REVIEW ARTICLE

RECORDS OF PHARMACEUTICAL AND BIOMEDICAL SCIENCES

Review Article on Phytochemical Constituents and Biological Activity of *Cymbopogon schoenanthus*

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Abstract

Cymbopogon schoenanthus belongs to the family *Poaceae*. It is a fragrant grass that grows wildly and extensively throughout Upper Egypt.Its oil has a strong aromatic odor and provides high therapeutic value *C. schoenanthus* contains a wide range of classes of bioactive chemicals that have already been identified. There has been a lot of interest lately in the phytochemical composition of *C. schoenanthus*, and a wide range of components, such as phenolic acids, flavonoids, terpenes and diterpenes, have been isolated. It has been investigated how these compounds contribute to biological efficacy by preventing the formation of kidney stones and possessing antiproliferative, anti-inflammatory, antibacterial, antioxidant, and nephroprotective properties. There is significant interest in drug discovery research from this plant due to the biological activity of the separated constituents that have been reported. Thus, the focus of this review is on the phytochemical investigations and biological activities of components from *C. schoenanthus* since 1963**.**

Keywords: *Cymbopogon schoenanthus*, phytochemical, flavonoids, biological activity.

1. Introduction:

Plants have been utilized as medicines in traditional medicine since the beginning of time, and they are also believed to provide humans with nutrients. Many of organic substances isolated from plants subsequently evolved into possible novel medications **(Dias *et al*., 2012)**.The genus *Cymbopogon*, a member of the family Poaceae**.** It is a perennial herb, erect, tufted 9 cm long glabrous culms with 3-4 nodes and a simple leaf.

It is highly reputed in Egyptian folk medicine as an effective renal antispasmodic and diuretic agent **(Tackholm & Boulos, 1974)**. The entire dried herb has been used for centuries by the Bisharin and Ababda tribes of the Aswan Province in the form of a decoction to produce diuresis, to relieve colicky pains, to help the removal of small stones from the urinary tract, and as an antipyretic in fever **(Fahmy, 1963)**

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

Table 1: The systemic classification of *C. schoenanthus*

Division	Magnoliophyta
Class	Liliopsida
Subclass	Commelinidae
Order	Cyperales
Family	Poaceae/Gramineae
Genus	Cymbopogon
Species	*Cymbopogon schoenanthus*

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

2. 1. Essential oil:
Essential oils are the major active compounds found in *C. schoenanthus* such as *α*-eudesmol, trans- dauca-4(11),7-diene, *α*- muurolol, hinesol and allo-ocimene (Bellik *et al*., 2019).

2. 2. Flavonoids:
A previous study demonstrated the existence of a number of flavonoids such as neohesperidin, hesperidin, taxifolin and diosmin. (Djemam *et al.*, 2020).

2. 3. Phenolic acids:
The air-dried *C. schoenanthus* contained Phenolic acids such as caffeic acid, 2,3- dihydroxybenzoic acid, ferulic acid and trans-cinnamic acid (Abdel-Rahman A et al., 2022).

2. 4. Amino acids:
The extract of *C. schoenanthus* shoots contains am ino acids as 4-aminobutyrate, alanine, asparagine and betaine **(Abdelsalam *et al.*, 2017)**.

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

3.1 Anti-oxidant activities:
C. schoenanthus essential oils were tested for antioxidant activity using the β-carotene-linoleic acid bleaching method. The plant Fresh leaves provided the best results **(Khadri *et al*., 2008).**

3.2 Anthelmintic and insecticidal activities:
The essential oil of *C. schoenanthus* was tested against trichostrongylids from naturally infected sheep utilizing larval development assay, egg hatch assay, larval exsheathment assay and larval feeding inhibition assay. *C. schoenanthus* essential oil shown good effectiveness against ovine trichostrongylids **(Katiki *et al.*, 2012)**.

3.3 Cytotoxicity activities:
The cytotoxic effects of ethanol extract of *C. schoenanthus* L. aerial part proved by using MTT assay that it is highly selective and effective against breast and prostate cancer cell lines (MDA-MB-435, MCF-7, and DU 145) **(Hago *et al*., 2024)**

3.4 Antimicrobial activities:
Water extracts of *C. schoenanthus* essential oils were tested for inhibitory effects on ten isolates of Gram-positive and Gram-negative bacteria using agar well diffusion and dilution procedures. *C. schoenanthus* essential oil proved efficient against *Escherichia coli*, *Staphylococcus aureus*, and *Klebsiella pneumoniae*. The essential oil did not effectively treat *Staphylococcus saprophyticus* **(Hashim *et al*., 2017).**

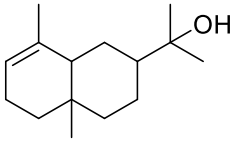
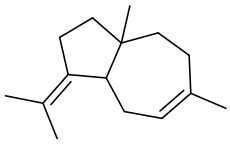
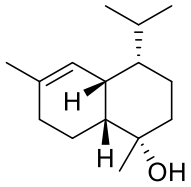
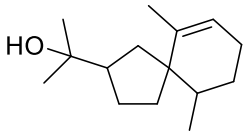
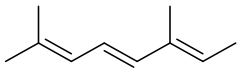
3.5 Antistress Effects:
The preventive potential of ethanol extract of *C. Schoenanthus* against stress disorders at *in vitro* and *in vivo* levels in ICR mice was proved **(Ben Othman *et al.*, 2013)**.

