MINI REVIEW

RECORDS OF PHARMACEUTICAL AND BIOMEDICAL SCIENCES

Review Article on Phytochemical Constituents and Biological Activity of *Cleome amblyocarpa*.

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Abstract

Cleome amblyocarpa (Barratte & Murb.) is widely growing in desert sandy habitats of Sinai, Egypt, and many parts of North Africa. Along the history, *C. amblyocarpa*, family Cleomaceae is frequently used to treat a variety of illnesses in traditional medicine. The plant was selected based on the outstanding results of a previous biological study that Correspondence Author conducted on a plant extract of *C. amblyocarpa*. : Use as anticancer, anti-inflammatory**,** gastrointestinal disorders, anti-diabetic, antimicrobial and anthelmintic. Several species of Cleomaceae have been reported to contain numerous phytochemicals such as triterpenoids, sterols, flavonoids, saponins, alkaloids, polyacetylenes and coumarins. The phytochemical components of this significant and useful genus are highlighted in this review, along with its several documented biological functions. In order to maximize the medicinal and nutritional benefits of *C. amblyocarpa*, more research on the active ingredients in this plant is necessary. This is because the plant extract is unquestionably a good source of components that strengthen health and may be utilized for both nutritional and therapeutic purposes.

Keywords: *Cleome amblyocarpa,* phytochemicals, triterpenoids, flavonoids, anticancer, anti-inflammatory.

1. Introduction

Plants have been considered a source of nutrition for humans and have been utilized as medicines in national medicine since the beginning of time **(Zayyat *et al*., 2018).** *Cleome amblyocarpa* (Barratte & Murb). is an annual herb that can reach a height of 80 cm. It belongs to the Cleomaceae family. It is a distinct-smelling glandular-pubescent herb. Its hairy, upright, multi - branched stem collects a covering of dust and sand particles **(Rassouli *et al*., 2014).** The Cleome genus comprises annual and herbaceous flowering plants that are part of the Cleomaceae family.

This genus is widely distributed in the hot and tropical regions of the world. It has around 170 species in it**(Khlifi *et al*., 2020).** *C. amblyocarpa* has been previously investigated for several secondary metabolites, such as terpenoids, flavonoids, phenols, and alkaloids, are abundant in Cleome species, as demonstrated by the phytochemical screening. That could help to explain why this genus is used in medicine as well as food **(Abdel-Monem, 2012).***C. amblyocarpa* is geographical distribution in north and east Africa , Sinai, Iran, Sudan, Iraq, Palestine, Ethiopia and Saudi Arabia **(Kamel *et al*., 2010).**

Figure 1: A photo of *C. amblyocarpa* distribution.

Table 1: The systematic classification of *C. amblyocarpa*

Division	Tracheophyta
Class	Dicotyledoneae.
Subdivision	Spermatophytina (spermatophytes, seed plants)
Order	Brassicales
Family	Cleomaceae
Genus	*Cleome*
Species	*amblyocarpa.*

We will focus on *C.amblyocarpa* , The wide-range of biological activities of *C.amblyocarpa* is due to its content of a variety of secondary metabolites, such as flavonoids (**Zaki *et al*., 2020)**, saponin**(Zaki *et al*., 2020)**, Terpenoidal and Sterol **(Ahmed *et al*., 2001; Harraz *et al*., 1995)**

2. Chemical constituents reported from *C.amblyocarpa*:

2. 1. Terpenoidal and Sterol Compounds

C. amblyocarpa has been found to contain a new dammarane triterpine, 15-*α*-acetoxycleomblynol A and Cleoamblynol A.**(Ahmed *et al*., 2001)**. Harraz *et al.* isolated Cleocarpanol, cabraleahydroxy lactone, stigma-4-en-3-one, lupeol, taraxasterol, ambylone, and Cleoamblynol A from *C. amblyocarpa* **(Harraz *et al*., 1995),** Table 2.

