GSC Biological and Pharmaceutical Sciences
eISSN: 2581-3250 CODEN (USA): GBPSC2
Cross Ref DOI: 10.30574/gscbps
Journal homepage: https://gsconlinepress.com/journals/gscbps/

(REVIEW ARTICLE)

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The antifungal spectrum of medicinal plants: A review

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GSC Biological and Pharmaceutical Sciences, 2023, 24(01), 118–146

Publication history: Received on 03 June 2023, revised on 11 July 2023, accepted on 14 July 2023

Article DOI: https://doi.org/10.30574/gscbps.2023.24.1.0277

Abstract

Medicinal plant possessed antifungal effects by many mechanisms, they caused membrane disturbance resulting in the loss of membrane integrity, inhibited DNA transcription and reduced the cell populations, inhibited the activity of fungal antioxidant enzymes and inhibited fungal biofilm formation. The current review discussed the antifungal effects of medicinal plants.

Keywords: Medicinal plant; Pharmacology; Antifungal**;** Natural; Therapeutics

1. Introduction

Traditional medicine is based on beliefs and practices that existed before the development of so-called modern medicine or scientific drug therapy. However, the recent pharmacological studies showed that the medicinal plants exerted many pharmacological effects, among these, the antifungal properties against dermatophytes and yeasts as a single treatment or combined with other antifungal agents, and some clinical trials showed that medicinal plants can be applied as an alternative antifungal agents for fungal diseases caused by traditional drugs- resistant fungal species [1-5]. Medicinal plant possessed antifungal effects by many mechanisms, they caused membrane disturbance resulting in the loss of membrane integrity, inhibited DNA transcription and reduced the cell populations, inhibited the activity of fungal antioxidant enzymes and inhibited fungal biofilm formation [6-16]. The current review will highlight the antifungal effects of medicinal plants.

Table 1 Medicinal plants with antifungal effects

Medicinal plants	Active components	Antifungal spectrum	Ref.
Adiantum capillus-veneris	extracted phenols	*Aspergillus niger* and *Rhizopus stolonifer*	17-18
Alhagi graecorum	methanol extract	*Aspergillus flavus, Alternaria alternate, Fusarium oxysporum, Fusarium solani, Bipolaris oryzae, Chetomium* and *Mucor*	19-20
Allium sativum	aqueous extract	*Cryptococcus neoformans*, *Candida*, *Cryptococcus*, *Trichophyton*, *Epidermophyton*, and *Microsporum* species	21-26
Alpinia galangal	essential oil from fresh rhizomes	*Trichophyton mentagrophytes*, *Trichophyton mentagrophytes, Trichophyton rubrum, Trichophyton concentricum, Rhizopus stolonifer,*	27-33

