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Detecting of Chemical compounds of aqueous and alcoholic extracts of damas *Conocarpus lancifolus Engl.* leaves using GC-MS technique

Lina Abdullah kadem

Dr.Eman Muhammad Abd Alzahra

College of Science University of Basrah

college of Science University of Basrah

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Abstract:

This study was conducted to identify the chemical compounds in the aqueous and alcoholic extract of damas leaves *Conocarpus lancifolus Engl.* using the GC-MS equipment on instrument. The results of this study showed the aqueous extract contained 23 chemical compounds and the alcoholic extract contained 22 chemical compounds. The compounds varied many alkaloids such as Dicyclopentadiene diepoxide, glycosides such as Lactos, terpenes such as alpha-Amyrin, fatty acids such as Oleic acid, esters such as Hexadecanoic acid, ethyl ester and phenolic such as Pluchidiol compounds. The compound (alpha.,beta.-Gluc-octonic acid lactone) recorded the highest percentage, while the compound (Dicyclopentadiene diepoxide) recorded the lowest percentage in the aqueous extract, while in the alcoholic extract (gamma.-Sitosterol) that achieved the highest percentage, and the compound (Bicyclo[2.1.1]hexan-2-ol,2-ethenyl) is the lowest. The similarity between the aqueous and alcoholic extracts in 5 compounds (Thiosulfuric acid (H₂S₂O₃), S-(2-aminoethyl) ester, L-Serine O-(phenylmethyl), Malonic acid hept-6-ynyl, 1-Heptatriacotanol, 2,7-Diphenyl-1,6-dioxypyridazino[4,5:2,3]pyrrolo[4,5-d]pyridazine). Most of the existing compounds had a known medical importance that varied between anti-cancer such as (alpha.-Amyrin) and antibiotics such as (gamma.-Sitosterol) and some of them used in treatment in cardiac systems such as (Procainamide).

Key word : Chemical compounds , damas leave , GC-MS

Introduction :

Plant extracts were an important source for many chemical compounds that are used in the pharmaceutical industries. Many plants are also used in folk medicine to treat many diseases (Dinesh and Rajakumar, 2016). The GC-MS technology is the best technology for discovering and identifying chemical compounds in plants (Mellon, 2000). It is one of the most widely used techniques for discovering chemical compounds from plant sources, and it is a multi-use method for the purpose of identifying and quantifying chemical compounds and through which the compounds can be identified by matching the spectra with the reference spectra (Aneesh, 2013).

There were many studies concerned with the GC-MS study in diagnosing chemical compounds and knowing the medicinal compounds present in plants, including the Al-Fekiki studies (2013) on the estimation of fatty acids from the oil nuclei of four types of date palms, as well as the extraction and purification of the alpha-amylase enzyme extracted from sorghum grains, as well as the study of Al-Saad

(2020) to characterize the chemical compounds of some types of the cruciferous family and the effect of glycoside extracts as antioxidants, and Al-Kinani(2020) study to diagnose the chemical compounds of volatile oils in some types of the labiatae family, with an indication of their role as antioxidants. and a study of Medloul (2021) on the effect of medicinal plants on laboratory mice, where these medicinal compounds were diagnosed using GC-MS .

The damas plant *Conocarpus lancifolius* Engl. is a dicotyledonous plant belonging to the family Combretaceae, which includes 18 genera and more than 600 species. Its native to the shores of rivers and seas in Somalia, Djibouti and Yemen (IPNI, 2005). This plant belongs to the genus *Conocarpus*. which contains two species, *C. lancifolius* Engl. & *C. erectus*, the common type in Iraq is *C. lancifolius* (IUCN, 2013). This tree is considered an alien to the Iraqi environment, as it was imported from neighboring countries and spread all over Iraq (Abd Ali, 2013). All over Iraq, as it adorns all Iraqi governorates and is quick to adapt to environmental conditions and is fast growing, its cultivation methods and its need for agricultural services are simple (Mahmood, 1993).

AL-Shatti *et al.* (2014) found that 31 chemical compounds were diagnosed using the GC-MC technique, which varied between alkaloids, glycosides, phenols and terpenes. The most important compounds found are Docosane, 1 tetradecane, Calammenene, and 2 - 4 dichloro phenol, pyrogallol and other compounds, and this study is the only study that shows the chemical compounds of the damas plant.