2. 2. Flavonoids

Nine Flavonoids isolated and identified from the methanolic extract such as, genistin, 5-O-methylgenistein, isoprunetin-7-glucoside, tamarixetin .
7-O-*β*-D-glucoside, isorhamnetin 3,7-O-*α*-L-dirhamnoside , kaempferol 3-O-*β*-glucoside-7-O-α-rhamnoside ,isorhamnetin 7-O-*α*-L-rhamnoside ,genistein-8-C-glucoside, and Kaempferitrin from *C. amblyocarpa*.**(Zaki *et al*., 2020)**, Table 2**.**

2. 3. Saponin

Zaki *et al*. isolated soysaponin I from the methanolic extract of *C. amblyocarpa* **(Zaki *et al*., 2020),** Table 2**.**

3. Biological activities reported from *C. amblyocarpa*:

3.1 Anti-inflammatory activities

The essential oil of *C. amblyocarpa* exhibited a potent anti-inflammatory effect through membrane stability and the inhibition of lipoxygenase (LOX) and cyclooxygenases (COX1, and COX2) **(Abd-ElGawad *et al*., 2021).**

3.2 Antioxidant activities

C. amblyocarpa hydroalcoholic extracts have been potential source of antioxidant activity determined by ABTS and DPPH scavenging activity, ferric reducing antioxidant power (FARP), and thiobarbituric acid reactive species (TBARS). These are the most commonly used methods for the determination of antioxidant activities of plant extracts. The results were expressed as EC_{50} (lower EC_{50} values indicate higher antioxidant activity) **(Khlifi *et al*., 2020).**

3.3 Antimicrobial activities

The hydroalcoholic extracts of *C. amblyocarpa* leaf and stem extracts possess antibacterial properties against four different Gram-positive and four different Gram-negative bacteria **(Khlifi *et al*., 2020).**

3.4 Anti-parasitic activities

Al Nasr demonstrated that *C. amblyocarpa* had the anti-leishmanial efficacy with IC_{50} values are 21.5 µg/mL against the L. major amastigote stage. The best SI values were obtained from the *C. amblyocarpa* extracts against the L. major amastigote stages with 5.7. **(Al Nasr, 2020).**

3.5 Antifungal activities

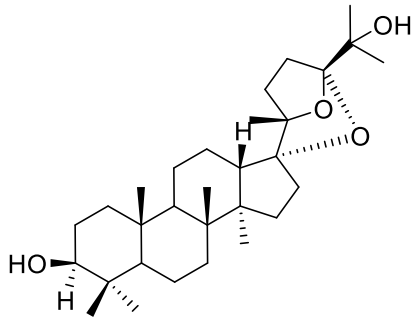
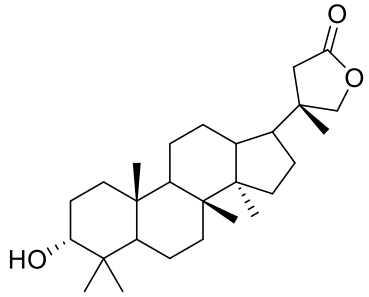
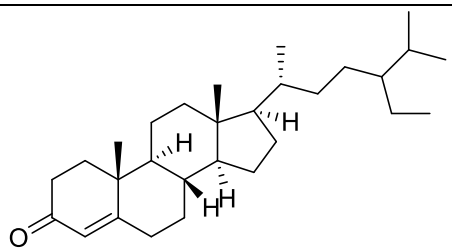
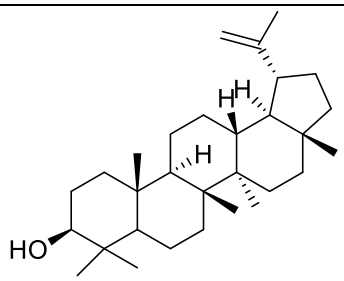
The ethanol and ethyl acetate extract of *C. amblyocarpa* demonstrated the highest MIC of