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		Aspergillus niger, *Colletotrichum musae* and *Fusarium oxysporum*	
Ammi majus	acetone and 95% ethanol extract	*Neurospora crassa*	34-35
Anchusa strigosa	aqueous extract	*Microsporum canis, Trichphyton mentagrophytes* and *Trichphyton violaceum*	36-37
Apium graveolens	methanolic extract	*Trichphyton longifuss, Candida albicans, Aspergillus flavus, Microsporum canis, Fusarium solani and Candida glabrata*	38-39
Arachis hypogaea	stilbenoids	Genera: Colletotrichum, Botrytis, Fusarium, and Phomopsis	40-43
Arundo donax	crude extracts	*Trametes versicolor , Coniophora puteana, Gloephyllum trabeum* and *Postia placenta*	44-45
Asclepias curassavica	crude methanolic extract	*Helminthosporium oryzae, Aspergillus niger* and *Fusarium oxysporum*	46-49
Asparagus officinalis	saponin	*Candida, Cryptococcus, Trichophyton, Microsporum* and *Epidermophyton* Species	50-52
Asphodelus fistulosus	aqueous extract	*Trichophyton violaceum*	53
Avena sativa	protein fraction	*Penicillium roqueforti*	54-55
Ballota nigra	essential oils	*Fusarium, Botrytis cinerea,* and *Alternaria solani*	56-58
Bellis perennis	triterpenoid glycosides	*Candida* and *Cryptococcus* species	59-60
Benincasa hispida	methanolic extract	*Candida albicans* and *Aspergillus niger*	61-62
Betula alba	betulinic acid	*Candida albicans*	63-64
Bidens tripartitus			
Brassica nigra			
Brassica rapa	peptide, crude extracts and fractions	*Candida albicans*, *Fusarium oxysporum* and *Mycosphaerella arachidicola*	65-69
Caesalpinia crista	α-(2-hydroxy-2-methylpropyl)-ω- (2-hydroxy-3-methylbut-2-en-1-yl) polymethylene, isolated from ethyl acetate leaf extract	*Candida albicans* and *Rhodotorula* Species	70-71
Calamintha graveolens	essential oil	*Candida albicans*	72
Calendula officinalis	methanol and ethanol extracts	*Candida albicans , Candida dubliniensis* and *Candida parapsilosis*	73-77
Calotropa procera	crude flavonoid, chloroform, methanol and ethyl acetate extracts	*Trichophyton rubrum, Trichophyton tonsurans, Trichophyton mentagrophyte, Epidermophyton floccosum, Aspergillus* Sp. and *Fusarium solani*	78-81
Capparis spinosa	ethanolic extract	*Alternaria alternata, Fusarium oxysporum, Phoma destructiva, Rhizoctonia solani,* and *Sclerotium rolfsii*	83-84

Capsella bursa-pastoris	shepherin I and II peptides	*Candida* species	85-86
Capsicum annum	extracts	*Aspergillus niger* and *Candida albicans*	87-88
Carum Carvi	essential oil	*Fusarium sulphureum, Phoma exigua var. foveata, Helminthosporium solani, Cladosporium cladosporioides, Fulvia fulvium, Alternaria alternata, Phoma macdonaldii* and *Phomopsis helianthi*	89-90
Cassia occidentalis	crude extracts	*Candida albicans*, *Aspergillus clavatus* and *Aspergillus niger*	91-92
Chenopodium album	methanol and n-hexane extracts	*Macrophomina phaseolina* and *Candida albicans*	93-95
Chrozophora tinctoria	crude methanol extract	*Fusarium moniliformes, Fusarium oxysporum, Fusarium solani, Aspergillus niger, Aspergillus fumigatus, Aspergillus flavus, Alternaria* sp., *Mucor* sp., *Rhizoctonia solani,* and *Cochliobolus sativus*	96-98
Chrysanthemum cinerariaefolium	methanolic and ethanolic leaf extract	*Candida tropicalis*, *Candida albicans*, *Candida albicans*, *Candida parapsilosis* and *Candida cruzei*	99
Cicer arietinum	several peptides	*Candida krusei, Candida tropicalis, Candida parapsilosis, Mycosphaerella arachidicola*, *Botrytis cinerea*, *Fusarium oxysporum* and *Drechslera tetramera*	100-104
Cichorium intybus	seeds extract/ fractions guaianolides-rich root extracts	*Aspergillus flavus* and *A. niger, R. solani* and *Sachharomyces cerevisiae* . *Trichophyton tonsurans*, *T. rubrum,* and *T. Violaceum*	105-108
Cistanche tubulosa	crude extract, phenylethanoid glycosides, campneosid I and II	*Aspergilus niger and Aspergilus fumigates*	109
Citrullus colocynthis	aqueous and diluted acetone extracts	*Candida glabrata*, *Candida albicans*, *Candida parapsilosis, Candida kreusei*, *Aspergillus ochraceus* and *Aspergillus flavus*	110-112
Citrus (*C aurantifolia, C limonum, C medica, C medica var limetta, C sinensis*)	juice of the fruit, burnt rind of the fruit and oil	*Aspergilus niger*, *Aspergillus flavus, Aspergillus fumigates, Candida albicans*, *Mucor* Sp and *Pencillium* Sp.	113-122
Clerodendrom inerme (*Volkameria inermis*)	ethanol, benzene and aqueous extracts	*Aspergillus niger*, *Aspergillus flavus*, *Candida albicans*, *Candida glabrata, Epidermophyton floccosum, Trichophyton mentagrophytes, Trichophyton rubrum, Trichophyton tonsurans*, *Aspergillus niger, Aspergillus flavus, Curvularia lunata, Botrytis cinerea* and *Fusarium oxysporum*	123-125
Clitoria ternatea	crude extract and protein	*Cryptococcus neoformans, Cryptococcus albidus, Cryptococcus laurentii, Candida albicans*, *Candida parapsilosis*, *Curvularia* sp., *Alternaria* sp., *Cladosporium* sp., *Aspergillus flavus, Aspergillus fumigatus, Aspergillus niger, Rhizopus* sp., *Sclerotium* sp, *Rhizoctonia solani, Fusarium solani, Colletotrichum lindemuthianum, Lasiodiplodia*	126-131

