

# The Phytochemical and the Antifungal Activity of Senna Didymobotrya Ethanol Extracts from Leaves of Plants in Iraq

Inteithar Ali Fisaa<sup>1</sup>, Neepal Intair Al Garaawi<sup>2\*</sup>

<sup>1,2\*</sup>Department of Biology, College of Education for Pure Science, Kerbala University, Kerbala, Iraq

Email: <sup>2\*</sup>neepal.i@uokerbala.edu.iq

**Abstract:** In the present study a various phytochemical compounds that have been isolated from Senna didymobotrya and showed phytoconstituents from leaves against three of pathogenic fungi are as follows: *Alternaria alternate*, *Neoscytalidium dimidiatum* and *Sordaria fimicola*. The Phytochemical of Senna didymobotrya leaves were exposed to (GC-MS) analysis. The results showed highest activity against reviewed fungal, (*Alternaria alternate*, *Neoscytalidium dimidiatum* and *Sordaria fimicola*) . all three concentrations of extract (10,20,30 mg/ml) in respectively" were given a results ( 0.00 )mm in the diameter of colonies. The GC-MS analysis of Senna didymobotrya leaves parts showed the presence of -1,3-Propanediol ;Silane, (3-chloropropyl)ethoxydimethyl ;2-Mercaptophenol ; Nonadecane ; .alpha.-D-Mannopyranoside, methyl 3,6-anhydro ; 4-Methyl-2,5-dimethoxybenzaldehyde ; 1-Heptadecene ; 1,3,5-Cycloheptatriene,3,7,7-trim ethyl- ;Ar-tumerone ; Propanamide, N-(4-methoxyphenyl)-2 -methyl- ; Curlone ; 4-O-Methylmannose ;Hydroperoxide, 1,4-dioxan-2-yl ; Phytol, acetate ; 5-Nonadecen-1-ol ; 9-Octadecyne ; Pentadecanoic acid ; Ethyl 9-decenoate ; Phytol ; 9-Octadecenoic acid, (E) .

**Keywords:** Senna didymobotrya "gas chromatography –mass spectrometry, bioactive phytochemical , antifungal activity"

## 1. INTRODUCTION

**Senna didymobotrya** is hairy deciduous shrub , can reach (5 m)in height, leaves paripinnate, compound ( 50 cm ),leaflet elongated oval , 6.5 cm long, round base, apex acuminate,.Flowers in racemes of bright yellow flowers are purplish and fragrant, bisexual or male. Fruit ellipsoid –globose drubs, 1-1.5cm in diameter, exo-carp thin and smooth, endo-carp brownish yellow.[1] [2].

The phytochemical compounds of Senna didymobotrya revealed the presence of alkaloids, tannins, phenol, triterpens [3][4] [5]. Extracts from different parts of Senna didymobotrya were studied as potential antifungal agents for selected phytopathogenic fungi[6] [7] [8].

"The biochemical componentes are taxonomically and chemically awfully diverse composites with incomperhensible function. They are used in agriculture, scientific research and the human therapy.[9]So ,this study aimed to explain a synthetic drugs from herbal plant extract and Propolis and their effects on mentioned fungi".

## 2. MATERIALS AND METHODS

### 1- Study area and sampling

"The studied fungi were isolated from infected plants by these fungi in Kerbala fields, the fungi were identifying in the agricultural college laboratory, Kerbala University.

### 2. Microscopic assessment

" The samples were examined using a method [9] " the area were cleaning with a cotton saturated swab with 70% alcohol to get rid of a bacteria and Saprophytes fungi, and then taken a scrape from the influenced parts infected by a tool Loop fertilization and then placed On a pure glass slide with a drip of 0% KOH and then put the glass slide cover and heat the sample on a benzene flame and examined by amicroscope for the occurrence of dermatophytes spores or hypha, Mentioned Fungi were diagnosed based according to: [9] [10] ,The phenotypic characteristics of spores and fungal colonies and microscopic properties and were espoused by identifying the appearance and color of the colony from the bottom of the dish".

