

# الآية

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالَ تَعَالَى: ﴿ وَأَوْحَىٰ رَبُّكَ إِلَى النَّحْلِ أَنِ اتَّخِذِي مِنَ الْجِبَالِ بُيُوتًا وَمِنَ الشَّجَرِ وَمِمَّا يَعْرِشُونَ ﴿٦٨﴾ ثُمَّ كُلِّي مِن كُلِّ الثَّمَرَاتِ فَاسْلُكِي سُبُلَ رَبِّكِ ذُلًّا يَخْرُجُ مِنْ بُطُونِهَا شَرَابٌ مُّخْتَلِفٌ أَلْوَانُهُ فِيهِ شِفَاءٌ لِلنَّاسِ ﴿٦٩﴾ إِنَّ فِي ذَلِكَ لَآيَةً لِّقَوْمٍ يَتَفَكَّرُونَ ﴿٧٠﴾

صدق الله العظيم

سورة النحل

## ***Dedication***

*All praise to Allah today we fold the day tiredness and the errand summing up between the cover of this humble work.*

*To the spring that never stops giving*

*To my mother.*

*To whom he strives to bless comfort and welfare and never-stints what he owns to push me in the success way who taught me to promote life stairs wisely and patiently*

*To my dearest father God mercy.*

*To whose love flows in my veins and my heart*

*To my brothers and sisters.*

*To those who taught us letters of gold and teach us their knowledge simply*

*To my teachers*

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## **Abstract**

This research aimed to study the effect of laser irradiation on bee honey (Seder) physical and chemical properties.

Four honey samples were used in this study with 250 g of each; three of them were irradiated by He-Ne laser with output powers 1 mW, 1.5 mW and 2 mW for 5 minutes for each sample.

Analysis included measuring of some honey physical and chemical properties for the irradiated and no irradiated samples particularly electrical, conductivity, refractive index, density, viscosity, Moisture, Ashes, Wax, Monocular Sugars, Total sugars, Glucose, Fructose, Maltose, Sucrose and acidity, it also included estimation of some elements like Na, Ca, K, Fe, Mg.

The results show that irradiation by He-Ne lead to upward effect for some physical and chemical properties like electrical conductivity, Monocular Sugars and density, and it lead to downward effect for index, Ashes, Wax, Sucrose and density, while it lead to no significant changes on refractive index, viscosity, Moisture, Total sugars, Fructose, Maltose, acidity and elements.

## مستخلص

يهدف هذا البحث إلى دراسة تأثير التشعيع بالليزر على الخواص الفيزيائية والكيميائية لعسل النحل (الصدر).

استخدمت في هذه الدراسة أربع عينات من عسل الصدر كتلة العينة الواحدة 250 جرام تم تشعيع ثلاث عينات منها بليزر الهيليوم نيون بقدرات 1 ملي وات و1.5 ملي واط و2 ملي واط لمدة 5 دقائق لكل.

شملت التحاليل قياس بعض الخواص الفيزيائية والكيميائية لعسل النحل (الصدر) المشع وغير المشع مثل الموصلية الكهربائية ومعامل الانكسار والكثافة واللزوجة والرطوبة والرماد والشمع والسكريات الكلية والأحادية والجلكوز والفركتوز والمالتوز والسكروز والحموضة كما شملت تقدير نسب بعض العناصر مثل الصوديوم والكالسيوم والبوتاسيوم والحديد والمغنسيوم.

أظهرت النتائج أن التشعيع بليزر الهيليوم نيون أدى إلى التأثير على بعض الخواص الفيزيائية والكيميائية بالزيادة مثل التوصيل الكهربائي و السكريات الأحادية و الجلوكوز والكثافة، وأثر على خواص أخرى بالنقصان مثل الرماد و الشمع و السكروز و الكثافة . وخواص أخرى لم تتأثر (تغيرات طفيفة) مثل معامل الإنكسار واللزوجة و الرطوبة و السكريات الكلية و الفركتوز و المالتوز و الحموضة و المعادن.

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**Sudan University of Science and  
Technology  
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# **Investigation of Irradiated Bee Honey by Pulsed He-Ne Laser (632.8nm)**

**تقصي عسل النحل المشع بليزر الهليوم  
نيون (632.8nm) النبضي**

**A dissertation Submitted as Partial Fulfillment of the Requirements  
for the Degree of Master of Science in Physics.**

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