

## Table Of Content

<b>Journal Cover</b>	2
<b>Author[s] Statement</b>	3
<b>Editorial Team</b>	4
<b>Article information</b>	5
Check this article update (crossmark)	5
Check this article impact	5
Cite this article	5
<b>Title page</b>	6
Article Title	6
Author information	6
Abstract	6
<b>Article content</b>	8

---

# Academia Open



*By Universitas Muhammadiyah Sidoarjo*

---

## Originality Statement

The author[s] declare that this article is their own work and to the best of their knowledge it contains no materials previously published or written by another person, or substantial proportions of material which have been accepted for the published of any other published materials, except where due acknowledgement is made in the article. Any contribution made to the research by others, with whom author[s] have work, is explicitly acknowledged in the article.

## Conflict of Interest Statement

The author[s] declare that this article was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## Copyright Statement

Copyright © Author(s). This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licences/by/4.0/legalcode>

## EDITORIAL TEAM

### Editor in Chief

Mochammad Tanzil Multazam, Universitas Muhammadiyah Sidoarjo, Indonesia

### Managing Editor

Bobur Sobirov, Samarkand Institute of Economics and Service, Uzbekistan

### Editors

Fika Megawati, Universitas Muhammadiyah Sidoarjo, Indonesia

Mahardika Darmawan Kusuma Wardana, Universitas Muhammadiyah Sidoarjo, Indonesia

Wiwit Wahyu Wijayanti, Universitas Muhammadiyah Sidoarjo, Indonesia

Farkhod Abdurakhmonov, Silk Road International Tourism University, Uzbekistan

Dr. Hindarto, Universitas Muhammadiyah Sidoarjo, Indonesia

Evi Rinata, Universitas Muhammadiyah Sidoarjo, Indonesia

M Faisal Amir, Universitas Muhammadiyah Sidoarjo, Indonesia

Dr. Hana Catur Wahyuni, Universitas Muhammadiyah Sidoarjo, Indonesia

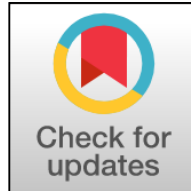
Complete list of editorial team ([link](#))

Complete list of indexing services for this journal ([link](#))

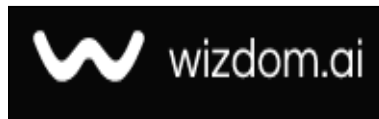
How to submit to this journal ([link](#))

## Article information

**Check this article update (crossmark)**



**Check this article impact (\*)**



**Save this article to Mendeley**



(\*) Time for indexing process is various, depends on indexing database platform

## **Comparative Analysis of Lutein Content in Leaves and Fruit of *Lycium barbarum*: Implications for Medicinal Applications**

*Analisis Perbandingan Kandungan Lutein pada Daun dan Buah Lycium  
barbarum: Implikasi untuk Aplikasi Obat*

**Omaima Saddam Zirjawi, umaymasaddam@gmail.com, (1)**

*University of Basra, Iraq*

**Ula M Noor Almousawi, umaymasaddam@gmail.com, (0)**

*University of Basra, Iraq*

**Amjed Haseeb Khamees, umaymasaddam@gmail.com, (0)**

*University of Basra, Iraq*

<sup>(1)</sup> Corresponding author

### **Abstract**

Herbal medicine stands as a pivotal realm of contemporary research, offering substantial benefits with minimal side effects. *Lycium barbarum*, recognized for its abundant bioactive compounds, holds promise in treating various ailments, particularly in antiaging and antioxidative capacities. Carotenoids, notably lutein and zeaxanthin, constitute key bioactive compounds with diverse functions in both plant physiology and human health, including photo protection against intense light and detoxification of reactive oxygen species. This study meticulously examines the lutein content within leaves and fruit of *L. barbarum*, employing a uniform extraction method and solvent. The investigation illuminates significant variations in lutein content between the leaves and fruit, shedding light on potential applications in herbal medicine and nutraceuticals.