Research studies have confirmed that the extracts of the damas tree are highly and clearly effective in inhibiting the growth of liver and breast cancer cells in the original tissues, citing the presence of effective and important compounds that have not yet been identified that can provide a therapeutic option for certain types of cancers. And the extract of the leaves damas plant in some countries is used as a kind of herbal remedy to treat anemia, diarrhea, fever and some chest diseases (Chandler, 1982).

Biochemical studies have shown that the bark and leaves of the damas tree are rich in high levels of tannins and antioxidants compound which used in the treatment of bleeding gums, vaginal bleeding and skin ulcers. Recently, the efficiency of organic solvents extracted from different parts of the damask plant has been evaluated as antioxidant and anti-cancer compounds, citing the presence of effective compounds that have not yet been identified (Al-Dabbagh, 2020). Currently, a new compound was isolated from this plant called lancifotarene, and this compound showed cytotoxicity towards cancer cells including lymphatic leukemia, colon cancer and breast cancer, in addition to the antioxidant properties and its role as dieresis , The leaf extract possesses cytotoxic and antifungal properties (Malik *et al.* , 2021). The minimum inhibitory concentration towards *Aspergillus fumigatus*, *A. nigar*, *A. Flavus* was determined for samples taken from the skin and its effective role towards *Candida albicans* for samples taken from blood and urine (Malik *et al.*, 2020).



Figure (1): damas tree *Conocarpus lancifolius* Engl.

The aim of this study to show the importance of damas plant due to the many rumors about it and currently it is being removed from the streets and the municipality is prevented from cultivating it, as the removal of this plant is a great loss to our environment. It is also one of the plants that can be used in the phytoremediation of soil contaminated with hydrocarbons Petroleum, heavy metals and wastewater treatment((Mirbahar and Yaseen ,1996; Suleiman *et al.*,2013).It is also a vital accumulation of some heavy elements (Al- Maliki , 2021)

Methods:

:Collecting damas leaf samples

The leaves of the damas plant were collected from different places in Basra governorate and cleaned from the dust , after that, these leaves were dried and ground by an electric mill, and the powder of the leaves was kept in clean glass bottles till use.

2-Preparation of extracts :

Two types of extracts (aqueous and alcoholic extract) prepared from leaves of the damas plant .

Aqueous extract:

The aqueous extract was prepared according to the method (Harbone, 1984), where 10 gm of damask leaf powder was taken and 100 ml of distilled water was added to it. It was placed in a glass beaker with a capacity of 500 ml, and the mixture was placed in a magnetic strrir device for three hours, then left over night, then filtered through filter papers, the filtrate was taken and dried at laboratory temperature until a powder was obtained .

Alcoholic extract:

The alcoholic extract was prepared according to the method (Harbone, 1984), by taking 10 gm of powdered damask leaves and adding to it 100 ml of ethyl alcohol at a concentration of 70% and placing it in a glass beaker with a capacity of 500 ml, then placing the mixture on a magnetic strrir device for three hours. Then the extract was left for a whole night, then the extract was filtered by filter papers, the filtrate was taken and dried at laboratory temperature until a powder was obtained .

Identification of the active compounds of damas plant by GC-MS technology :

The chemical compounds present in the aqueous and alcoholic extracts of damas plant were characterized by an Agilent 7890 B GC gas chromatography technique connected to an Agilent 5977 A MSD mass spectrometer powered by Mass Hunter GC/MS Acquisition software of the USA, located at Basra Oil / Nahran Omar Laboratories. The device contains a capillary column of type 5 DB-MS, which is a column of compact silica type with dimensions of 30 m in length and 0.32 mm in diameter, and the thickness of the static phase is 0.25 μm . High purity helium gas was used 99.9%. The separation process was carried out according to the thermal program of the GC-MS at a temperature of 40 $^{\circ}\text{C}$ for five minutes, then the temperature was raised to 150 $^{\circ}\text{C}$, then it was raised to a temperature of 250 $^{\circ}\text{C}$ at a rate of four temperatures per minute. The other conditions for the test were the mass spectrum of 70 electron volts, where the mass range ranged between 35-500 and the flow speed was 1.83 ml per minute .

