

The Isolation and Detection of β -Cryptoxanthin from Marigold by Ultrasonic Extraction and Chromatographic Techniques

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ABSTRACT

The marigold (*Tagetes erecta* L.) belongs to the Asteraceae family. The hexane crude extract from dried marigold flowers contains compounds with properties that may help treat and prevent cancer. In this research, β -cryptoxanthin was isolated and identified from marigold using ultrasonic extraction and chromatography techniques. The extraction of marigold with hexane yield at 6.51 %w/w. However, none of β -cryptoxanthin was found after the saponification reaction. The hexane extract from marigold was further separated using chromatography techniques, and the resulting pure compounds were analyzed via nuclear magnetic resonance (NMR) spectroscopy. Two pure compounds, **TEFL03** and **TEFL05**, were identified. **TEFL01-TEFL04** belong to the terpenoid group, while **TEFL05** is an isoflavone. The isolated pure compounds have potential for development into future medicine.

OBJECTIVES

- To study extraction method of β -cryptoxanthin in *T. erecta* L.
- To isolate β -cryptoxanthin from *T. erecta* L. extract
- To study chemical constituent from *T. erecta* L. extract

INTRODUCTION

Marigold (*Tagetes erecta* L.) is native to the Americas, particularly Mexico and Central America, and spread worldwide after its discovery by Europeans. Today, marigold is considered an important plant that is not only used for decorative purposes but is also rich in antioxidant carotenoids, such as β -cryptoxanthin, which help reduce the risk of cancer and heart disease. Research in this field has developed extraction methods using ultrasonic techniques combined with saponification reactions to efficiently extract compounds from marigold while preserving the bioactivity of the extract. This makes marigold a promising candidate for future applications in the medical and food industries.

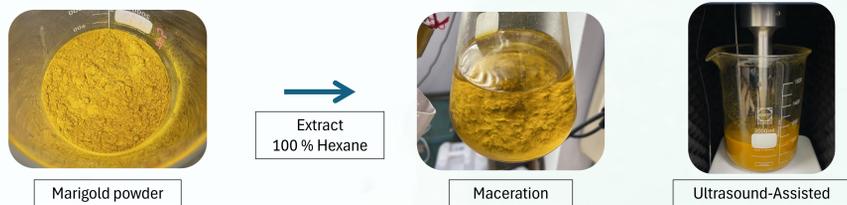
Scientific classification

Kingdom : Plantae
Phylum : Magnoliophyta
Class : Magnoliopsida
Order : Asterales
Family : Asteraceae
Genus : *Tagetes*
Species : *Tagetes erecta*

