

**Deanship of Graduate Studies
AL- Quds University**



**Detection of Trace Gas Emissions From Leaves, Seeds and
Flowers Using Conventional and Photothermal Deflection
Spectroscopy**

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M. Sc. Thesis

Jerusalem- Palestine

1430 / 2009

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“Thesis Submitted to the Faculty of Science, Al-Quds
University in Partial Fulfillment of the Requirements for the
Degree of Master of Science in physics”

Abu - Dies, Jerusalem

**Palestine
1430 / 2009**

Master Physics Program
Deanship of Graduate Studies

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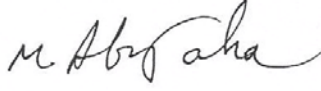
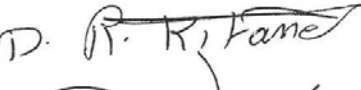

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Al – Quds University

1430/ 2009

DEDICATION

To my mother

To my father

To my husband

To my daughter

To my son

&

To my brother's Mohamed soul

Yasmeen abdel Jaleel Mohammad Aburayyan

Declaration:

I certify that this thesis submitted for the degree of Master is the result of my own research, except where otherwise acknowledged, and that this thesis (or any part of the same) has not been submitted for a higher degree to any other university or institution.

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Date:

Acknowledgements:

Great thanks and prayer to Allah, who granted me the capability to finish this work.

I am grateful and thankful to my advisor Prof. Dr. Mohammad Abu – Taha for his assistance, kindness, and patience all the time during the research.

My great thanks to all my beloved family; to my mother who help me all time during my life are not forgettable, to my father for his support and to my sisters and brothers.

Special thanks go to my husband who was very patient and kind and supportive during my studies. My love and thanks to my daughter Rama and my son Yuseif.

Abstract:

Photothermal spectroscopy is a group of sensitive techniques used to study the optical absorption and thermal prosperities of the three material states, by detecting the difference in the deflection of probe beam position. Different kinds of position sensors were used for this aim. These sensors were sensitive but also expensive.

The present work concerned with the study of the effect of trace gases emitted from different samples on the path of the deflection laser probe beam. Two sensitive techniques were used, i.e. conventional light deflection (CLD) which is simple, inexpensive, easy to handle, and a more sophisticated photothermal deflection (PTLD) which employs expensive position sensors and rather more complicated than CLD.

The present work include a new experimental technique, simply a single slit with a photometer is used to investigate the light deflection position difference. The two methods proved their ability to distinguish different gas emissions.

ملخص:

مطيافية التأثير الضوئي الحراري هو مجموعة من التقنيات الحساسة المستخدمة في دراسة خصائص المواد بحالاتها الثلاث، عن طريق قياس التغير في موقع الشعاع الضوئي. تستخدم أنواع مختلفة من أجهزة قياس موقع الأشعة الضوئية، وهي أجهزة حساسة ولكنها أيضا مكلفة. الدراسة الحالية تشمل دراسة تأثير الغازات القليلة المنبعثة من عينات مختلفة على مسار شعاع الليزر المنعكس. واستخدم لتحقيق هذا الهدف طريقتين: طريقة انعكاس الضوء العادية ، وهي بسيطة وغير مكلفة ويسهل إتمامها. و الطريقة الثانية، هي التأثير الضوئي الحراري على مسار الشعاع المنعكس، وهي أكثر تطورا وتحتاج إلى جهاز قياس الموقع الغالي الثمن فهو أكثر تعقيدا من الطريقة الأولى.

العمل الحالي يشمل طريقة جديدة يمكن تجربتها وذلك باستخدام أدوات بسيطة مثل ال single slit و ال photometer المستخدم لقياس التغير في مسار الشعاع الضوئي. هاتين الطريقتين أثبتنا قدرتهما على كشف انبعاث غازات مختلفة.

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List of abbreviations:

Symbol	Abbreviation representation
CLD	Conventional light deflection
PTLD	Photothermal light deflection
cw	Continuous wave
IR	Infrared radiation
PSD	Position sensitive detector