STUDIES ON DETERIORATION OF
RICEBRAN OIL

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B.Sc., (Agric.)
Cairo University 1963

Disertation Submitted in Partial Fulfilment
of the Requirements

For Degree of

MASTER OF SCIENCE

(Agric. Biochem.)

Faculty of Agriculture

Ain Shams University

Cairo, U. A. R.

1971

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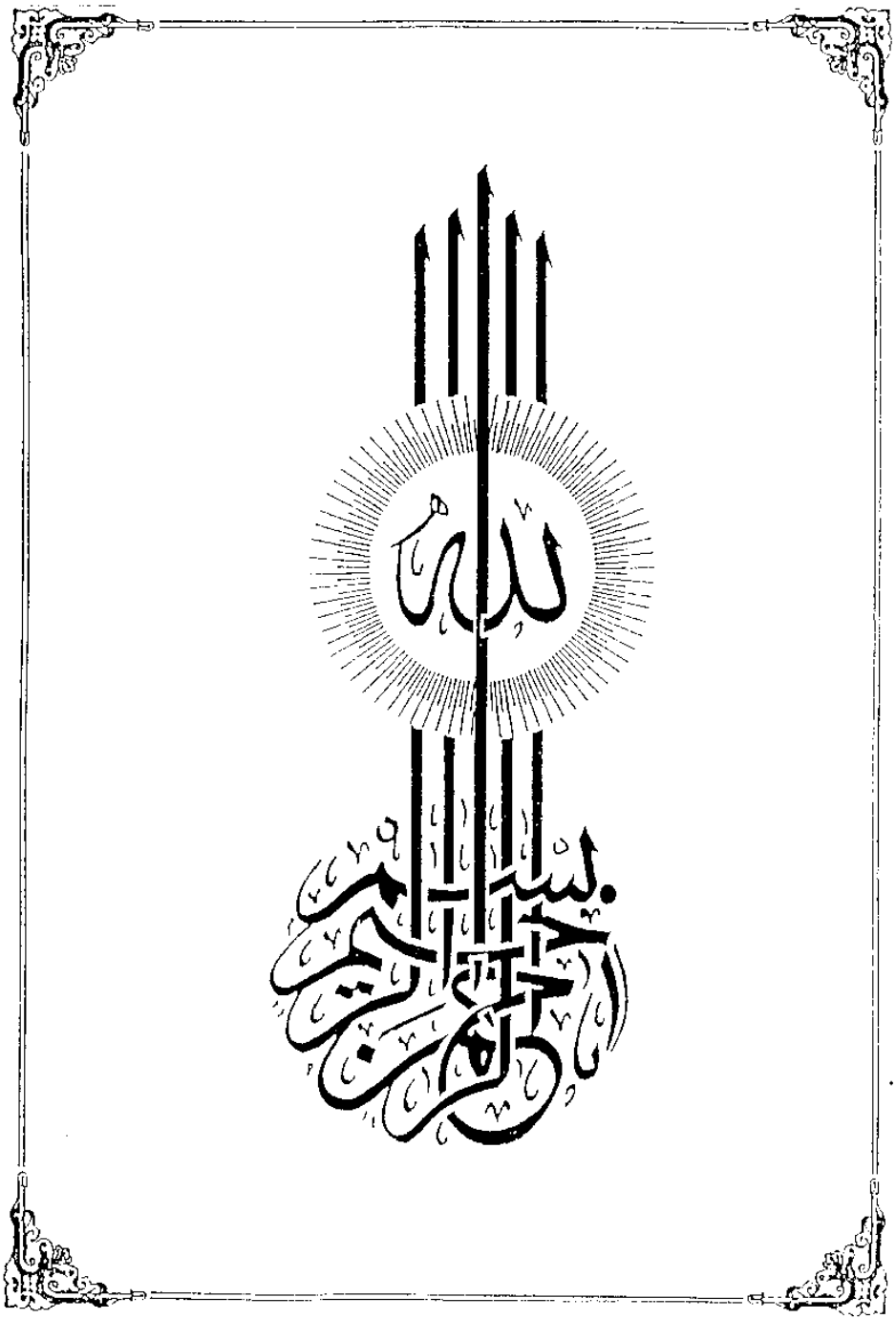
Date : 7 / 9 /1972.