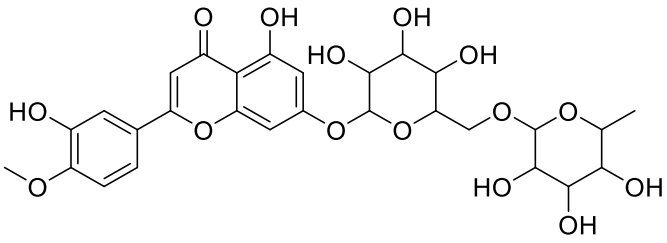
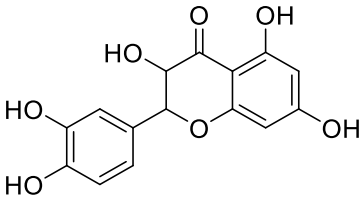
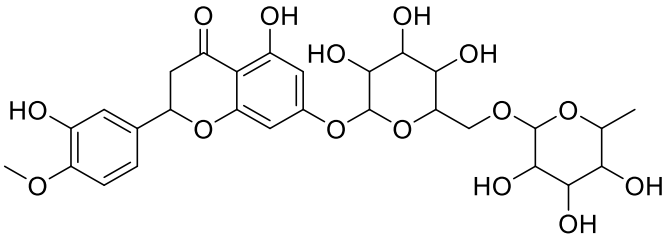
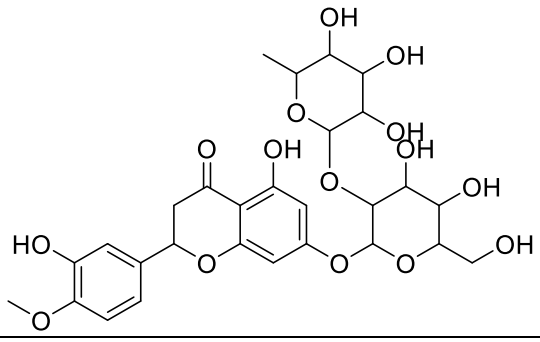
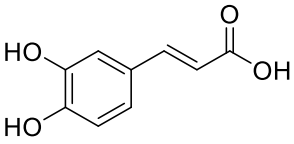
3.6. Dermal activity:
Treatment with a phenolic compound-rich fraction of *C. schoenanthus* ethanolic extract increased the production of melanin **(Abdel-Rahman A et al., 2022).**

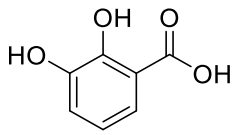
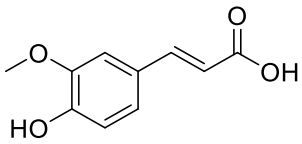
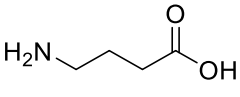
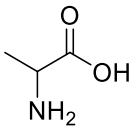
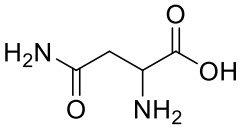
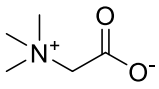
3.7. Enzyme inhibition activity:
The essential oil derived from *C. schoenanthus* showed acetylcholinesterase and butyrylcholinesterase inhibitory effect **(Yagi *et al*., 2020).**

3.8. Anti-inflammatory activity:
Reduction of NO in the cell system appeared to be more pronounced after treatment with the aqueous extract of *c. schoenanthus* **(Lopes *et al*., 2022)**.

Table 2: Examples of some compounds isolated from *C. schoenanthus* family *Poaceae*

Structure	Name	Plant	Reference
	α-eudesmol	*C. schoenanthus*	(Bellik *et al*., 2019)
	Trans- dauca-4(11),7-diene	*C. schoenanthus*	(Bellik *et al*., 2019)
	α- Muurolol	*C. schoenanthus*	(Bellik *et al*., 2019)
	Hinesol	*C. schoenanthus*	(Bellik *et al*., 2019)
	Allo-ocimene	*C. schoenanthus*	(Bellik *et al*., 2019)

	Diosmin	*C. schoenanthus*	(Djemam *et al.*, 2020)
	Taxifolin	*C. schoenanthus*	(Djemam *et al.*, 2020)
	Hesperidin	*C. schoenanthus*	(Djemam *et al.*, 2020)
	Neohesperidin	*C. schoenanthus*	(Djemam *et al.*, 2020)
	Caffeic acid	*C. schoenanthus*	(Abdel-Rahman A et al., 2022)

	2,3-Dihydroxybenzoic acid	*C. schoenanthus*	(Abdel-Rahman A et al., 2022)
	Ferulic acid	*C. schoenanthus*	(Abdel-Rahman A et al., 2022)
	4-Aminobutyrate	*C. schoenanthus*	(Abdelsalam *et al*., 2017)
	Alanine	*C. schoenanthus*	(Abdelsalam *et al*., 2017)
	Asparagine	*C. schoenanthus*	(Abdelsalam *et al*., 2017)
	Betaine	*C. schoenanthus*	(Abdelsalam *et al*., 2017)

4. Conclusion:

C. schoenanthus is a promising herbal medicine due to its effectiveness and biodiversity; this review discusses its chemical constituents, pharmacological properties, and therapeutic benefits.

5. Conflict of interest:

There is no conflict of interest declared by the authors.

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