#### **Highlight:**

- **Herbal Medicine Advancements:** This study underscores the pivotal role of herbal medicine in contemporary research, emphasizing its potential for providing substantial benefits with minimal side effects.
- ***Lycium barbarum*'s Therapeutic Potential:** The research highlights *Lycium barbarum*'s significance due to its rich array of bioactive compounds, particularly in addressing antiaging and antioxidative requirements.
- **Bioactive Carotenoids in Focus:** The study delves into the functions of essential

bioactive compounds, lutein and zeaxanthin, elucidating their roles in plant physiology and human health, including their photoprotective and detoxifying properties.

**Keyword:** Herbal Medicine, Lycium Barbarum, Bioactive Compounds, Carotenoids, Lutein Content

Published date: 2023-10-17 00:00:00

## Introduction

Folk herbal medicine has been highly used over many decades all over the world alike, and this because its natural origin and its minimum side effects when compared with other synthetic drugs. plants characterized by it contain of therapeutically important constituents. Their compounds are extracted from herbs and purified for its therapeutic benefit [1].

*Lycium barbarum*, also referred to as LB, Gouqi, wolfberry, or *Fructus lycii*, is a widely recognized traditional herbal plant that exhibits a broad geographical range. The significance of this substance in China and other Asian nations is of great importance, as it serves not only as a dietary supplement for daily use, but also possesses medicinal properties. *L. barbarum*, has garnered significant attention from both Chinese and international medical researchers and dietetic health professionals in recent years. This heightened interest can be attributed to the comprehensive examination of LB, which has revealed its noteworthy antioxidant properties and potential anti-aging benefits. [2]

*L. barbarum* is regarded as a botanical species with therapeutic properties that have been utilized in traditional and folk herbal medicine practices. The herbal raw material of *Lycium*, scientifically known as *fructus Lycii* and *cortex Lycii radices*, encompasses its fruit and bark. However, it is worth noting that the therapeutic chemicals can also be found in the seeds and leaves of *Lycium*. The fruits of *L. barbarum* exhibit various therapeutic properties, including antiaging, protective, immunostimulant, energizing, adaptogenic, anticancer, and antioxidant activity. These fruits are also abundant in biologically active compounds such as specific polysaccharides, carotenoids, flavonoids, terpenoids, vitamins B and C, and the element germanium.[3]

Carotenoids, which include oxygen-containing xanthophylls and oxygen-free carotenes, are present throughout the tree of life. A tiny set of carotenoids that are necessary for human nutrition and must be received from diet, such as lutein, zeaxanthin, and  $\beta$ -carotene (provitamin A)[4]

Lutein is a fat-soluble carotenoid pigment composed of 40 carbon atoms, including a sequence of prominent conjugated double bonds.

The conspicuous red color and propensity to supply free radicals in these substances are attributed to the presence of double bonds in their structure.[5]

Lutein (, -Carotene- 3, 3' diol) is an oxygenated derivative of hydrocarbon carotenoids that occurs naturally. It is found in different plants. It plays a physiological role in increasing eyesight and protecting the eyes from damaging UV rays. [6]

This study focuses on lutein in the *L. barbarum* extract of leaves and fruit and compares between them when the extraction method and the solvent is the same

## Material and Methods:

### 1. Plant Material:

The plant was collected from different cities (Baghdad, Basrah, Maysan). then the specimen was diagnosed by Dr Ula Almosawi in the Pharmacognosy Laboratory, Faculty of Pharmacy at Basrah University.

It was first cleaned, washed and air dried at room temperature for 5 days. Then, the plant parts were crushed using blender until it becomes powder and prepared it to extraction process.

### 2. Extraction methods

To make the extracts, 5 grams of each plant part from each area were weighed out one by one, and 100 milliliters of 85% methanol were added to a 250-milliliter conical jar as a solvent. Our ultrasonic bath (DS-2510 DT) was set to 60 kHz and left on for 30 minutes at room temperature. All of the extracts were filtered and put in the fridge until they were analyzed [7]

### 3. High Performance Liquid Chromatography (HPLC) Analysis of lutein in Crude Extracts :

An HPLC analysis was performed for the detection and estimation of lutein in twelve extracts of plant. Analysis was carried out by HPLC system (Shimadzu) and the analysis was done in ministry of science and technology /Baghdad

HPLC Conditions:

Mobile phase :

1. A- Acetonitrile 76%
2. B- Methanol 21.5%
3. C- n- hexane 2.5%

Column type: ODS c18 (250 \* 4.6 Id)mm, 5um particle size

Flow rate: 1ml/min

Temperature: at room temp.

