

# DEDICATION

To my parents

Who introduced me to the joy of reading  
from birth enabling such a study to take  
place today

, my family

, my friends

and

all persons

who be devoted to me

*Nazik*

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## ABSTRACT

The aim of this research was the study of Phenoxazone 9 dye photosensitization; By using coherent and non coherent light sources; The emission spectroscopy was used to investigate the production of singlet oxygen, which has therapeutic effect from this dye after irradiation.

Five samples were prepared using ethanol, propanol, toluene, acetone and chloroform to dissolve Phenoxazone 9. Three light sources were used to irradiate the mentioned samples. Firstly, blue light emitting diode (LED) (450 - 470 nm) with power of 60  $\mu$ W. Secondly, He Ne laser (632.8 nm), with output power of 1 mW. Thirdly, green diode laser (532 nm) with output power of 4 mW. A spectrometer connected to PC was used to collect and record the emission spectra of the samples with different time.

The results showed that the most efficient solvents to produce singlet oxygen were acetone and ethanol, which gave positive results with each light source used. Toluene and chloroform produced singlet oxygen when coherent light source (laser) was used, but propanol succeeded to produce single oxygen with He Ne laser only. The best light source to produce singlet oxygen from phenoxazone 9 in the solvents was He Ne laser, unlike green diode laser and LED, where the first failed with propanol and the second failed with propanol, toluene and chloroform.

The highest production of singlet oxygen form phenoxazone 9 was found when it dissolved in acetone and irradiated by green diode laser with exposure time of four minutes where two emission peaks of singlet oxygen at 703 nm and 634 nm were recorded.

## المستخلص

الهدف من هذا البحث هو دراسة فعالية صبغه الفينوكسازون 9 لإنتاج الاوكسجين الاحادى باستخدام تقنية مطيافية الانبعاث للتحقق من امكانية استخدام هذه الصبغه فى العلاج الضوئى. حضرت خمسة عينات بتذويب الفينوكسازون 9 فى الايثانول , بروبانول , التولوين , الأسيتون والكلوروفورم. ثم أستخدمت ثلاثة مصادر ضوئية لتشعيع العينات, الاول هو ثنائى الباعث الضوئى بطول موجى فى المدى الازرق (450 - 470 nm) وبقدرة 60 مايكرو واط , والثانى ليزر الهليوم نيون بقدرة 1 مللى واط و اخيراً ليزر الثنائى بطول موجى 532 nm وبقدرة 4 مللى واط , استخدم جهاز المطياف لتسجيل الانبعاثات للعينات بعد تشعيها بأزمان مختلفه.

اوضحت النتائج ان افضل العينات من حيث الكفاءه فى انتاج الاوكسجين هو الاستون ويليه الايثانول حيث نجح فى انتاج الاوكسجين الاحادى مع كل المصادر الضوئية المستخدمه. التولوين والكلوروفورم اعطيا نتائج ايجابيه مع المصادر الضوئيه المترابطه (الليزر) اما البروبانول فنجح مع ليزر الهيليوم نيون فقط. وجد ان افضل المصادر الضوئيه المستعمله لانتاج الاوكسجين الاحادى باستخدام الفينوكسازون 9 هو ليزر الهيليوم نيون حيث نجح مع كل العينات بعكس ليزر الثنائى وثنائى الباعث الضوئى حيث فشل ليزر اشباه الوصلات مع البروبانول كما فشل الباعث الضوئى مع البروبانول والتولوين والكلوروفورم.

أفضل الظروف لانتاج الاوكسجين الاحادى وجدت عند تذويب الفينوكسازون فى الاستون تشعيه بليزر الثنائى بزمن تعريض مقداره اربعة دقائق حيث ظهرت قمتان (703 nm و 634 nm) فى مدى انبعاث الاوكسجين الاحادى.

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