:Results

The results of GC-MS, as shown in Table (1)Figure (2), that the aqueous extract differs from the alcoholic extract with chemical compounds, as the percentage of similarities with chemical compounds is very few, as there are only five similar compounds types between the two extracts, with different ratios , which are (Thiosulfuric acid ($\text{H}_2\text{S}_2\text{O}_3$),S-(2-aminoethyl) ester, L-Serine O-(phenylmethyl), MALONIC

ACID HEPT-6-YNYL, 1-Heptatatriacotanol, 2,7-Diphenyl-1,6-dioxopyridazino[4,5:2,3]pyrrolo[4,5-d]pyridazine). Most of these compounds well-known medical importance and are used in the pharmaceutical industries. The water extract contained 23 chemical compounds, and the highest percentage was recorded of the oily compound α .,.beta.-Gluc-octonic acid lactone, with a percentage of 19.67369%, and then for Procainamide, which recorded a percentage of 11.35737%, and then for Thiosulfuric acid (H₂S₂O₃), S- (2-aminoethyl) with 9.342453% and then the compound L-Serine O-(phenylmethyl) a Which recorded a ratio of 9.132159%. As for the alcoholic extract, it contains 22 chemical compounds. The highest of these compounds were recorded at (γ -Sitosterol oil> turbo compound α .-Amyrin, > oil compound 9,12-Octadecadienoic acid (Z,Z). - > oily compound n-Hexadecanoic acid) (23.66817, 16.28504 ,15.36112 , 14.05218) % respectively . The chemical compounds varied in the aqueous and alcoholic extracts The compounds varied many alkaloids, glycosides, terpenes, fatty acids, esters and phenolic compounds as shown in the table 1and 2,Figure (3).

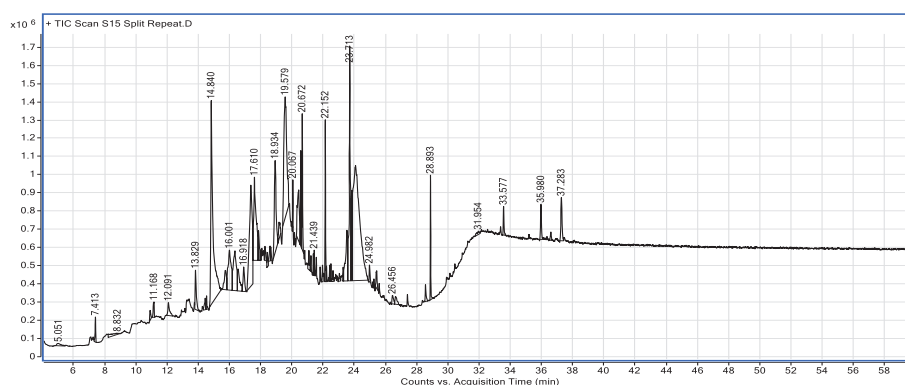


Figure (2) : Chemical composition of the aqueous extract of damas leave.

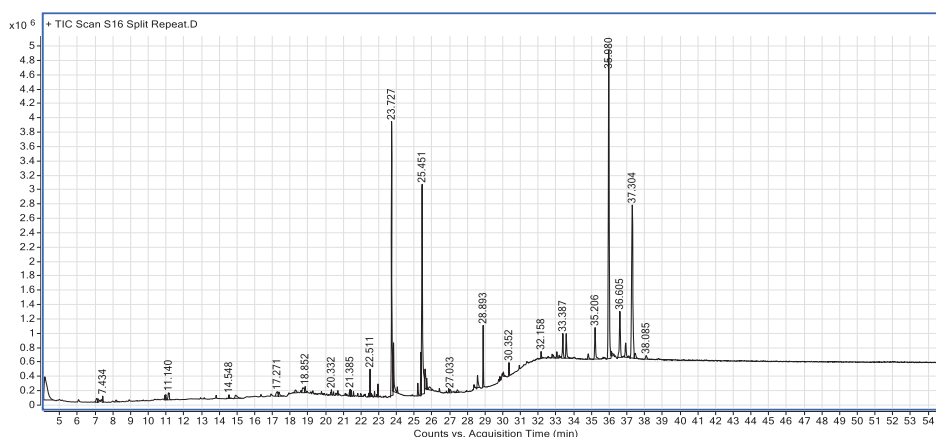


Figure (3) : Chemical composition of the alcoholic extract of damas leave.

Table (1) : Chemical compound of the aqueous extract of damas leave.