Volume injection: 20ml

## Results and Discussion

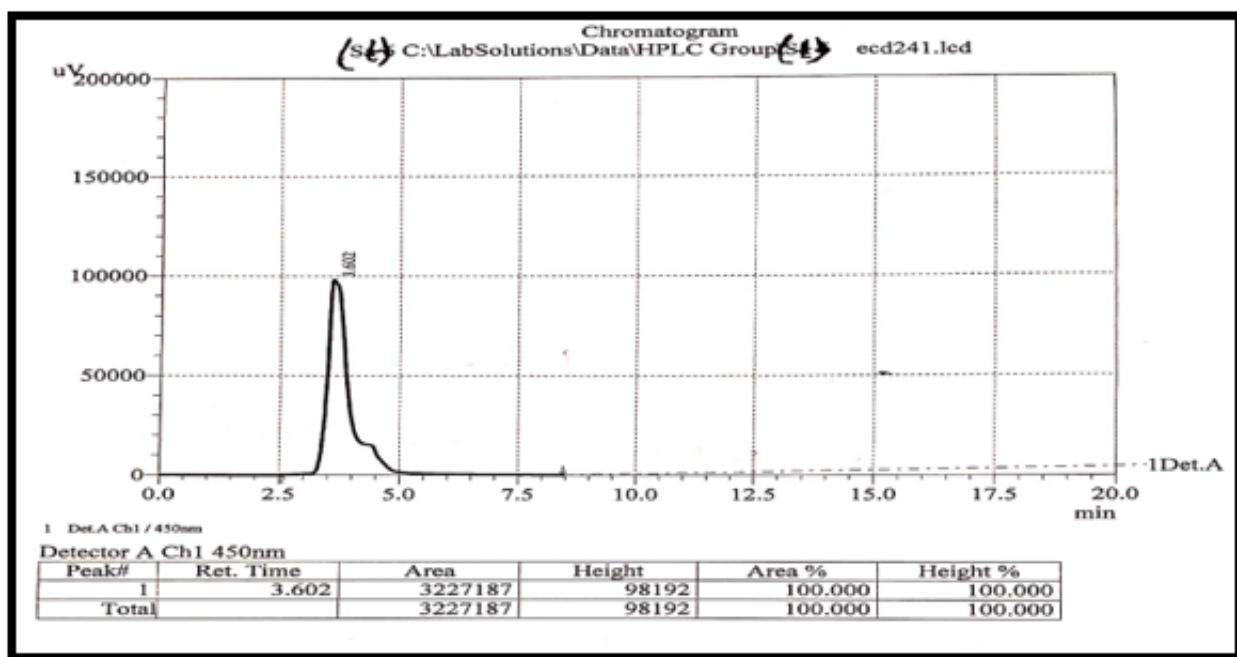


Figure 1. Stander