		theobromae, Pyricularia grisea, Bipolaris oryzae and *Colletotrichum gloeosporioides*	
Corchorus acutangulus (*Corchorus aestuans*)	various solvent extracts	*Aspergillus niger, Candida albicans, Candida tropicalis, Candida kefyr, Cryptococcus neoformans*, *Rhizopus stolonifer* and *Saccharomyces cervisiae*	132-133
Corchorus capsularis	crude methanolic extract	*Candida albicans* and *Saccharomyces cerevisiae*	134-135
Coriandrum sativum	essential oils	*Aspergillus niger, Candida albicans, Candida kefyr, Candida tropicalis*, *Microsporum canis*,	136-144
Cressa cretica	hexane, ethyl acetate and methanol extracts	*Candida albicans, Candida tropicalis, Aspergillus fumigatus, Aspergillus flavus*, *Aspergillus niger*, *Fusarium oxysporum*, *Penicillium citrinum, Paecilomyces varioti*, *Microsporum gypseum* and *Trichophyton rubrum*	145-149
Crotalaria juncea	aqueous extract	*Aspergillus flavus, A. niger, Fusarium solani, Macrophomina phaseolina and Rhizoctonia solani*	150-151
Cuminum cyminum	essential oil	*Trichophyton rubrum*, *Candida albicans*, *Aspergillus niger, Aspergillus flavus*, *Saccharomyces cerevisiae* and *Candida albicans*, *R. stolonifer*, *Verticillium dahliae*, *Rhizoctonia cerealis*, *Alternaria alternata*, *Alternaria solani*, *Gaeumannomyces graminis*, *Sclerotinia sclerotiorum*, *Phytophthora capsici*, *Thanatephorus cucumeris*, *Blumeria graminis*, and *Botrytis cinerea*	152-166
Cupressus sempervirens	chloroform extracts and essential oil	*Candida albicans, C. terus*, *Trichoderma reesei*, *Saccharomyces cerevisiae*, *Aspergillus niger, Aspergillus flavous, Aspergillus fumigatus, Fusarium solani, Fusarium oxysporium, Fusarium culmorum*, *Fusarium equisiti*, *Fusarium verticillioides*, *Fusarium nygamai*, *P. digitatum, Botrytis cinerea, Microdochium nivale* var. nivale and *Alternaria* sp	167-173
Cydonia oblonga	ethanolic and acetonic extracts	*Aspergillus niger*	174-175
Cymbopagon schoenanthus	aqueous and organic extracts	*A. flavus, A. niger, C. spicifer, F. dimerum, M. circinelloides*, *Alternaria alternata*, *Cochliobolous spicifer*, *Stachybotrys atra* var microspora, and *Ulocladium botrytis*, *Candida albicans*, *Candida tropicalis*, *Candida krusei*, *Epidermophyton floccosum*, *Trichophyton rubrum*, *Trichophyton mentagrophytes*, *Trichophyton verrucosum* and *Microsporium canis*	176-178
Cynodon dactylon	ethanol, methanol, acetone, chloroform, hexane and petroleum ether extract	*Aspergillus niger, Candida albicans, Candida kefyr* and *Candida tropicalis*	178-179
Cyperus rotundus	essential oil	*Candida parapsilosis, Aspergillus flavus, Aspergillus fumigatus* and *Fusarium oxysporum*	180-182
Dactyloctenium aegyptiacum	ethyl acetate, *n*-butanol and ethanolic extracts	*Aspergillus fumigates, Aspergillus niger* and *Candida albicans*	183-184