### 3. Plant Extract perperation:

Wahid and Jafar method (12) was followed in the extraction process, "

### 4. Cultivated Method of alcoholic extract of *Senna didymobotrya* plant on pathogenic fungi growth.

"El-Kady etal (13) Method were chased, "The alcoholic extract of ***Senna didymobotrya*** was merged with (PDA) cultivated media with three concentrations (10,20, 30) mg/ml ( three replicates for each concentration) . After a solidifying a medium, a hole was made at a center of each dish by a cork borer piercing ( 5 mm) in a diameter with A control treatment. The dishes were inoculated with expermented fungus inoculum and grown on the PDA medium for 10 days each by fixing a disk with a diameter of 5 mm each in the center of the dish. Astudied dishes were incubated at 25 ° C and for 10 days, the diameter of the growing colony was measured . Results were recorded", and the inhibition ratio was calculated by using the following [14] ":

$$\text{Inhibition ratio} = \frac{\text{Average diameter of fungus in control dish(1)} - \text{Average diameter of fungus in tretment dish}}{\text{Average diameter of fungus in control dish(1)}} \times 100$$

### 5-Collection and preparation of plant materials

" ***Senna didymobotrya*** leaves were located from various spots in Iraq . Then leaves were washed and dried at room temperature . 40g of plants powdered had taken in 200 ml ethanol and then filtered .

### 6- Constituents Identification of Extract by Gas chromatography – mass spectrum (GC/MS)

Phytochemical identification of ***Senna didymobotrya***. were carried out by GC-MS analysis in 'a (QP 2015 Plus SHIMADZU) instrument under computer designed control at 60 eV. About 1µL of them ethanol extract was injected into the GC-MS column using a micro syringe and the scanning was done for 45minutes". [ 13, 14]

### 3. RESULTS AND DISCUSSION

#### 1. Antifungal activity

In the current study, three types of fungi were selected to test the efficacy of the ethanol extract of *Senna didymobotrya* leaves on the growth and development of three types of plantpathogenic fungi are as follows: *Alternaria alternate*, *Neoscytalidium dimidiatum* and *Sordaria fimicola*.

the ethanolic extract of *Senna didymobotrya* leaves showed "a high antifungal activity against three types of plantpathogenic fungi studied.

The results showed that all studied fungal, at 3 concentrations of extract (20,30,40 mg/ml) respectively were give a results (0.00 mm) in the diameter of colonies in *Alternaria alternate*, *Neoscytalidium dimidiatum* and *Sordaria fimicola*, the results are obtained in Table (1). the results of the current study are in agreement with the findings of [8] who confirmed that ethanol leaves *Senna didymobotrya* extract works to inhibit the growth of fungal pathogens. [6] found that ethanolic of *Senna didymobotrya* leaves extract inhibits plant pathogenic fungi because the leaves contain some secondary metabolites that have antimicrobial properties.