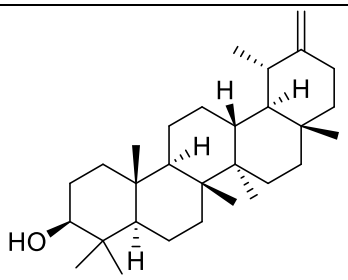
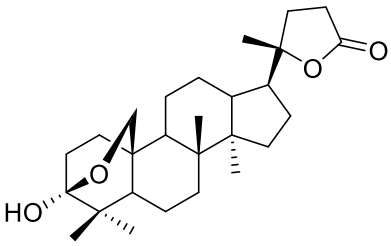
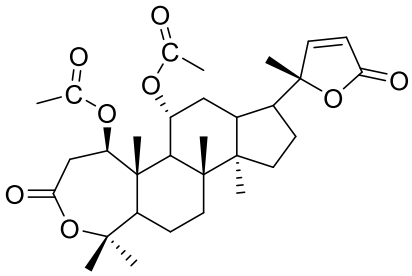
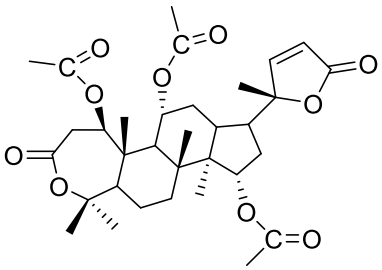
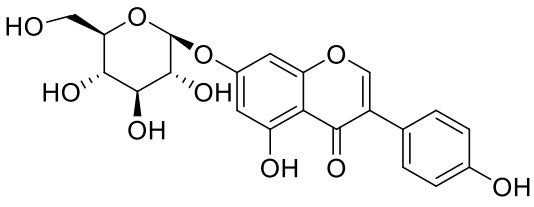
25 mg/mL against *Paecilomyces lilacinus* and Paecilomyces *variotii* **(Hashem, 2011)**

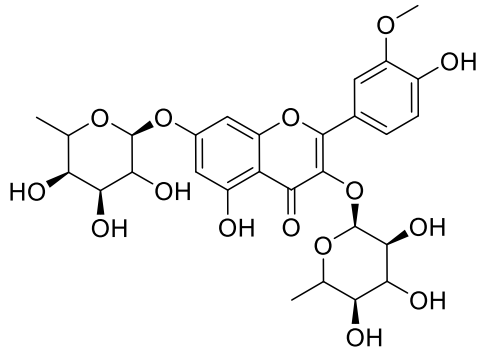
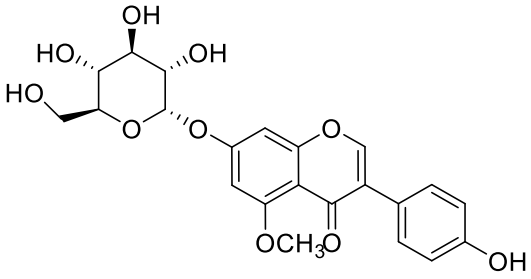
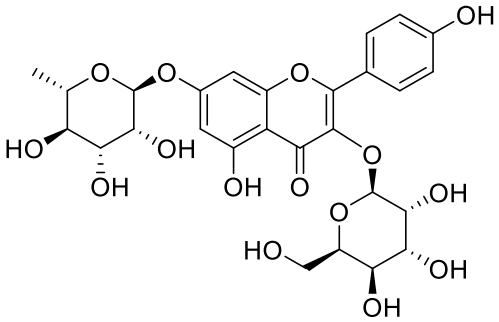
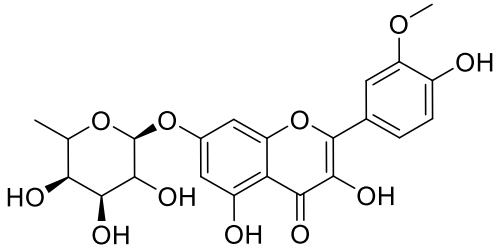
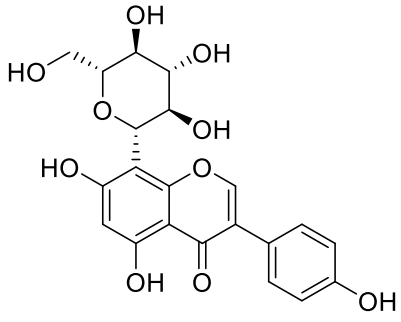
3.6 Cytotoxic activities