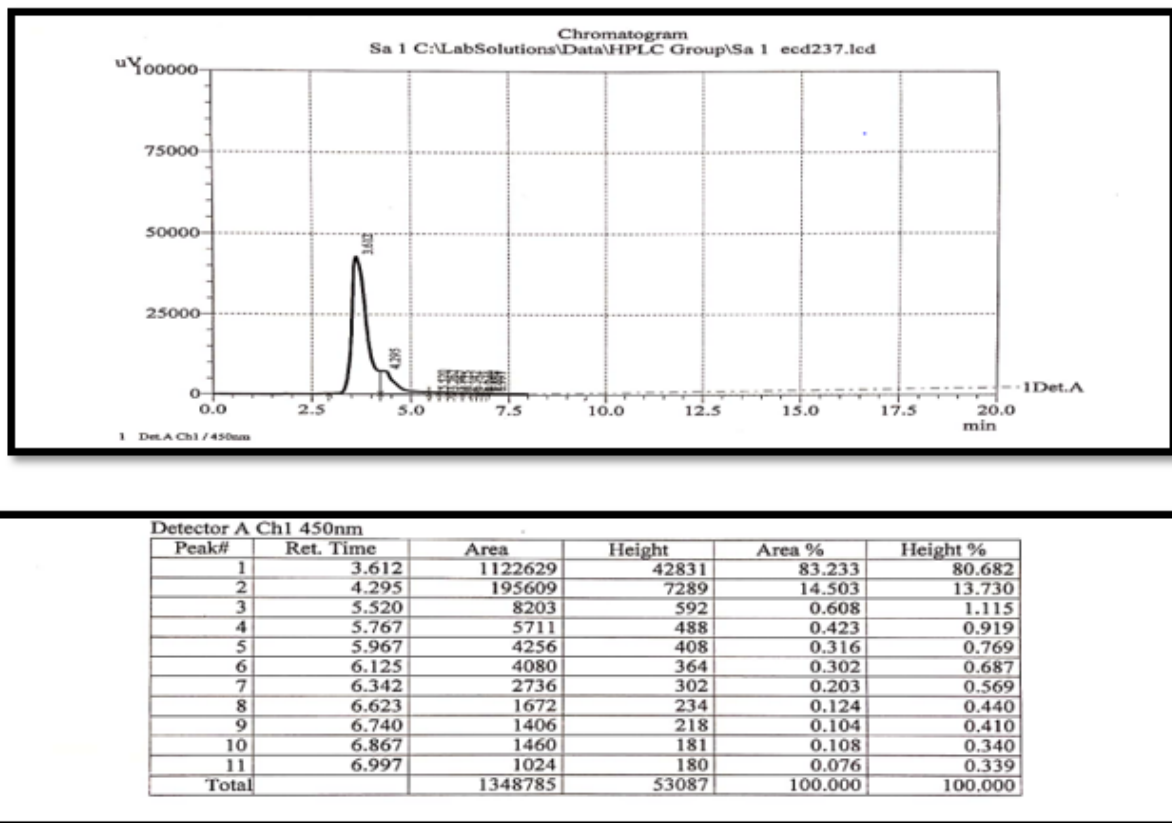


Figure 2. Figure and table HPLC of the lutein in the leaves extract of Baghdad