Datisca cannabina	crude extracts	*Candida albicans* and *Aspergillus niger*	185
Datura fastuosa	hexane, chloroform, acetone, methanolic fractions and 2beta-(3,4-dimethyl-2,5-dihydro-1H-pyrrol-2-yl)-1'-methylethyl pentanoate isolated from the leaves	*A. fumigatus, A. flavus* and *A. niger*.	186-188
Datura stramonium	chloroform and ethanol extracts of branches and leaves	*Candida albicans, Candida utilis, Saccharomyces cerevisiae, Aspergillus fumigates, Aspergillus niger, Aspergillus parasiticus, Fusarium semithectum*, *Fusarium colmorum, Fusarium oxysporum, Ceratocystis ulmi* and *Rhizoctoina solani*, *Colletotrichum gloeosporioides*, *Trichoderma harzianum*, *Phytophthora nicotiana*, *Pythium ultimum* and *Rhizoctonia solani*	189-198
Desmostachya bipinnata	Ethanolic extract	*Candida tropicalis, Candida albicans*, *Aspergillus fumigates, Aspergillus flavus* and *Pencillium chrysogenum*	199-200
Dianthus caryophyllus	two benzoic acid derivatives, protocatechuic acid (3,4- dihydroxybenzoic acid) and vanillic acid (4-hydroxy-3-methoxy benzoic acid)	*Fusarium oxysporum*	201-202
Dodonaea viscose	aqueous, methanol, chloroform and acetone extracts	*Candida albicans*, *Curvularia lunata*, *Fusarium oxysporum*, *Penicillium citrinum, Aspergillus niger*, *Aspergillus flavus, Paecilomyces varioti, Microsporum gypseum,* and *Trichophyton rubrum*	203-208
Dolichos lablab (syn: *Lablab purpureus*)	chloroform, n-hexane, ethyl acetate extracts	*Saccharromyces cerevaceae*, *Candida albicans, Aspergillus niger, Fusarium oxysporum, Rhizoctonia solani, Coprinus comatus*	209-212
Echinochloa crus-galli	peptide EcAMP1	*F. graminearum, F. solani, A. alternata*, *A. solani*, *B. sorokiniana, P. infestans*, *P. debaryanum*, and *P. Ultimum*	213-214
Echium italicum	oil	*Aspergilus niger* and *Candida albicans*	215-216
Ephedra alata and *Ephedra foliata*	different crude extracts	*Aspergillus fumigatus*, *Penicillium italicum Syncephalastrum racemosum*, and *Candida albicans*	217-219
Equisetum arvense	oil	*Aspergillus niger* and *Candida albicans*	220-221
Erigeron Canadensis (Syn: *Conyza canadensis*)	essential oil, ethanol and methanol extracts	*T. longifusus, M. canis, Candida albicans*, *Candida glabrata*, *Candida parapsilosis*, *Candida tropicalis*, *C. lindemuthianum, Cryptococcus neoformans, A. flavus, F. solani* and *C. glaberata*	222-228
Erodium cicutarium	essential oils	*A. restrictus*, *A. chrysogenum, A. fumigatus* and *C. Albicans*	227-228
Eryngium creticum	aqueous extracts	*M. canis, T. mentagrophytes* and *T. violaceum*	229-230