Name	Formula	Area%
Dicyclopentadiene diepoxide	C ₁₀ H ₁₂ O ₂	0.256789
6-Methyl-3-cyclohexen-1-carboxaldehyde	C ₈ H ₁₂ O	0.43119
2-(1-Butyl-2-nitroallyl)cyclohexanone	C ₁₃ H ₂₁ NO ₃	0.242199
- Cyclotetrasiloxane ,octamethyl	C ₈ H ₂₄ O ₄ Si ₄	0.402332
cis-Verbenol	C ₁₀ H ₁₆ O	0.570381
Benzeneethanamine ,N,.alpha.,.alpha.-trimethyl-	C ₁₁ H ₁₇ N	8.365925
Thiosulfuric acid (H ₂ S ₂ O ₃), S-(2-aminoethyl) ester	C ₂ H ₇ NO ₃ S ₂	9.342453
Procainamide	C ₁₃ H ₂₁ N ₃ O	11.35737
HEPT-6-YNYL MALONIC ACID	C ₁₀ H ₁₄ O ₄	3.226358
Aspidospermidin-17-ol,1- acetyl-16-methoxy	C ₂₂ H ₃₀ N ₂ O ₃	5.244552
alpha.-D-Glucopyranoside ,O-.alpha.-D-glucopyranosyl-(1.fwdarw.3)-.beta.-D-fruc	C ₁₈ H ₃₂ O ₁₆	7.439262
Lactose	C ₁₂ H ₂₂ O ₁₁	8.912035
10-Heptadecen-8-ynoic acid, methyl ester, (E)-	C ₁₈ H ₃₀ O ₂	0.402262
L-Serine,O-(phenylmethyl)	C ₁₀ H ₁₃ NO ₃	9.132159
Pluchidiol	C ₁₃ H ₂₀ O ₂	2.106315
Octadecadiynoic acid, trimethylsilyl ester 9,12-	C ₂₁ H ₃₆ O ₂ Si	0.263581
Estra-1,3,5(10)-trien-17.beta.-ol	C ₁₈ H ₂₄ O	6.567421
d-Glycero-1-gluco-heptose	C ₇ H ₁₄ O ₇	2.680219
.alpha.,.beta.-Gluco-octonic acid lactone	C ₈ H ₁₄ O ₈	19.67369
} Acetamide ,{N-methyl-N-[4-(3-hydroxypyrrolidiny)-2-butynyl]	C ₁₁ H ₁₈ N ₂ O ₂	0.344355
1-Heptatriacotanol	C ₃₇ H ₇₆ O	0.492812
-2,7-Diphenyl-1,6-dioxypyridazino[4,5:2',3']pyrrolo[4',5'-d]pyridazine	C ₂₀ H ₁₃ N ₅ O ₂	1.094792
2,1-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester	C ₂₄ H ₃₈ O ₄	1.451545

Table (2) : Chemical compound of the alcoholic extract of damas leave.

Name	Formula	Area%
Bicyclo[2.1.1]hexan-2-ol,2- ethenyl	C ₈ H ₁₂ O	0.236883
Silicic acid(H ₄ SiO ₄), tetraethyl ester	C ₈ H ₂₀ O ₄ Si	0.632122
Ethanimidothioic acid, 2-(dimethylamino)-N- [[[(methylamino)carbonyl]oxy]-2-oxo-, 9,12-Octadecadienoic acid(Z,Z)-	C ₇ H ₁₃ N ₃ O ₃ S	0.876631
Ethyl linoleate	C ₁₈ H ₃₂ O ₂	2.817194
n-Hexadecanoic acid	C ₂₀ H ₃₆ O ₂	0.59205
Phthalic acid, butyl oct-3-yl ester	C ₁₆ H ₃₂ O ₂	14.05218
Hexadecanoic acid, ethyl ester	C ₂₀ H ₃₀ O ₄	2.969574
tert-Hexadecanethiol	C ₁₈ H ₃₆ O ₂	0.291454
9,12,15-Octadecadienoic acid(Z,Z,Z)-	C ₁₆ H ₃₄ S	0.638435
Oleic Acid	C ₁₈ H ₃₀ O ₂	15.36112
Dasycarpidan-1-methanol acetate (ester)	C ₁₈ H ₃₄ O ₂	1.719293
Bis(2-ethylhexyl) phthalate	C ₂₀ H ₂₆ N ₂ O ₂	0.907072
Cyclotrisiloxane, hexamethyl-	C ₂₄ H ₃₈ O ₄	2.451672
Tris(tert-butyl)dimethylsilyloxy)arsane	C ₆ H ₁₈ O ₃ Si ₃	4.22003
.gamma.-Sitosterol	C ₁₈ H ₄₅ AsO ₃ Si ₃	0.580769
.alpha.-Amyrin	C ₂₉ H ₅₀ O	23.66817
1-Heptatriacotanol	C ₃₀ H ₅₀ O	16.28504
-2,7-Diphenyl-1,6-dioxopyridazino[4,5:2',3']pyrrolo[4',5'- d]pyridazine	C ₃₇ H ₇₆ O	1.213071
Thiosulfuric acid (H ₂ S ₂ O ₃), S-(2-aminoethyl) ester	C ₂₀ H ₁₃ N ₅ O ₂	6.481427
HEPT-6-YNYL MALONIC ACID	C ₂ H ₇ NO ₃ S ₂	1.039189
L-Serine,O-(phenylmethyl)	C ₁₀ H ₁₄ O ₄	1.858328
	C ₁₀ H ₁₃ NO ₃	1.108295

