



International University of Africa
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**Chemical Composition and GC/MS Analysis of Garden
Cress (*Lepidium sativum*) Seeds Oil**

A Thesis Submitted in Partial Fulfillment of the Requirements of The
Degree of Master Degree of Science In Industrial Chemistry

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Dedication

I dedicate this work to my parents

Brothers and sisters, co-workers,

Friends.

Acknowledgement

I would like to thank my supervisor Dr. Mahmoud M. Ali head of the department.

I would also like to acknowledge Mr. Omer Adam Omer of the faculty of pure and applied science as the second reader of this thesis, and I am gratefully indebted to his for his very valuable comments on this thesis.

Finally, I must express my very profound gratitude to my parents and to my brothers and sisters. This accomplishment would not have been possible without them.

Thank you.

Abstract

Lepidium sativum is widely used as herbal medicine and it is widely available in market in very low cost. The objectives of this study were to determine of physiochemical properties of fixed oil extracted from *L.sativum* seeds and identification of its chemical compositions using GC-MS instruments. Fixed oil of *L.sativum* was extracted from seeds with normal hexane using soxhlet apparatus. The results obtained showed that 21.8% oil yield, 27.5% protein, 6.19% ash content and (5.8%) moisture content. In addition the physiochemical properties of extracted fixed oil are the density is 0.92g/cm³, Refractive index 1.47nDt, Viscosity 25.88g², Color degree (red - yellow - blue) 0.98 – 34.7 – 0, Acid value 0.56, Peroxide value 2.88, Saponification value 189.57, unsaponification value 1.97 and Iodine value 100.17. Moreover the chemical compositions of extracted fixed oil results obtained from GC-MS were saturated free fatty acids such as Palmitic acid 9.48%, Stearic acid 3.77%, Arachidic acid 5.65%, Behenic acid 1.92%, Lignoceric acid 0.99% and unsaturated free fatty acids such as Palmitoleic acid 0.21%, Linoleic acid 11.87%, Oleic acid 23.98%, Linolenic acid 18.94%, Eicosenoic acid 13.32%, Erucic acid 7.62%, Docosatrienoic acid 0.28% and Nervonic acid 1.35%.

مستخلص البحث

نبات حب الرشاد من النباتات التي تستخدم بصورة واسعة في العلاج بالأعشاب وهو متوفر في الاسواق ورخيص الثمن. هدفت هذه الدراسة للتعرف علي الخواص الكيميائية والفيزيائية لزيت بذور نبات حب الرشاد وكذلك المكونات الكيميائية لهذا الزيت. استخلص الزيت من بذور نبات حب الرشاد بالهكسان العادي باستخدام جهاز السوكسيليت. اظهرت الدراسة النتائج التالية نسبة زيت (٢١.٨%) وان نسبة البروتين (٢٧.٥%)، نسبة الرماد (٦.١٩%) و الرطوبة (٥.٨). بالإضافة الي ان الخواص الكيميائية و الفيزيائية للزيت المستخلص فقد وجدت كما يلي : كثافة الزيت (٠.٩٢)، اللزوجة (٢٥.٨٨)، معامل الانكسار (١.٤٧)، درجة اللون (احمر ٠.٩٨-اصفر ٣٤.٧ – ازرق ٠.٠٠)، رقم الحموضة (٠.٥٦)، رقم البيروكسيد (٢.٨٨)، قيمه المواد المتصبنه (١٨٩.٥٧)، قيمه المواد الغير متصبنه (١.٩٧)، رقم اليود (١٠٠.١٧). وكذلك المكونات الكيميائيه للزيت المستخلص والتي تم تحليلها بواسطة جهاز كروماتوغرافيا الغاز المزود بمقدر مطياف الكتله (GC/MS) قد اظهرت ان الزيت يحتوي علي احماض دهنيه مشبعه واحماض دهنيه غير مشبعه بنسب متفاوتة وهي كما يلي : احماض دهنيه مشبعه ومنها حمض البالمتيك (٠.١٦%)، حمض الستريك (٣.٧٧%)، حمض الارشيديك (٥.٦٥%). ومن الاحماض الدهنيه الغير مشبعه حمض البالمتوليك (٠.٢١%)، حمض اللينوليك (١١.٨٧%)، حمض الاوليك (٢٣.٩٨%)، حمض اللينولينك (١٨.٩٤%)، حمض الاكوسينويك (١٣.٣٢%)، حمض الايرويك (٧.٦٢%). وقد اظهرت دراسه ان الزيت يحتوي علي (٩) من الأحماض الدهنيه المشبعة و (١٢) من الاحماض الدهنيه غير المشبعه.

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