Eucalyptus Species	essential oil, methanolic and aqueous leaf extracts	*Aspergillus niger*, *Candida albicans*, *Penicillium digitatum, Microsporum canis, Microsporum gypseum, Tricophyton rubrum, Tricophyton schoenleinii, Tricophyton mentagrophytes* and *Epedermophyton floccosum*	231-236
Eupatorium cannabinum	essential oil, chloroformic, water and hydroalcoholic extract	*Candida albicans, Aspergillus niger, Trichoderma lignorum* and *Fusarium oxysporum*	237-239
Euphorbia hirta (syn: *Euphorbia pilulifera*)	acetone, chloroform, ethyl acetate, benzene, butanol, ethanol, dimethyl formamide and diethyl ether extracts	*Candida albicans*, *T. mentagrophytes, Aspergillus niger, Aspergillus flavus, Aspergillus fumigatus, Aspergillus erythrocephalus* and *Fusarium* spp.	240-244
Euphorbia tinctoria (syn: *Euphorbia macroclada*)	methanol extracts of the flowering branches	*Candida albicans*, *Candida tropicalis, Candida glabrata*, *Candida tropicalis*, *Candida parapsilosis*, *Candida krusei, Trichophyton* sp., *Epidermophyton* sp., *Verticillium dahliae*, *Fusarium oxysporum*, *Rhizopus stolonifer*, *Penicillium italicum*, *Rhizoctonia solani*, *Alternaria solani*, *Stemphylium solani*, *Cladosporium* sp., *Mucor* sp., and *Pythium* sp.	245-247
Fagopyrum esculentum	peptides	*Fusarium oxysporum* and *Mycosphaerella arachidicola*	248-249
Ficus carica	methanolic, ethyl acetate, hexan and chloroformic extracts	*Candida albicans*, *Cryptococcus neoformans* and *Microsporum canis*	250-252
Ficus religiosa	oil and aqueous extract of bark leaf, stem and fruit	*Aspergillus niger* and *Candida albicans*	253-255
Foeniculum vulgare	essential oil, organic and aqueous leaves extracts	*Aspergillus niger*, *Aspergillus flavus, Fusarium graminearum*, *Candida albicans* and *Rhizopus stolonifer*	256-260
Fraxinus ornus	*n*-hexane fraction of seeds	*Candida albicans*	261
Fumaria officinalis	N-octacosan 7β ol isolated from the methanol extract	*Candida albicans* and *Aspergillus niger*	262-263
Galium aparine	lipophilic complex	*Candida albicans*	264-266
Galium verum	water, alcohol (70%) and chloroform extracts	*Candida albicans*	267
Glossostemon bruguieri	ethanolic extract	*Aspergillus flavus*, *Aspergillus fumigates* and *Penicillium chrysogenum*	268
Glycyrrhiza glabra	extracts of rhizomes and roots	*Candida albicans, C. glabrata, C. parapsilosis, C. tropicalis Aspergillus niger, Aspergillus flavus, Aspergillus awamorii* and *Rhizopus solani*	269-271
Gnaphalium luteoalbum	acetone leaf extract	*Aspergillus parasiticus, Aspergillus niger, Colletotrichum gloeosporioides, Fusarium oxysporum, Penicillium expansum, Penicillium janthinellum, Phytophthora nicotiana, Pythium ultimum* and *Trichoderma harzianum*	272