Discussion :

The results of the GC-MS revealed that some of the bioactive compounds that were found in the aqueous and alcoholic extract of the damas plant are of great medical importance, and this is what gives this importance to the plant, since the medicinal compounds found in this plant constitute a large proportion of it. Viewed Some of the chemical compound them are important in the treatment of cancerous diseases, such as compounds (9,12-Octadecadienoic acid(Z,Z)- ,. alpha.-Amyrin(Mangunwidjaja et al., 2006)). and some of them affect the digestive system and intestinal activity, as they encourage the growth of beneficial bacteria in the intestine, such as the compound (Lactose)(Katab , 2020). Some compounds act as antioxidants, cancer and arthritis, such as (n-Hexadecanoic acid ,Pluchidiol ,9,12-Octadecadienoic acid(Z,Z)- Glycoside, 9,12,15-Octadecadienoic acid(Z,Z,Z)- ,Hexadecanoic acid, ethyl ester ,Oleic Acid ,gamma.-Sitosterol , alpha.-Amyrin)(Hema *et al.* ,2011) compounds, and those that have a role in protecting the heart, such as (9,12,15-Octadecadienoic acid(Z,Z,Z)-)(Arora *et al.*2017) . some chemical compounds are important as antibacterialsuch as (gamma.-Sitosterol ,.alpha.-Amyrin ,Hexadecanoic acid, ethyl ester ,1-Heptatriacotanol)(Venkata *et al.*, 2012; Akpuaka *et al.*, 2013),,(Chitra and Karthikeyen , 2012). The current study agreed with the study of Al-Shatti *et al.*(2014) presence of some compounds and differed with them in other compounds that this

difference is due to the heterogeneity in the study area and environmental factors between the two plant which affects the nature of the compounds formed inside the solvent extraction method plant .

Table (3) : Some of chemical compound and important .

Chemical compound	Important
Procainamide	The medicine is used in cardiac systems (Shobha et al. (Ruba ,2021)
alpha.-D-Glucopyranoside ,O-.alpha.-D-glucopyranosyl-(1.fwdarw.3)-.beta.-D-fruc	Anticarcinogenic antimutagenic, antineoplastic and anti-thrombotic (Mohammed ,2016)
Lactose	Activates and enhances the work of the intestines and the digestive system, and this is done by encouraging the growth of beneficial bacteria present in the intestine. Prevents the risk of multiple diseases resulting from the growth of harmful bacteria that cause toxins and diseases within the intestine. It mainly helps children fight intestinal infections and provides the body with the necessary energy it needs. Lactose is a substance derived from carbohydrates, which in turn increases the energy level in the body in general Helps absorb, benefit from, and even retain minerals in the body, such as zinc, magnesium and manganese (katab , 2020)
Pluchidiol	Antioxidant and anti-inflammatory activity (Kavitha ,2021)
1-Heptatriacotanol	Anti-hypercholesterolemic Flavoring Agents, Insect sex pheromone, antiacne agents, antibiotic (Butler <i>et al.</i> , 1981; Kubo <i>et al.</i> , 1994)
9,12-Octadecadienoic acid(Z,Z)-	Anti-inflammatory, antiarthritic, antioxidant, anticancer (Mangunwidjaja <i>et al.</i> , 2006). Hypocholesterolemic, cancer preventive, hepatoprotective, nematocidic, Insectifuge, antihistaminic, Antieczemic, antiacne, 5-alpha reductase inhibitor, antiandrogenic anticoronary insectifuge (Rajeswari <i>et al.</i> , 2012). Antiarteriosclerotic, anti-anaphylactic, antiprostatic (Rajeswari and Srinivasan 2015).
n-Hexadecanoic acid	Antioxidant, hypocholesterolemic , anti-inflammatory property, 5-alpha-reductase inhibitor Anti-inflammatory, nematocidic, pesticide, lubricant, antiandrogenic, flavor, hemolytic 5-alpha reductase inhibitor, antioxidant, hypocholesterolemic Kumar and Rajakumar (2016). Antioxidant, hypocholesterolemic nematocidic, pesticide, antiandrogenic flavor, hemolytic, 5- Alpha reductase inhibitor (Hema <i>et al.</i> 2011).
Hexadecanoic acid, ethyl ester	Antibacterial, antioxidant, Antioxidant, hypocholesterolemic, nematocidic, pesticide, antiandrogenic flavor, hemolytic, 5-alpha reduct-

