



**Sudan University of Science and
Technology
College of Graduate Studies**



**Investigation some of Physical Properties
of Irradiated Sunflower Oil by Nd: YAG
Laser (1064 nm)**

**تقصي بعض الخصائص الفيزيائية الزيت زهرة
الشمس المشع بليزر النيوبديوم ياغ (1064
نانومتير)**

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

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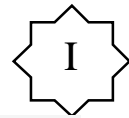
بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

الآيَة

قال تعالى :

لَا تُورِثُ نُّورُ السَّمَاوَاتِ وَالْأَرْضِ مِثْلُ نُّورِهِ كَمِثْلِ شِكَاةٍ فِيهَا
رِصْبَاحٌ أَمْصَبَاحٌ فِي زُجَاجَةٍ الزُّجَاجَةُ كَأَنَّهَا كَوْكَبٌ رَّيُّ
ذُو مَنِّ شَجَرَةٍ مُبَارَكَةٍ زَيْتُونَةٍ لَا شَرْقِيَّةٍ وَلَا غَرْبِيَّةٍ يَكَادُ
يُنْهَاهَا يُضْرِبُهَا وَ لَوْ لَمْ تَمْسَسْهُ نَارٌ نُّورٌ عَلَى نُّورٍ يَهْدِي اللَّهُ
هُ مَنْ يَشَاءُ وَيَضْرِبُ اللَّهُ الْأَمْثَالَ لِلنَّاسِ وَاللَّهُ بِكُلِّ
شَيْءٍ عَلِيمٌ)

الآية (35) سورة النور



Dedication

To the spring that does not tire of giving my happiness with thread woven from her heart to my dear mother To whom I seek and enjoy to rest and happiness, which did not spare anything to push me in the way of success, which taught me to rise the ladder of life with wisdom and patience to the spirit of my dear father

To whom their love is going on in my veins, and in their memories, my dear sisters.

To whom we have traveled together, as we make our way together towards success, to join hands with each other, and with a flower we learned to my friends and colleagues

To those who have formulated for us the knowledge of the letters and their thoughts lighthouse to enlighten us the biography of science and success our distinguished teachers ...



Acknowledgment

At such moments the firefly is able to think before the letters are in vain and try to collect them in a line

Many lines pass through the imagination and ultimately leave us only a little memories and pictures of us together with comrades who were on our side, it is our duty to thank them and farewell as we take our first step in the life

We wish to thank all those who lit a candle in the ways of our knowledge and thanks, and I thank him for putting people in my heart, my mother and the spirit of my father and brothers.

To those who stood on the platforms and give the outcome of the idea of Liner our path to the distinguished professors in the Faculty of Science and thank you very much to Dr. / Ali Maarouf, who preferred to supervise this research, God bless us all the best we have all the respect and respect.



Abstract

In this research the effect of continuous Nd: YAG laser on sunflower oil has been investigated.

Sunflower oil samples irradiated by continuous Nd: YAG laser 1064 nm wavelength and different output powers (0, 10, 30 and 60) W for time five minutes for all samples, then the refractive index, viscosity, pH value and saponification value was determined for each sample.

The results reveals a significant changes of increase and decrease of the oil due to in the physical properties (refractive index and viscosity) laser irradiation, it also results in significant changes of increase and decrease in the chemical properties; (pH value and saponification value) of the oil.

المستخلص

في هذا البحث تم التحقق من تأثير ليزر النيوبديوم ياغ المستمر على زيت زهرة الشمس.

تم تشيع عينات زيت زهرة الشمس بواسطة ليزر النيوبديوم ياغ المستمر ذو الطول الموجي 1064 نانومتر بقدرات مختلفة هي (10 و 30 و 60) وات لمدة خمس دقائق لكل عينة، بعد ذلك تم تحديد كل من معامل الإنكسار والزوجة والرقم الهيدروجيني ورقم التصبن لجميع العينات.

أظهرت النتائج تغيرات كبيرة بالزيادة والنقصان في الخصائص الفيزيائية (معامل الإنكسار والزوجة) للزيت بسبب التشيع بالليزر وكذلك تسبب في تغيرات كبيرة بالزيادة والنقصان في الخصائص الكيميائية (الرقم الهيدروجيني ورقم التصبن) للزيت.



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