Gossypium Species	basic proteins and oils	*Trichophyton rubrum, Candida albicans*, *Botrytis cinerea*, *Alternaria brassicicola*, *Chalara elegans* and *Fusarium oxysporum*	274-275
Haplophyllum species	ethanolic, polyphenolic and alkaloid extracts	*Aspergillus fumigates, Aspergillus flavus*, *Aspirinillus parasiticus, Geotricum candidum* and *Syncephalastrum racemosum, Aspirinillus parasiticus* and *Mucor* sp	276-278
Hedera helix	α-hederin	*Candida* sp	279-281
Helianthus tuberosus	The leaf extracts and phenolic acids	*Botrytis cinerea, Colletotrichum gloeosporioides, Phytophthora capsici, Alternaria solani*, *Rhizoctonia cerealis* and *Rhizoctonia solani*	282-284
Helicophyllum Species	The ethanolic leave extracts	*C. tropicalis, C. albicans, C. dublicans,* and *C. krusei*	285-286
Heliotropium Species	*n*-hexane, butanol, aqueous, ethyl acetate methanol and chloroform leaves, flowers, and stem extracts	*Aspergillus niger, Aspergillus flavus, Aspergillus parasiticus, Aspergillus oryzae, Aspergillus fumigates*, *Trichoderma longibrachiantum, Fusarium solani* and *Candida albicans*	287-288
Hibiscus rosa-sinensis	methanol, chloroform, n-hexane and aqueous extracts	*Candida parapsilosis, Candida glabreta*, *Candida albicans* and *Aspergillus niger, Aspergillus flavus* and *Trichophyton rubrum*	289-291
Hibiscus sabdariffa	methanolic leaves extracts	*Candida albicans*, *Aspergillus niger*	292-295
Hyoscyamus Species	methanolic extracts of the seeds	*Candida albicans, Candida tropicalis*, *Candida guilliermondii*, *Candida krusei*, *Candida glabrata, Candida lusitaniae, Candida kefyr, Candida parapsilosis, Cryptococcus neoformans, Aspergillus fumigatus*, *Aspergillus flavus, Scopulariopsis brevicaulis, Cryptococcus laurentii, Trichophyton mentagrophytes*, *Trichophyton rubrum*, *Trichophyton soudanense*, *Microsporum canis*, *Microsporum gypseum*, *Epidermophyton floccosum*	296-298
Hypericum triquetrifolium	essential oils	*Aspergillus niger, Fusarium solani, Botrytis cinerea, Candida albicans, Candida glabrata* and *Candida krusei*	299-301
Inula graveolens (Syn: Dittrichia graveolens)	Volatile oil	*Candida albicans*	302-303
Iris pallid	Iridal, a triterpenoidic compound	*Candida albicans* and *Candida parapsilosis*	304
Jasminum officinale	different solvent extracts of the flowers and whole plant (leaves, barks and roots)	*Candida albicans* and *Aspergillus niger*	306-307
Jasminum sambac	methanol extract and essential oil	*Malassezia* sp and *Alternaria* sp	308-310
Juglans regia	methanolic, ethyl acetate, alkaloid, and hydrolyzed	*Ascosphaera apis* and *Candida albicans*	311-313

	methanolic extract of the leaves		
Juniperus communis	many fractions as well as essential oil	*Candida albicans*, *Alternaria* sp, *Aspergillus nidulans*, and *Aspergillus niger*	314-315
Juniperus oxycedrus	methanolic extract of the leaves and oil	*Alternaria tenuis, Aspergillus niger, Fusarium oxysporum, Penicillium coryophilum*, *Trichophyton rubrum* and *Candida albicans*	316-319
Lagerstroemia indica	petroleum ether, chloroform, methanol and distilled water extracts of the barks, leaves and fruits	*Candida albicans*, *A. oryzae*and and *A. niger*	320-321
Lagerstroemia speciosa	various extracts of the fruits	*Aspergillus niger, Aspergillus flavus* and *Candida albicans*	322
Lallemantia royaleana	methanolic seed extract and essential oil	*Aspergillus flavus, Aspergillus niger, Aspergillus parasitic, Candida albicans* and *Saccharomyces cervisiae*	323-324
Lantana camara	petroleum ether, acetone, methanolic and water extracts	*Trichophyton mentagrophytes, Candida albicans, Candida tropicalis, Saccharomyces cerevisiae, Aspergillus niger, Aspergillus fumigates, Aspergillus flavus, Penicillium spp., Fusarium oxysporum, Alternaria alternata, Sclerotium rolfsii* and *Curvularia lunata*	325-329
Lawsonia inermis	lawsone and methanol, ethanol, chloroform, ethyl acetate and aqueous leaf and bark extract	*Aspergillus niger, Aspergillus flavus,* and *Penicillum notatum* and *Fusarium* sp**,** *Epidermophyton floccosum, Mirosporum audouinii, Microsporum gypseum, Microsporum fulvum, Trichophyton rubrum, Trichophyton concentricum, Trichophyton tonsurans, Trichophyton violaceum, Candida albicans*, *C. glabrata*	330-342
Lemna minor	lyophilized water extract and ethanol extract	*Candida parapsilosis* and *Candida glabrata*	343
Lepidium sativum	methanolic, ethanolic and petroleum ether seed extracts	*Aspergillus niger, Aspergillus terreus, Aspergillus flavus, Aspergillus fumigatus, Candida albicans, Saccharomyces cerevisiae, Fusarium equiseta, Microsporum canis, Streptococcus faecalis, Mucor sp., Alternaria alternate, Trichoderma viride, Trichoderma horzianum and Trichophyton mentagrophytes*, and *Penicillium sp*	344-349
Linum usitatissimum	seeds extracts	*Candida albicans*	350
Lippia nodiflora	stem and leaves extracts	*Candida albicans, Candida krussie, Candida tropicalis, Aspergillus niger, Trichophyton mentagrophytes, Microsporum gypseum, Malassezia pachydermatis* and *Cryptococcus neoformans*	351-357
Lithospermum officinale	Shikonin	*Saccharomyces cerevisiae, Trichophyton rubrum, T. mentagrophytes, T. tonsulans var. sulfureum, Microsporum gypseum, Epidermophyton fluccosum, Candida albicans, Candida krusei* and *C. glabrata*	358-359