	ase inhibitor, antifibri-nolytic, lubricant, antialo-pecic (Selvan and Velavan, 2015), anti-inflammatory (Hema <i>et al.</i> , 2011), cancer preventive, hepatopro-TECTIVE, antihistaminic, anti-eczemic, antiachne, antiar-thiritic, anticoronary (Krishnamoorthy and Subramaniam 2014), antibacterial, antifungal (Chandrasekaran <i>et al.</i> , 2011)
9,12,15-Octadecadienoic acid(Z,Z,Z)-	Preventive against cardiovascular disease (Arora <i>et al.</i> ,2017),normal growth and development, anti cancer , anti-diabeec.anti-atheiosclerotic,anti-hypertensive,anti-microbial activity Hypocholesterolemic Nematicide Antiarthritic Hepatoprotective Anti androgenic Hypocholesterolemic 5-Alpha reductase inhibitor Antihistaminic Anticoronary Insectifuge Antieczemic Antiacne ,(Chitra and Karthikeyen , 2012)
Oleic Acid	5-alpha-reductase inhabitior,anticancer, Insectifuge, 36nti-inflammatory, cancer preventive and hypocholesterolemic , Antimicrobial, edible oils, Fish Oil Supplementation, Colorectal Cancer Prevention, Flavoring Agents, Insecticide, Acaricide, Herbicide, Plant growth regulator, Surfactants Lubricants, Paint additives (Dilika <i>et al.</i> , 2000)
.gamma.-Sitosterol	used to treat Hyperlipidemias, Antioxidant, antibacterial and prophylactic activities (Venkata <i>et al.</i> , 2012; Akpuaka <i>et al.</i> , 2013)
.alpha.-Amyrin	Anticancer, anti inflammatory and Antimicrobial,(Chitra and Karthikeyen , 2012)

Conclusion:

We conclude through the research that the chemical compounds differ according to the quality of the extract, as the aqueous extract differs from the alcoholic extract in the chemical compounds in it, as it is similar in only five chemical compounds, as well as the percentage of these compounds differs in the aqueous extract from the alcoholic extract, and that some of these compounds are of great medical importance It constitutes a high percentage of the extract and is used in many pharmaceutical industries.

References:

- Abd Ali B. A. (2013). An environmental study on the conocarpus tree Conocarpus lancifolius Engl. Newly entered to Iraq. Research entrance and museum of natural history – Baghdad University. 2(207).(in arabic)
- Akpuaka, A.; Ekwenchi, MM. and Dashak, D. A. (2013). Biological Activities of Characterized Isolates of n-Hexane Extract of *Azadirachta Indica* A. Juss (Neem) Leaves. Nature and Science, 11(5):141-147.