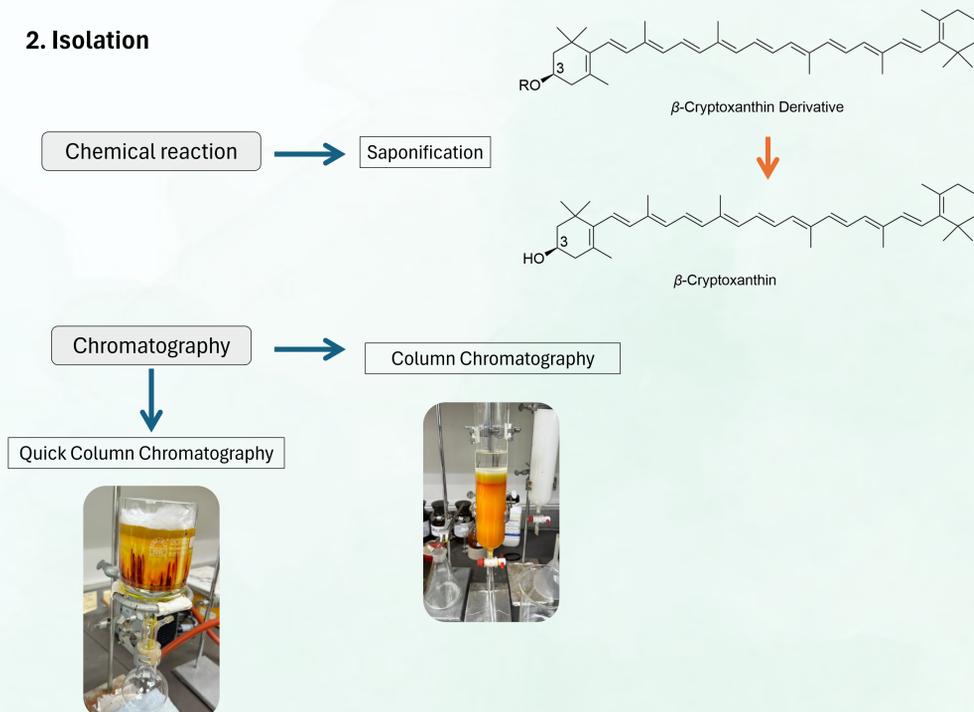


METHODOLOGY

1. Extraction



2. Isolation



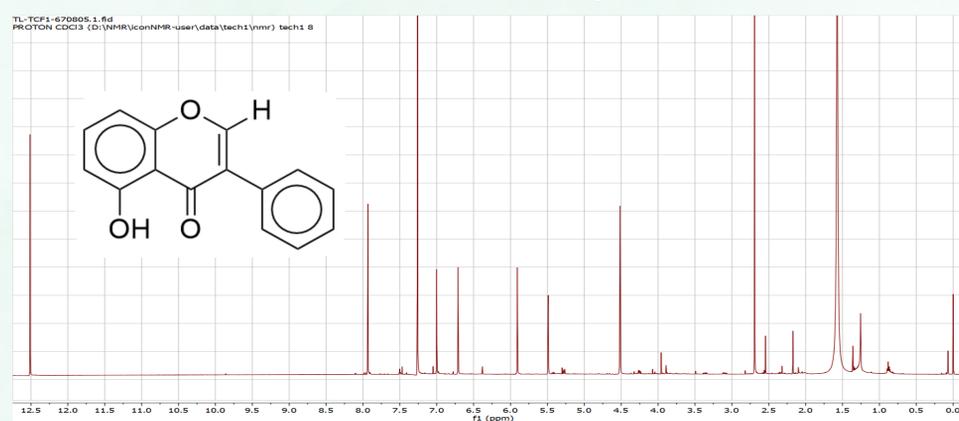
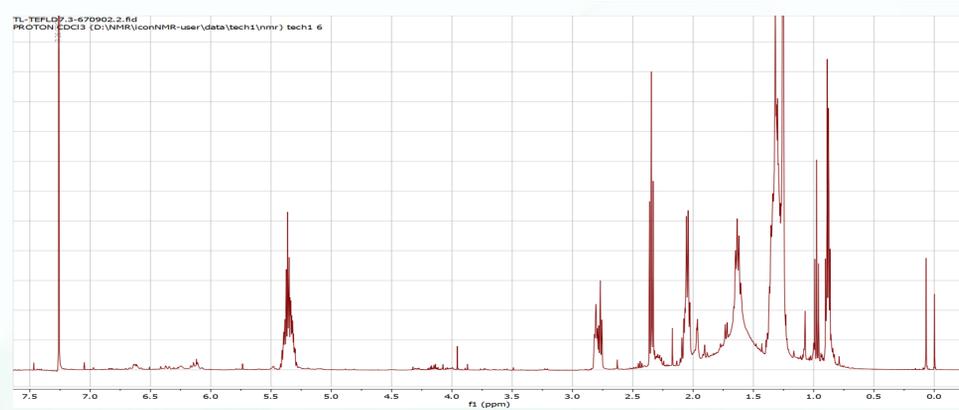
RESULT AND DISCUSSION

Result of marigold extraction

Method	Ratio Powder : Hexane	Time (hr.)	Marigold powder (g)	Amount (g)	Yield (%)
Maceration	1 : 10	24	100	5.60	5.60
Ultrasound-Assisted extraction	1 : 5	0.25	100	6.51	6.51

Result of separated compounds followed by NMR analysis

Code	weight (mg)	Physical Appearance	Solvent System of TLC	Rf
TEFL01	1.30	Brown Viscous Liquid	15%EtOAc/Hexane	0.73
TEFL02	6.30	Yellow-Brown Viscous Liquid	15%EtOAc/Hexane	0.21
TEFL03	1.90	Yellow Viscous Liquid	30%EtOAc/Hexane	0.17
TEFL04	3.60	Yellow-Brown Viscous Liquid	10%EtOAc/Hexane	0.17
TEFL05	0.80	Yellow Viscous Liquid	20%Acetone/Hexane	0.20



CONCLUSIONS

- Ultrasound-Assisted Extraction
- Saponification of β -cryptoxanthin cannot be separated.
- Unable to separate β -cryptoxanthin
- Terpenoids and Flavonoids can be separated.
- TEFL01 is Terpenoids group
- TEFL02-04 is Carotenoid group
- TEFL05 is isoflavone group

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