Table (1) Antifungal activity of ethanol extracts from *Senna didymobotrya*


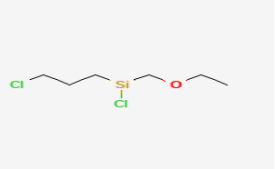
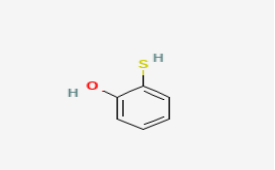
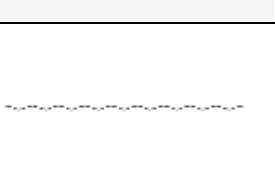
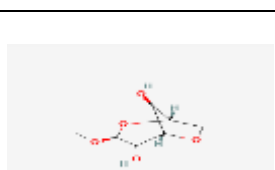
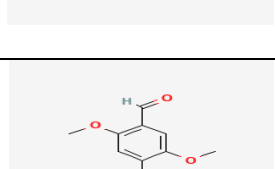
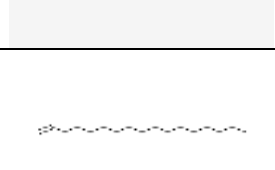
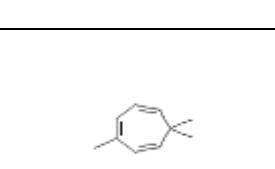
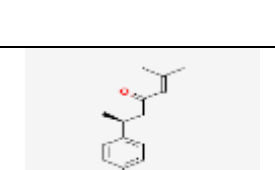
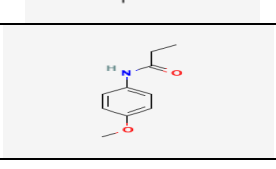
Fungal type	Comparison 1 With distilled Water	Comparison 2 With Clotrimazole (2mg/ml)	Concentration (10 mg/ml)	Concentration (20 mg/ml)	Concentration (30 mg/ml)
<i>A. alternate</i>	80.00	0.00	0.00	0.00	0.00
<i>N. dimidiatum</i>	80.00	0.00	0.00	0.00	0.00
<i>S. fimicola</i>	80.00	0.00	0.00	0.00	0.00

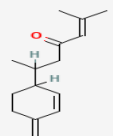
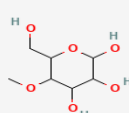
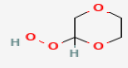
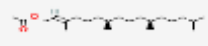
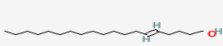

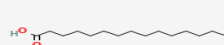



#### 2- Assessment of Biochemical compounds of *Senna didymobotrya* leaves

"The GC-MS analysis of ethanol extract of *Senna didymobotrya* leaves are appeared the presence of 20 components performed in Table 2. The separated compounds has different biological activities, as. Anxiolytic antimicrobial, anti-inflammatory spasmolytic,, antiproliferative, , antialgal effects and antioxidant".

Table (2) Major phytochemical composites in ethanolic extract of *Senna didymobotrya* leaves

No.	Chemical names	RT Min) (	Exact mass s	Chemical structure	Molecular formula	Molecular weight
-----	----------------	-----------------	--------------------	--------------------	----------------------	---------------------

1.	1,3-Propanediol	4.288	1.22		$C_3H_8O_2$	76.09
2.	Silane, (3-chloropropyl)ethoxydimethyl	5.421	1.75		$C_6H_{13}Cl_2O$ Si	200.15
3.	2-Mercaptophenol	7.784	4.88		$C_6H_6OS$	126.18
4.	Nonadecane	10.13 6	1.14		$C_{19}H_{40}$	268.5
5.	.alpha.-D-Mannopyranoside, methyl 3,6-anhydro	11.11 7	1.20		$C_7H_{12}O_5$	176.17
6.	4-Methyl-2,5-dimethoxybenzaldehyde	12.47 7	1.13		$C_{10}H_{12}O_3$	180.20
7.	1-Heptadecene	12.80 0	1.14		$C_{17}H_{34}$	238.5
8.	1,3,5-Cycloheptatriene,3,7,7-trimethyl-	12.98 4	1.26		$C_{10}H_{14}$	134.22
9.	Ar-tumerone	13.83 6	6.00		$C_{15}H_{20}O$	216.32
10.	Propanamide, N-(4-methoxyphenyl)-2-methyl-	14.10 6	1.53		$C_{10}H_{13}NO_2$	179.22

11.	Curlone	14.30 0	3.60		$C_{15}H_{22}O$	218.33
12.	4-O-Methylmannose	14.44 0	1.37		$C_7H_{14}O_6$	194.18
13.	Hydroperoxide, 1,4-dioxan-2-yl	14.77 5	8.51		$C_4H_8O_4$	120.10
14.	Phytol, acetate	15.97 2	7.91		$C_{22}H_{42}O_2$	338.6
15.	5-Nonadecen-1-ol	16.27 4	1.83		$C_{19}H_{38}O$	282.5
16.	9-Octadecyne	16.50 1	2.41		$C_{18}H_{34}$	250.5
17.	Pentadecanoic acid	17.55 8	10.7 5		$C_{15}H_{30}O_2$	242.40
18.	Ethyl 9-decenoate	17.83 9	2.79		$C_{12}H_{22}O_2$	198.30
19.	Phytol	19.24 1	3.77		$C_{20}H_{40}O$	296.5
20.	9-Octadecenoic acid, (E)-	19.65 1	21.0 0		$C_{18}H_{34}O_2$	282.5