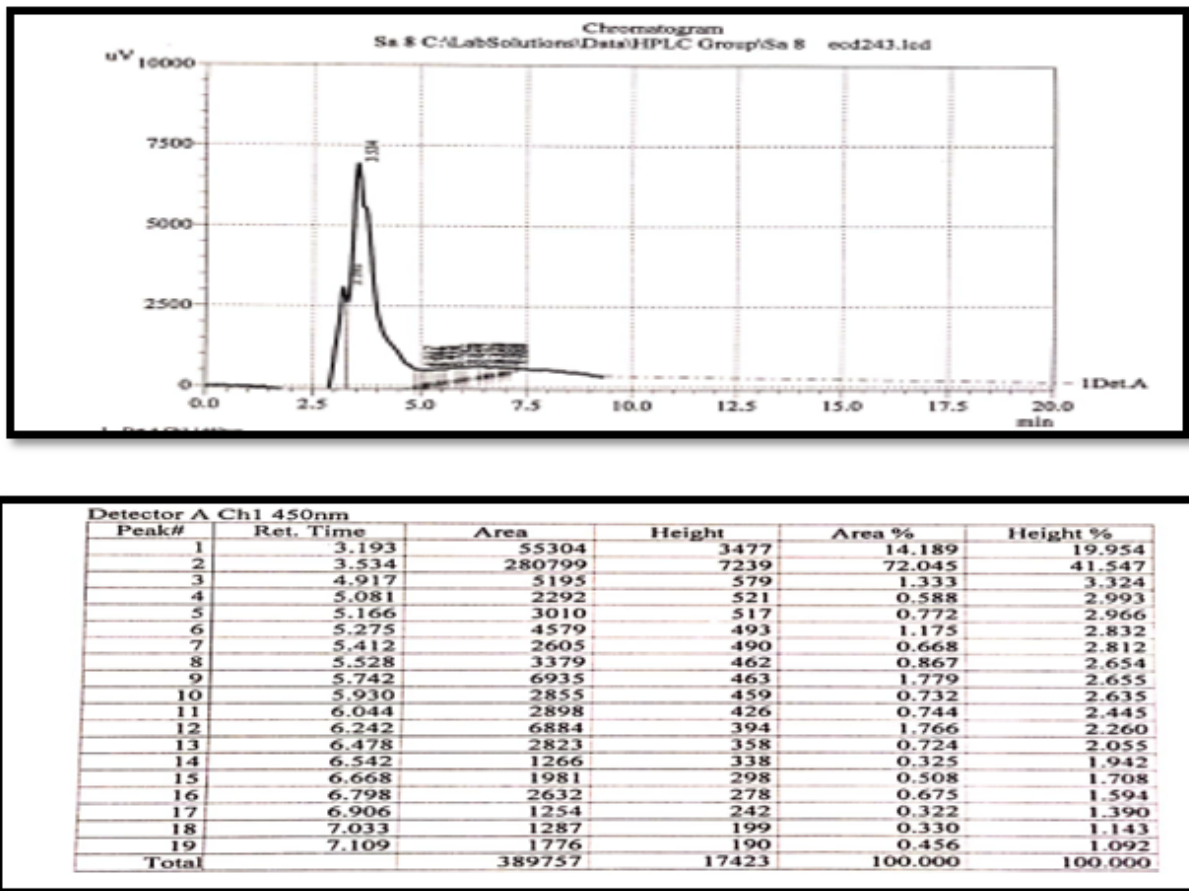


Figure 3. Figure and table HPLC of the lutein in the fruit extract of Baghdad