- AL- Fakiki, D. F. A. 2013. Determination of the fatty acids of the oil from the kernels of four date palm cultivars (*Phoenix dactylifera* L.) using gas chromatography-connected mass spectrometry (GC-MS). Basra Journal of Date Palm Research, Vol. 12, p. 1-2, p. 16-30. <https://search.emarefa.net/detail/BIM-372788>(in arabic)
- AL-Dabbagh ,R. A. (2013). The damas tree whats for it and whats on it .Articale in ALKhaleej Emirates Newspaper(in Arabic)
- AL-Fakiki D. F. A. (2013). Extraction, purification and characterization of the alpha-amylase enzyme extracted from germinated sorghum kernels. Basra Research Journal: Operations, Vol. 39, p. 1b, pp. p. 13-26. (in arabic)
- Al-Kinani A. H. A. (2020). Molecular and chemical study of some types of medicinal plants of the labiatae family with an explanation of their role as antioxidants. Master's thesis. University of Basra. College of Science. biology Sciences.
- Al-Maliki H. H. N. (2012) The use of the *Conocarpus lancifolius* Engl. As a bioaccumulator of some heavy metals in Basra Governorate. Higher diploma thesis. Albasrah university . Faculty of Science Department of Environment(in arabic)
- Al-Saad O. A. L. (2020) A chemical and molecular study of some species of the brassicaceae family and the effect of glycoside extracts and antioxidants. Master Thesis . College of Science . Department of biology. (in arabic)
- AL-Satti ,H.A.;Amina, R. ;Patrice, S. and Redh, A. (2014) .The Allelopathic Potentiol of *Conocarpus lancifolius* (Engl.) Leaves on dicot (*Vigna sinensis* L.),Monocot (*Zea mays* L.)and soil –Borne Pathogenic Fungi. American J.of plant science.2889-2903.
- Aneesh S.(2013). Asian J Pharm Clin Res.; 6(3):68-74.
- Arora K. (2017). Screening and evaluation of bioactivecomponents of *Cenchrus ciliaris* L. by GC-MS analysis.International Research Journal of Pharmacy 8 (6): 69-76.
- Butler L. I.; McDonough L. M. (1981) Insect sex pheromones: Evaporation rates of alcohols and acetates from natural rubber septa. Journal of Chemical Ecology. 7(3):27–633.
- Chandler, S. E.(1982) . Letter ex Imperial Institute, London accompanying Kew Herbarium specimen . Quot. From Booth and Wickens,1988.
- Chandrasekaran, M.; Senthilkumar, A. and Venkatesalu, V.(2011). Antibacterial and antifungal efficacy of fatty acid methyl esters from leaves of *Sesuvium portulacastrum* L. Eur. Rev. Med. Pharmacol. Sci., v. 15, no. 7, p. 775-780.
- Chitra S. and Karthikeyan J.(2018). Phytochemical profiling of act whiskers (*orthosiphon stamineus*) tea leaves extract . Jorunal of pharmacognous and phytochemistry ; 7(6):1396-1402 .
- Dilika, F.; Bremner, PD. and Meyer JJM. (2000). Antibacterial activity of linoleic and oleic acids isolated from *Helichrysum pedunculatum*: a plant used during circumcision rites. Fitoterapia, 71(4):450-452.
- Dinesh kumar, G. and Rajakumar, R.(2016). Gas Chromatography-Mass Spectrometry Analysis of Bioactive Components from the Ethanol Extract of *Avicennia marina* Leaves. Innovare Journal of Science; 4(4):9-12.
- Harborne , J.B. (1984) . Phytochemical methods : Aguide to modern techniques of plant analysis. Chapman and Hall . London pp 278 .
- Hema, R.; Kumaravel, S.; Alagusundaram, K.(2011). GC/MS determination of bioactive components of *Murraya koenigii*. Journal of American Science, v. 7, no. 1, p. 80-83
- International Plant Names Index (IPNI) Copyright (2005).