## 2. REFERENCES

- [1] Shaheen, A. S. (2007). Characteristics of the stem leaf transitional zone in some species of Caesalpinioideae ( Leguminosae) .Turk Journal of Bot. Vol. 31:297-310.
- [2] Townsend, C. C. And Guest, E. (1974). Flora of Iraq,vol.3.minstry of Agriculture and Agrarian Reform, Iraq. 662 p.
- [3] Mworio,J. K.; Kibiti, C. M.; Ngugi, M. P. ;Ngeranwa,J. N. (2019). “Antipyretic potential of dichloromethane leaf extract of Eucalyptus globulus (Labill) and Senna didymobotrya (Fresenius) in rats models,” Heliyon, vol. 5, no. 12, Article ID e02924.
- [4] Jeruto, P.; Arama, P. F.; Anyango, B. ; Maroa, G. (2017). “Phytochemical screening and antibacterial investigations of crude methanol extracts of Senna didymobotrya (Fresen.) H. S. Irwin & Barneby,” Journal of Applied Biosciences, vol. 114, no. 1, pp. 11357–11367.
- [5] Jeruto, P.; Arama, P. F.; Anyango, B. (2017). “In vitro antifungal activity of methanolic extracts of different Senna didymobotrya (fresen.) H.S. Irwin & Barneby plant parts,” African Journal of Traditional, Complementary, and Alternative Medicines, vol. 13, no. 6, pp. 168–174.
- [6] Orwa, C. A.; Njue, L. G. (2019). “Efficacy of crude extract from candle brush (Senna didymobotrya) leaves against Aspergillus niger in reduction of post-harvest losses in tomatoes,” Asian Food Science Journal, vol. 10, no. 2, pp. 1–8.
- [7] Sadia, B.; Cherutoi, J.; Achisa, C. (2021). Optimization, Characterization, and Antibacterial Activity of Copper Nanoparticles Synthesized Using Senna didymobotrya Root Extract. urnal of Nanotechnology. Volume 2021, Article ID 5611434, 15 pages.
- [8] Al-Rawi, A. and Farty, J. L. J.1964. Medical plants in Iraq. 2nd Ed. Al-Eaqaza poplishers. Ministry of water and agriculture.100pp.
- [9] Abu-Serag N.A, Al-Gara'awi N. I and,A M Ali.Analysis of bioactive phytochemical compound of ( Cyperus aucheri Jaub.) By using gas chromatography –mass spectrometry. IOP Conf. Series: Earth and Environmental Science (2019). 388(1):012063
- [10] SA Allaith, DF Alfekaik, MA Alssirag. (2019). Identification of Pistacia vera and Prunus amygdalus Batsch seed oils using GC-MS as useful methodology for chemical classification., IOP Conference Series: Earth and Environmental Science 388 (1), 012061.
- [11] Champion, R.; Burton, J.; Burns, D. and Breathnach, S.(1998). Text book of dermatology. 6<sup>th</sup>. ed. Blackwell Science Ltd. P. 1277-1376.
- [12] Wahid,A.Z and Jafar,F.N .(2005).Test of Life effectiveness of Carthamustinctorius Extract toward germ and fungi .AlBasrah research journal.Volume: 31 Issue: 3BPages: 39-47.
- [13] El-Kady, I. A.; Mohamed, S. S. and Mostafa, E. M.(1993). Antibacterial and antidermatophyte activities of some essential oils from spices. Qatar Univesity. Sci. J. 13 (1): 63-69..
- [14] Gahukar R.T. (2012) . Evaluation of plant-derived products against pests and diseases of medicinal plants: A review., Crop Protection,Vol 42, PP: 202-20