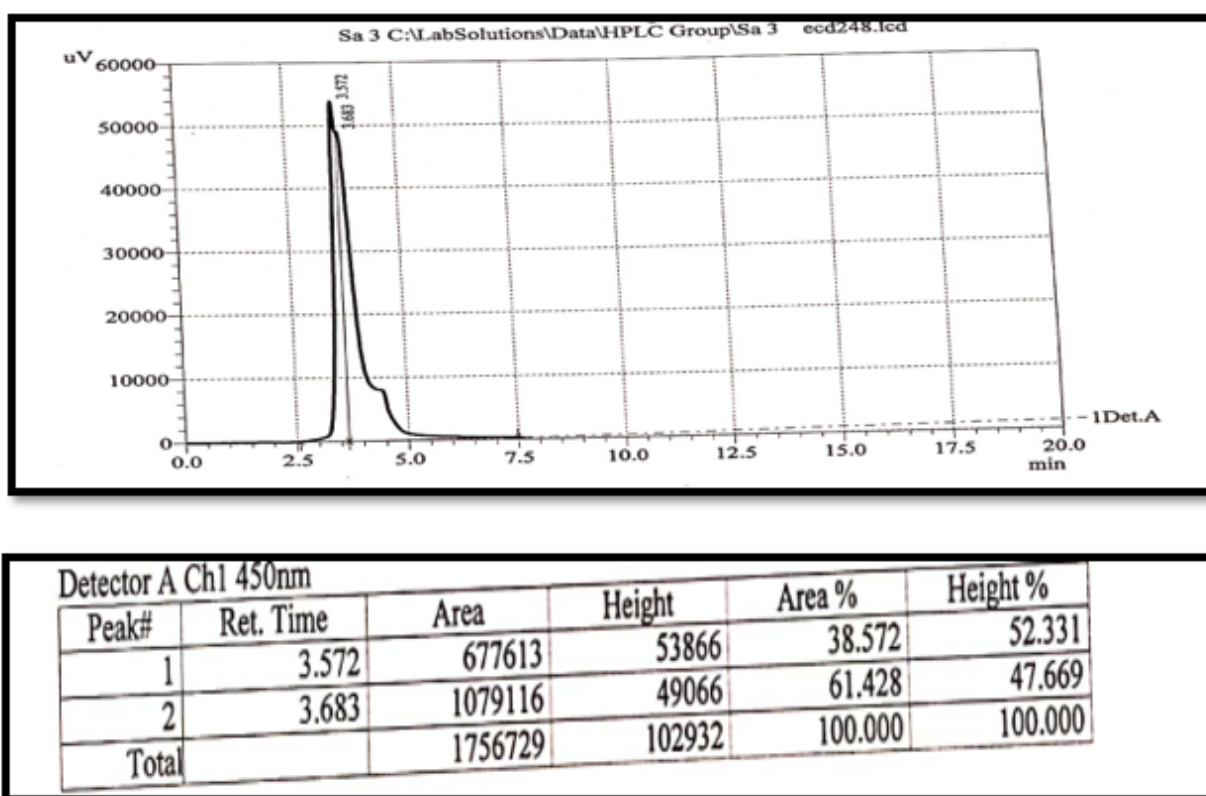


Figure 4. Figure and table HPLC of the lutein in the leaves extract of Basrah