Luffa acutangula	fruits, leaves, roots and seeds extracts	*Candida albicans*, *Candida tropicalis, Curvularia lunata, Drechslera hawaiiensis, Fusarium equiseti* and *Phoma sorghina*	360-364
Luffa cylindriica	seeds and fruits extracts	*Candida albicans, Aspergillus flavus, Aspergillus niger, Aspergillus fumigates, Aspergillus rhyzobus*, *Sacharomyces cerevisiae*	365-372
Lycopus europaeus	euroabienol and essential oils	*P. chrysogenum, A. restrictus*, *A. chrysogenum*, *A. fumigates*, *C. albicans* and *S. cerevisiae*	372-373
Lythrum salicaria	crude extracts	*Candida albicans*	374-377
Mangifera indica	peel and seed extracts, flavonoides	Candida, Dekkera, Hanseniaspora, Lodderomyces, Metschnikowia, Pichia, Schizosaccharomyces, Saccharomycodes Zygosaccharomyces, *Alternaria alternata, Aspergillus fumigatus, Aspergillus niger, Aspergillus ochraceus, Aspergillus ustus*, *Macrophomina phaseolina* and *Penicillium citrii*	378-382
Marrubium vulgare	essential oil	*Penicillium digitatum, Botrytis cinerea, Fusarium solani* and *Aspergillus niger*	383-385
Matricaria chamomilla	crude chamomile oil, farnesene, (-) -α-bisabolol and bisabololoxides	*Trichophyton mentagrophytes*	386-387
Medicago sativa	saponin-rich fractions	*Candida albicans*	388-389
Melilotus officinalis	crude extracts were evaluated against	*Candida inconspicua*, *C. guilliermondii*, *C. albicans*, C*. krusei*, C*. lusitaniae*, *C. glabrata, C. parapsilosis*, *C. methapsilosis*, *C. ortopsilosis*, *Microsporum canis*, *Trichophyton mentagrophytes* var. *interdigitale*, *Trichophyton mentagrophytes* var. *mentagrophytes, Trichophyton rubrum* and *Tricophyton violaceum*	390-393
Mirabilis jalapa	acetone, chloroform, ethanol and methanol extracts of the leaves	*Aspergillus flavus, Aspergillus fumigatus, Aspergillus niger* and *Aspergillus terreus*	394-395
Morus alba	ethyl acetate twig extracts	*Trichophyton rubrum*	396-397
Narcissus tazetta	ethanolic extract	*Nigrospora oryzae, Microsporum canis, Pleuralus ostreatus, Curvularia lunata*, *Trichophyton longifusus*, *Drechsleza rostrata, Aspergillus niger, candida albicans,* and *Alefcheria boydii*	398-399
Nasturtium officinale	oil	*Candida albicans*	400-401
Nerium oleander	crude extract**s**	*Aspergillus niger*, *Aspergillus flavus, Aspergillus fumigates, Fusarium moniliforme, Penicillium expansum* and *Rhizopus oryzae*	402-404
Nicotiana tabacum	methanol and water extracts of the leaf and ground snuff	*Candida albicans* and *Malassezia furfur*	405-407
Ononis spinosa	root aqueous extract, butanol extract and ash	*Candida albicans, Candida glabrata, Candida tropicalis, Candida krusei, Candida guilliermondii,*	408-411