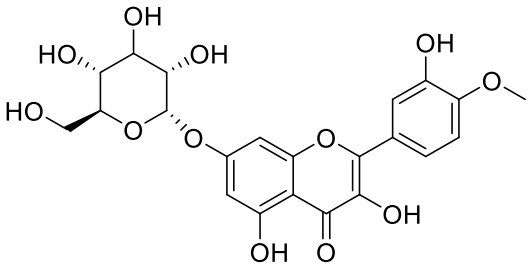
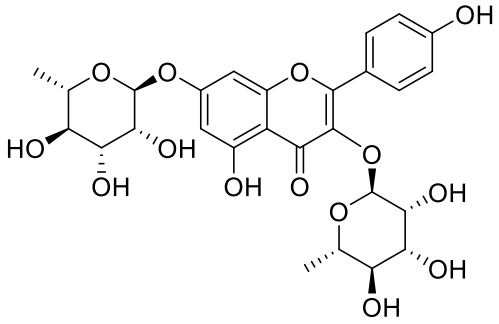
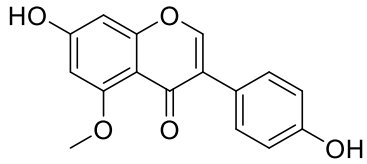
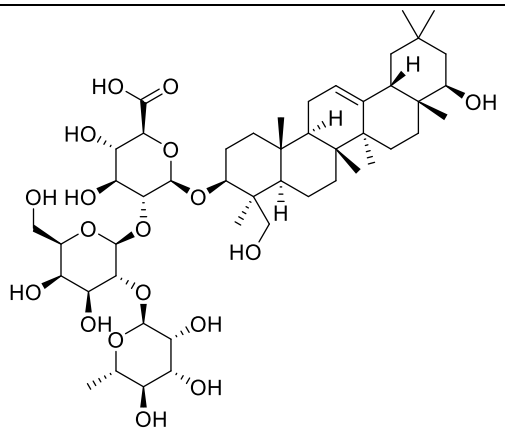
Khlifi *et al*. concluded that the cytotoxic capability of the hydroalcoholic extracts from the aerial section of *C. amblyocarpa* was assessed *in vitro* on A549 and H1299 lung cancer cells. Following 48 hours of treatment with varying concentrations of the leaf and stem extracts (50, 100, and 200 µg/mL), no significant cytotoxic effects were noted for the stem extract (IC_{50} > 200 µg/mL). Conversely, the leaf extract demonstrated potent dose-dependent cytotoxic action against A549 and H1299 cells, as demonstrated by IC_{50} values of 100 and 200 µg/mL **(Khlifi *et al*., 2020)**

Table 2: Examples of some compounds isolated from *C. amblyocarpa* of family Cleomaceae.

Structure	Name	Reference
	**Cleocarpanol**	**(Harraz *et al*., 1995)**
	**Cabraleahydroxy lactone**	**(Harraz *et al*., 1995)**
	**Stigma-4-en-3-one**	**(Harraz *et al*., 1995)**
	**Lupeol**	**(Harraz *et al*., 1995)**

	**Taraxasterol**	**(Harraz *et al*., 1995)**
	**Ambylone**	**(Harraz *et al*., 1995)**
	**Cleoamblynol A**	**(Harraz *et al*., 1995)** **(Ahmed *et al*., 2001)**
	**15-*α*-acetoxycleomblyol A**	**(Ahmed *et al*., 2001)**
	**Genistin,**	**(Zaki *et al*., 2020)**

	**Isorhamnetin, 3,7-O-*α*-L-dirhamnoside**	**(Zaki *et al*., 2020)**
	**Isoprunetin-7-glucoside**	**(Zaki *et al*., 2020)**
	**Kaempferol 3-O-*β*-glucoside-7-O-*α*-rhamnoside**	**(Zaki *et al*., 2020)**
	**Isorhamnetin 7-O-*α*-L-rhamnoside**	**(Zaki *et al*., 2020)**
	**Genistein-8-C-glucoside**	**(Zaki *et al*., 2020)**

	**Tamarixetin 7-O-*β*-D-glucoside**	**(Zaki *et al*., 2020)**
	**Kaempferitrin**	**(Zaki *et al*., 2020)**
	**5-O-methylgenistein**	**(Zaki *et al*., 2020)**
	**Soysaponin I**	**(Zaki *et al*., 2020)**

4. Conclusion:

C. amplyocarpa are growing all over the world. It is used in folk medicine for treatment of different disease. Here we just report a brief review for the chemical constituent and biological activity of the plant.

5. Conflict of interest:

The authors report no declaration of conflict of interest.

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