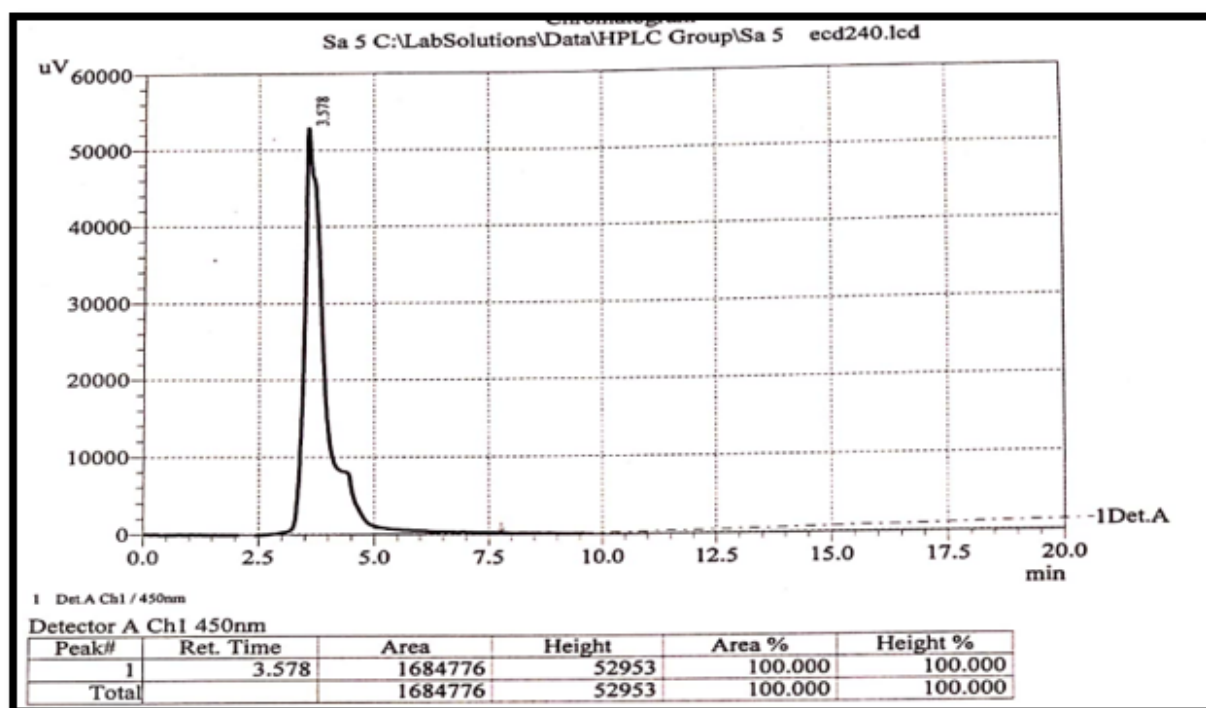
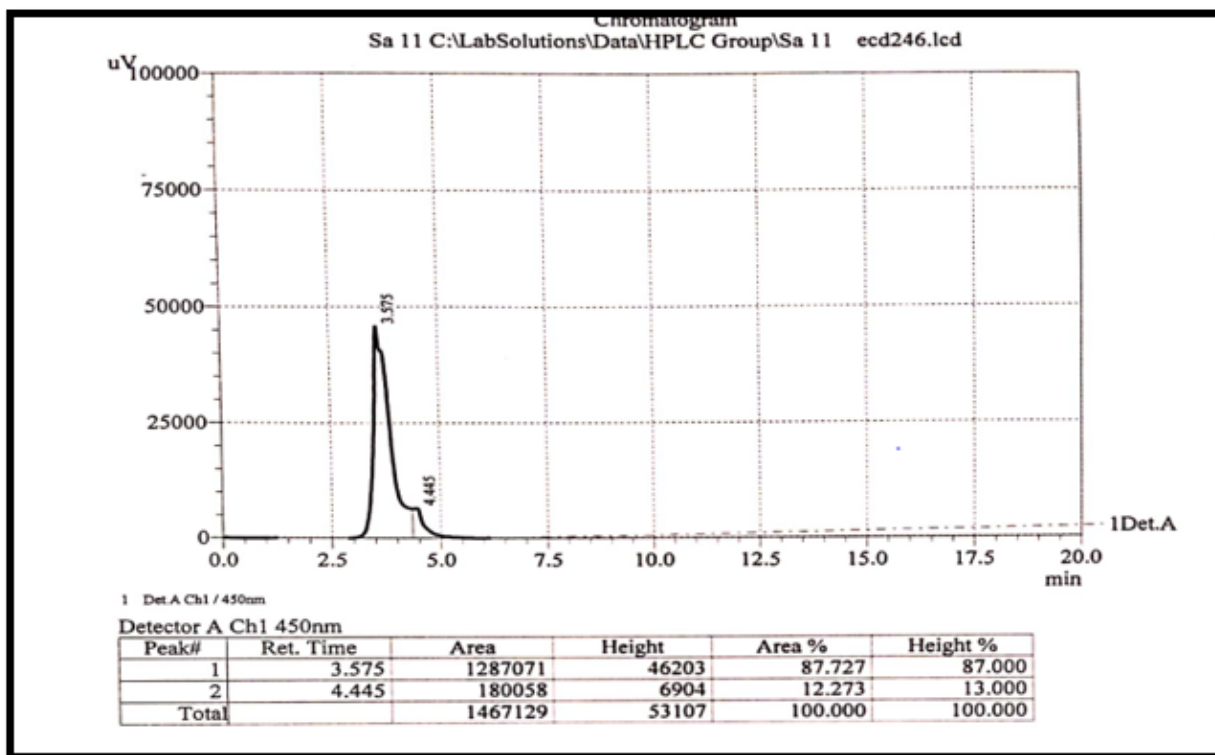
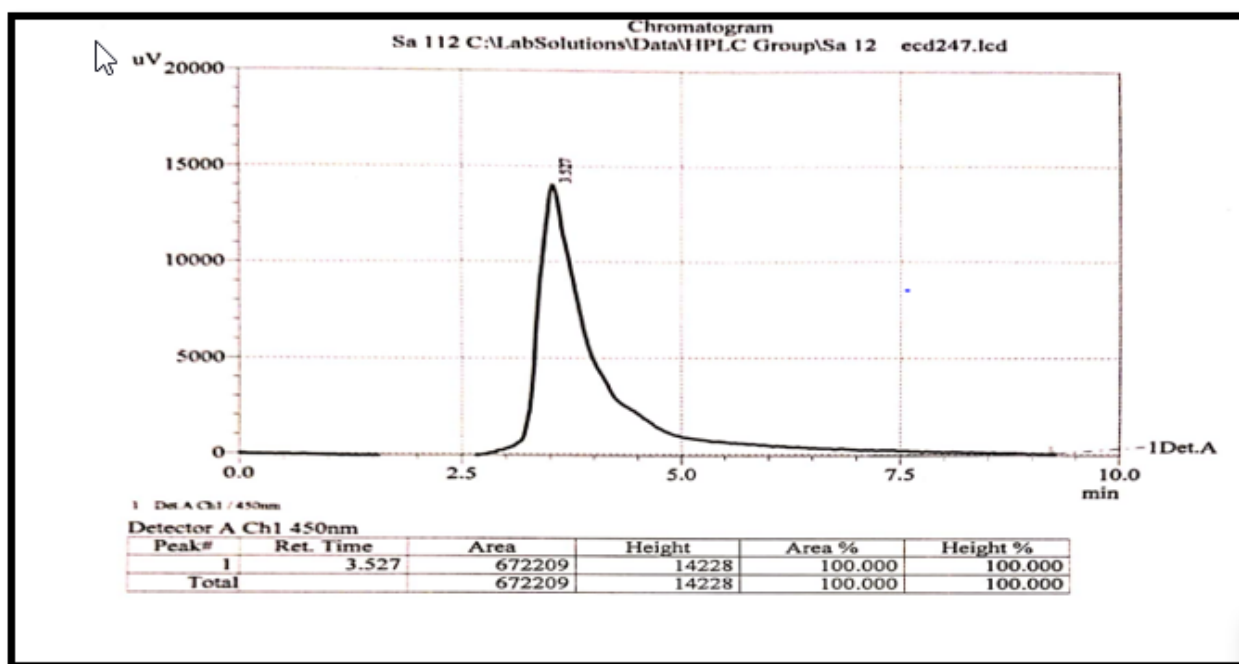


