



**International university of Africa**

**Dean ship of graduate studies**



**Physicochemical properties and GC/MS**

**Analysis of BT cotton seed oil**

**A Thesis submitted for the supplemental fulfillment of the requirements of the M.Sc degree in industrial chemistry**

**By:**

**Walaa Ahmed Mohamed Alhussien**

**Superviosor:**

**Dr: Mahmoud Mohamed Ali**

**Sudan**

**2018**

## **Dedication**

**To my family with love**

## Acknowledgements

I thank god so much and thank everyone who gave me help in this research

Special thank to my supervisor: **Dr. Mahmoud Mohammed Ali** for his kind support

## Subject of Contents

No	Subject	Page
I	Dedication	i
II	Acknowledgement	ii
III	Subject of Contents	iii
IV	Subject of Tables	viii
V	Abstract (English)	ix
VI	Abstract (Arabic)	x
<b>Chapter One : (Introduction )</b>		
1.1	Introduction	1
1.2	Objectives	2
<b>Chapter Two (Literature review)</b>		
2.1	cotton seed oil properties	3
2.2	using cotton seed oil	4
2.3	Bt -What is it	4
2.4	Creatin Bt cotton	5
2.5	The Safety of Bt and Bt cotton	6
2.6	Gossypol	6
2.6.1	Gossypol in Cotton Products:	7
2.6.2	Liver Damage:	7
2.6.3	Determination of total Gossypol and free Gossypol content in different varieties of B and non Bt cotton:	7
2.7	Effects of Bt Toxin on Lactating Animals:	8
2.8	Bt Cotton in Sudan:	9
2.8.1	Production of Bt Cotton in Sudan	9
2.8.2	the Third Year of Commercial Planting of Bt Cotton in Sudan:	10
2.9	Cotton Production in Burkina Faso	11
2.10	Bt Cotton in India	13

<b>Chapter Three (Materials and Methods)</b>		
3.1	Materials	17
3.1.1	sours of materials	17
3.1.2	chemicals	17
3.1.3	Regents	17
3.1.4	Solvents	17
3.1.5	glass ware	18
3.1.6	Equipment	18
3.2	methods	19
3.2.1	A proximate analysis	19
I	Moisture	19
II	crude oil	19
III	Crude protein	20
IV	Crude fiber	20
V	Ash content	21
3.2.2	physical properties of the oil	22
I	Specific gravity	22
II	Refractive index	22
III	Determination of color	22
IV	Viscosity	23
3.2.3	chemical properties of the oil	24
I	Acid value	24
II	Saponification value	24
III	Un Saponification value	25
IV	Peroxide value	26
V	Iodine value	26
3.3	Gc/ms Spectrophotmeter	27
3.3.1	oil methylation	27

3.3.2	fatty Acid	27
<b>Chapter four( Results and Discussion)</b>		
4.1	properties of Bt cottonseed	28
4.2	physiochemical properties of Bt cottonseed oil	29
<b>Chapter five</b>		
	Conclusion and Recommendations	31
	References	32

### List of tables

No	Subject	Page
table (4.1)	properties of BT cotton seed	28
Table (4.2)	physicochemical properties of BT cotton seed oil	29
Table (4.3)	GC/MS analysis	30

## ABSTRACT

The objective of the study was to determine the physical and chemical properties of the oil extract from the genetically modified cotton. The study began taking the seed from marangan surgeon (Wdmdanistate)

The seed were cleaned from impurities and then dredged .The oil was extracted by saxolite device using . n-Hexane solvent.

The tests included ( ash content – moisture content – crude protein – crude fiber oil ratio – density – viscosity – refractive index – color - Iodin Value – peroxide value – acid value - saponification, un saponification ) .

The results of these tests were within the limits allowed by the specifications of the Sudanese standards, except for the proportion of oil was slightly lower the in the non – focused.

- The analysis of GC/MS was also performed on the oil sample and the result was that the fatty acids retained the some structural and there was no change.

## مستخلص البحث

كان الهدف من الدراسة هو معرفة الخواص الفيزيائية والكيميائية للزيت المستخلص من بذرة القطن المحورة وراثياً.

بدأت الدراسة بأخذ عينات من بذرة القطن المحورة من محالج مارنجان في مدينة ود مدني ولاية الجزيرة.

تم تنظيف البذور جيداً من الشوائب ثم سحنها واستخلص الزيت منها عن طريق جهاز السكسوليت (تم استخدام الهكسان كمذيب).

تم اجراء الاختبارات الفيزيوكيميائية للزيت المستخلص وبذرة القطن وشملت هذه الاختبارات ( نسبة البروتين - الرطوبة - الالياف - الرماد - نسبة الزيت -الكثافة - معامل الانكسار - اللزوجة - اللون - رقم الحموضة - رقم اليود- البروكسيد -التصبن )

وكانت نتائج هذه الاختبارات ضمن الحدود التي تسمح بها الهيئة السودانية للمواصفات والمقاييس.

أيضا تم اجراء تحليل GC/ MS على عينة الزيت دراسة اهم الاحماض الدهنية المعروفة وكانت النتيجة ان هذه الاحماض محتفظة بنفس التركيب البنائي لها ولم يحدث تغيير