- IUCN, (2012). IUCN Red List of Threatened Species. Version 2012.2. <www.iucnredlist.org>.
- Katab Zyada .2020 . what do you Knowabout his nutritional value .
- Kavitha R. (2021). Phytochemical screening and GC-MS analysis of bioactive compounds present in ethanolic extracts of leaf and fruit of trichosanthesis dioica roxb. International Journal of Pharmaceutical Sciences and Research.DOI: 10.13040/IJPSR.0975-8232.12(5).2755-64.
- Krishnamoorthy, K.; Subramaniam, P.(2014) Phytochemical profiling of leaf, stem, and tuber parts of Solena amplexicaulis (Lam.) Gandhi using GC-MS. InternationalScholarly Research Notices, v, Article
- Kubo, I.; Muroi, H. and Kubo A. (1994). Naturally Occurring Antiacne Agents. Journal of Natural Products, 57(1):9-17.
- Mahmood I. Sh., (1993) ,Trees of Pakistan . 142 pp pdf.usaid.gov/pdf_docs/pnabw250.pdf
- Malik, S. ;Muhammad, A. ;Bashir, A. Ch.; Hafiza, S. Y. ;Muhammed, U. and Khurram, A. (2020).Isolation characterizathion and preliminary cytotoxic and antifungal evaluations of novel Lancifoliolate isolated form methanol extract of Conocarpus lancifolius. Anti- Cancer Agents in Medicinal Chemistry . . 20-14. DIO : 10.2174/1871520620620666200424110923
- Malik, S. ;Muhammed, A. ;Shabana, B. ;Muhammed, A. S. ;Tahir, A.C.; Azhar, R.; Muhammad, U. ;Mohammed, A.; Sara, T. E. and Gabar E. (2021) .Phytochemical and Molecular Dynamic Analysis ofNovel Biomolecule Lancifotarene Extracted From Conocarpus Lancifolius as Cytotoxic, Antiureaseand Antidiabetic Agent . DOI:
- Mangunwidjaja, D. S.; Kardono, S. R. and Iswantini, L. B. S. D.(2006) Gas chromatography and gas chromatography-mass spectrometry analysis of Indonesian Croton tiglium seeds. J.AppliedSci., v. 6, no. 7, p. 1576-1580.
- Medlool Narges Kazem (2021). Histological and physiological study of the effect of the good plants cynomorum co cinema and lichen (distance tubulosa) on testes of laboratory mice. Master's thesis, College of Science. Department of biology(in arabic)
- Mellon, F.(2000) Mass Spectrometry of Natural Substances in Foods. RSC Bood Analysis Monographs, Ed. Belton. The Royal Society Chemistry Cambridge, U.K.
- Mirbahar, M. B.and Yaseen ,S. M.,(1996). Disposal of saline drainage water in agro-forestry systems. Proceedings of th drainage workshop on drainage and the environment, Ljubljana, Slovenia, April21 - 29,1996 . pp.497 -504.
- Mohammed, Y. H.;Ghaidaa, J. M. and Iman, H. H. 2016.Analysis of bioactive chemical compounds of Nigella sativa using gas chromatography-mass spectrometry . Journal of Pharmacognosy and Phytotherapy,2141-2502 .DOI: 10.5897/JPP2015.0364 .
- Olaleye, OO.; Kukwa, RE.; Eke, MO. and Aondo ,TO. (2018).Extraction, Physicochemical and PhytochemicalCharacterization of Oil from Sesame Seed. Asian FoodScience Journal 1 (4): 1-12.
- Rajeswari, B. and Srinivasan, M.(2015).GC-MS analysis of bioactive components from the ethanolic leaf extract of Flueggea leucopyrus Wild. International Journal of Pharmaceutical Sciences Review and Research, v. 33, no. 1, p. 270-273.
- Rajeswari, G.; Murugan, M. and Mohan, V. R.(2012) GC-MS analysis of bioactive components of Hugonia mystax L. (Linaceae). Research Journal of Pharmaceutical, Biological and Chemical Sciences, v. 3, no. 4, p. 301-308.
- Ruba ootom .(2021). Procainamide mediciane .
- Selvan, P. S. and Velavan, S.(2015) Analysis of bioactive compounds in methanol extract of Cissus vitiginea leaf using GC-MS technique. Rasayan Journal of Chemistry, v. 8, no. 4, p. 443-447.

Suleman, P., Redha, A., Afzal, M. and Al-Hasan, R. (2013) Temperature-Induced Changes of Malondialdehyde, Heat-Shock Proteins in Relation to Chlorophyll Fluorescence and Photosynthesis in *Conocarpus lancifolius* (Engl.). *Acta Physiologiae Plantarum*, **35**, 1223-1231.

Venkata, R.; Samuel, L.; Pardha ,SM.; Narasimhan, R.; Naga ,VKA.; Sudhakar, M. and Radhakrishnan TM. (2012). Antibacterial, antioxidant activity and GC-MS Analysis of *Eupatorium odoratum*. *Asian Journal of Pharmaceutical and Clinical Research*, 5(2):0974-2441.