Figure 5. Figure and table HPLC of the lutein in the fruit extract of Basrah



**Figure 6.** Figure and table HPLC of the lutein in the leaves extract of Maysan



**Figure 7.** Figure and table HPLC of the lutein in the fruit extract of Maysan

Conc. of the Sample = Area of Sample / Area of Stander X Conc. Stander X Dilution Factor

Were the dilution factor is 20

Area of the sample is the highest beak

Area of the stander= 3227187

City	Conc. Of Lutein in leaves	Lutein in fruit
Baghdad	6.95mg/ml	1.7mg/ml
Basrah	10.88mg/ml	10.44mg/ml
Maysan	7.9mg/ml	4.1mg/ml

**Table 1.** The concentration of lutein

## Conclusion

The experiment was done to measure the concentration of lutein in both leaves and fruit of *L. barbarum* and compare between concentration of lutein in leaves and fruit.

The result illustrate that both leaves and fruits extract contain lutein but in each region the leaves extract have lutein in higher concentration than fruit extract.

Our study shown that the lutein found in highly present in green leaves than fruit and this is match with Alisa Perry

## References

1. S. M. Olmat, "Drug discovery research in," in Edited by Omboon Vallisuta.
2. J. Ni, M. Au, H. Kong, X. Wang, and C. Wen, "Lycium barbarum polysaccharides in ageing and its potential use for prevention and treatment of osteoarthritis: a systematic review," BMC Complement. Med. Ther., vol. 21, no. 1, pp. 1-16, 2021.
3. A. Konarska, "Microstructural and histochemical characteristics of Lycium barbarum L. fruits used in folk herbal medicine and as functional food," Protoplasma, vol. 255, no. 6, pp. 1839-1854, 2018.
4. B. Food, B. Demmig-Adams, L. Marina, J. J. Stewart, and W. W. Adams III, "Zeaxanthin and Lutein: Photoprotectors, Anti-Inflammatories, and Brain Food," 2020.
5. N. Iman, N. Fuad, M. Sekar, S. H. Gan, P. T. Lum, and J. Vaijanathappa, "Lutein: A Comprehensive Review on its Chemical, Biological Activities and Therapeutic Potentials," 2020.
6. R. Hajare and C. I. Selvaraj, "Extraction and quantification of antioxidant lutein from various plant sources," 2018.
7. T. Z. Abdul-Jalil, A. A. Hussein, and K. Y. Saour, "Extraction and Isolation of  $\beta$ -sitosterol from Iraqi Wild Lycium barbarum by Different Techniques (Probe and Bath Ultrasound, HPTLC and PHPLC)," 2017, vol. 26, no. 2.