ACKNOWLEDGMENT

The author is greatly indebted to Prof. Dr. MOHAMED ABDEL-MONEIM KAMAL; Chairman and Professor of Agriculture Chemistry and Dr. SAAD EL-HINNAWY Professor of Agricultural Biochemistry, Faculty of Agriculture, Ain Shams University, for their inspiration, guidance and encouragement throughout the whole course of this research.

Thanks are also due to Professor Dr. YEHYA [illegible], Dean of The High Institute of Agriculture, At EL-MANSOURA for his continuous encouragements.

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INTRODUCTION

Rice stands now as one of the most important crops, second only to cotton, in Egypt. The area cultivated with rice has increased to more than 1,500.000 feddans after the construction of the High Dam. Our production of the rice has increased gradually as shown in the following table concerning the rice production in the world.

Rice Production in U. A. R. with reference to the world production.*

Year	World Production	U. A. R. Production	
	Tons	Tons	%
1965	244,285	1787	0.7
1966	247,922	1678	0.7
1967	265,172	2319	0.9
1968	275,171	2584	0.9

[illegible] amounts of rice bran are produced locally from rice milling. The rice bran has the following constituents :

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* Rice Congress, Cairo, 1970.

[illegible]	42 %
Crude protein	12 %
Oil	11 %
Moisture	12 %
Fibers	11 %
Ashes and silica	12 %

The rice bran is used generally as feeding stuff for both animals and poultry. The presence of the oil in such high amount leads to deterioration of the bran due to the rapid rancidity of the oil. Four plants were constructed at Alexandria, Kafr El Sheikh, El Mansoura and Damanhour to extract all the oil from the rice bran produced annually.

The constituents of the extracted rice bran are as follows :

Carbohydrates (soluble)	45	%
Crude protein	13	%
Oils	2	%
Moisture	12	%
Fibers, (crude)	12.5	%
Ashes & Silica	13.5	%

[illegible] improves the keeping quality of the bran.

The amounts of rice bran produced annually are presented in the following table* :

Year	Quantity of rice bran in 1000 tons
1962 - 1963	64
1963 - 1964	80
1964 - 1965	94
1965 - 1966	61
1966 - 1967	76
1967 - 1968	85
1968 - 1969	104

* [illegible] Congress, Cairo 1970.

The future uses of Ricinus oil must increase for soap manufacturing or as an edible oil if possible. Such situation necessitates thorough study of the factors effecting the deterioration of this oil. This work was carried out to study the autogonistic effects of heat, autoxidation and hydrolytic rancidity on this oil. More over it was extended to study the effects of high doses of Gamma rays on the properties of the oil. Owing to the drastic hydrolytic effect of lipases on this oil, the specificity and nature of lipases were also tackled in this work.

REVIEW OF LITERATURE

I. Physical & Chemical Properties of ricebran oil

Tsujimoto (1911) studied the composition of rice oil and found that the saturated fatty acids separated from their lead salts and purified by recrystalization showed a melting point of 58.5°C for the solid acids, their saponification no. was 213.28, showing them to be crude palmitic acid. The unsaturated fatty acids indicated the absence of linolenic acid and higher unsaturated acids. Oxidation of the unsaturated acids by Hazura's method produced dihydroxystearic acid which indicates the presence of oleic in the original fatty acids.

The unsaponifiable matter in oils and fats plays an important role in its autoxidation. Haberhauer (1929) found that extraction of ricebran oil by petroleum-ether yields about 4% of unsaponifiable matter. The crystallizable portion of the unsaponifiable matter contains hydrocarbon squalene (melting point -5°C), cerhyurosicosterol (melting point 144-5°C [illegible]), stigmasterol (melting point 139 - 70 °D - 50°) and a phytosterol which is probably sitosterol.