supplementation) as well as that of the suggested recipes.
- (2) Relation between supplementation and the rheological properties of the dough.
- (3) Effect of baking on the chemical composition of the balady bread prepared from the suggested blends.
- (4) Baking test and organoleptic evaluation of the produced balady bread were also considered.

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REVIEW

OF

LITERATURE

REVIEW OF LITERATURE

Wheat, millet, sorghum and soybean are usually milled into flour before using in manufacturing of bread. Flour containing the whole grain components may be used for such purpose, inspite of the fact that the germ and varying proportions of the outer layers are separated as bran; (Davidson, et al., 1963).

The functional properties of flour depend on several factors, i.e. variety, environmental and soil conditions under which the plant is grown, method of milling and the chemical composition of the resulted flour. On the other hand, wheat, millet, sorghum and soybean varieties varied widely in their chemical composition, i.e. proteins, minerals, vitamins, carbohydrates, enzymes, ... etc such variations have different effects on both processing and industrial utilization of flour; (Yanez et al., (1973) and Fetuga (1977)).

1. Chemical composition of wheat, millet, sorghum and soybean:

The mature grains of the previous cereals contain carbohydrates, nitrogenous compounds (mainly proteins), Lipids (fat), mineral salts, together with small quantities

of vitamins, enzymes and other substances. However, the ratios of such constituents varied greatly and could be summarized in the following table (1).

Table (1):- Some chemical composition of wheat, millet, sorghum and soybean.

Type	Percentages of some major chemical constituents					
	Protein	Fat	Carbohydrates	Ash	Fibres	Moisture
Wheat ⁽¹⁾	9-14	1.5-2.0	80-83	0.5-1.6	1-2.7	10-13
Sorghum ⁽²⁾	8.5-11.6	3.6	78-85	1.5-2.0	2.7	9-12
Millet ⁽³⁾	13.6	5.4	77.9	1.7-2.0	1.3	10.7
Defatted soy flour ⁽⁴⁾	50.0	0.75	30.0	6.0	3.0	5.2-10.0

(1) Kent-Jones & Amos (1967).

(2) Rooney, et al. (1968).

(3) Rasulev, E.S. (1977).

(4) Horan (1966), and Meyer (1966).

Proteins:

White, (1954) classified the flour protein that control the major properties of the dough into four main groups, water soluble protein, (albumin), salt soluble protein (globulin), alcohol soluble protein (gliadin), and protein which is insoluble in any of these solutions (glutein). However, the glutein properties are probably largely dependent on the colloidal nature of gliadin and glutenin of which the protein is composed as mentioned by Pylar (1952) and White (1954).

The protein content of wheat flour may be varied from about 9 to 14% as a result of raising the extraction degree from 82% to 95%; (Kent-Jones & Amos (1967). However, Hassan (1980) reported that the crude protein content was 9.5% in wheat flour of 72% extraction rate. However, it is worthy to mention that as early as in 1948 Finney and Barsam found that the crude protein of some wheat varieties was within the range from 8 upto 18%. Such variations could be reasoned by one or more of the following factors: variety and environments of cultivations. It was also, found to be from 6-20% by Pace (1962), and Zeleny (1964); 13.4 to 14.2% by Sidwell and Hammerle (1970); and 9.8 to 12.4% by Hallab et al. (1974).

Virupaksha et al. (1968) reported that the protein content of sorghum grains ranged from 10-19% on dry weight basis. They also classified the types of protein into albumins (1-8), Globulins (2-9), prolamins (32-59), glutelins (19-37)% of total protein.

The protein content of sorghum was studied by several investigators. Hussein et al. (1977,b), determined the gross chemical composition of sorghum flour (Giza 114). They reported that the protein content reached 9.19%. It was ranged from 8.2 to 11.3% with an average of 9.9% by Navin and Gene Sumrell (1979). On the other hand, El-Sabeh (1981) mentioned that the protein content of sorghum flour "variety Giza 114" 82% extraction was about 9.18%, and the addition of sorghum flour to wheat flour lowered the protein content.

Sawheny and Naik (1969) classified the types of protein in pearl millet grains into albumins 15%, Globulins 9%, prolamins 21-38%, glutelins 24-37% of total protein, they also indicated that the protein content of pearl millet was ranged from 9-16%. However, Adrain et al., (1975); and Perten (1977), found that the protein content of pearl millet in whole grain was 10.8% while it

was 8.4% of flour 75% extraction (dry basis).

Lorenz et al. (1980b) reported that the protein content of proso millet was 13.56% in flour of 73.4% extraction, 15.81% in flour of 78.4 extraction, and 14.50% in flour of 87.3% extraction rate.

The nutritional value of millet flour was studied by Awadalla and Slump (1974) who mentioned that the protein content of the millet was lower than that of the wheat flour but the "protein quality" (mg essential amino acids/g total N) was higher in millet than in wheat.

Lorenz and Maga (1972) found that the protein content of defatted soy flour reached 52.3% while it was only 46.7% as given by Hyong et al., (1972). However, same findings were given by Tsen and Hoover (1973), Bean et al. (1976), they reported a protein value that ranged from 51.2 to 52.8%.

The chemical composition of leguminous seeds varies and differs according to seeds varieties, peeled or unpeeled, moisture content, and the method of milling and seiving (Hassan,1980; and Krivelevich et al., 1981).