		Candida parapsilosis, Candida pelliculosa, *T. rubrum E. floccosum* and *M. gypseum*	
Phoenix dacylifera	water, acetone and methanol extracts of leaves and pits	*Fusarium oxysporum*, *Fusarium sp.*, *Fusarium solani*, *Aspergillus flavus*, *Alternaria alternata*, *Alternaria* sp. and *Trichoderma* sp.	412-413
Reseda lutea	methanolic leaves and flower extracts	*Candida albicans*	414-415

2. Conclusion

The resistance of pathogenic fungi to antifungal drugs is one of the major public health problem. Plant extracts have shown inhibitory effect on the growth of wide range of fungi. They are represented a good alternative for prevention and treatment of fungal diseases. The current review highlighted the antifungal effects of medicinal plants.

References

[1] Al-Snafi AE. Molecular mechanisms of the antimicrobial effect of natural flavonoids against human pathogens. In: Recent advances in the molecular mechanism of flavonoids. Edited by K. Pandima Devi, Studium press, India, 2018.

[2] Al-Snafi AE. Therapeutic properties of medicinal plants: a review of their antibacterial activity (part 1). International Journal of Pharmacology and Toxicology 2015, 6(3): 137-158.

[3] Al-Snafi AE. Medicinal plants with antimicrobial activities (part 2): Plant based review. Sch Acad J Pharm 2016, 5(6): 208-239.

[4] Al-Snafi AE. Antimicrobial effects of medicinal plants (part 3): plant based review. IOSR Journal of Pharmacy 2016, 6(10): 67-92.

[5] Al-Snafi AE. Therapeutic properties of medicinal plants: a review of plants with antifungal activity (part 1). Int J of Pharm Rev & Res 2015, 5(3):321-327.

[6] Wu T, He M, Zang X, Zhou Y, Qiu T, Pan S and Xu X. A structure–activity relationship study of flavonoids as inhibitors of E. coli by membrane interaction effect. Biochimica et Biophysica Acta (BBA) - Biomembranes 2013, 1828(11): 2751–2756.

[7] Bitencourt TA, Komoto TT, Massaroto BG, Miranda CE, Beleboni RO, Marins M and Fachin AL. Trans-chalcone and quercetin down- regulate fatty acid synthase gene expression and reduce ergosterol content in the human pathogenic dermatophyte Trichophyton rubrum. BMC Complement Altern Med 2013, 13:229. doi: 10.1186/1472-6882-13-229.

[8] Alves LA, Freires IA, Pereira TM, Souza A, Lima EO and Castro RD. Effect of *Schinus terebinthifolius* on *Candida albicans* growth kinetics, cell wall formation and micromorphology. Acta Odontol Scand 2013, 71: 965–971.

[9] Jung HJ, Park K, Lee IS, Kim HS, Yeo SH, Woo ER and Lee DG. S- phase accumulation of Candida albicans by anticandidal effect of amentoflavone isolated from *Selaginella tamariscina*. Biol Pharm Bull 2007, 30(10):1969-1971.

[10] Lee MH, Han DW, Hyon SH and Park JC. Apoptosis of human fibrosarcoma HT-1080 cells by epigallocatechin-3-O-gallate via induction of p53 and caspases as well as suppression of Bcl-2 and phosphorylated nuclear factor-κB. Apoptosis 2011, 16:75–85.

[11] Onsare JG and Arora DS. Antibio film potential of flavonoids extracted from Moringa oleifera seed coat against *Staphylococcus aureus, Pseudomonas aeruginosa* and *Candida albicans*. J Appl Microbiol 2015, 118(2):313-325.

[12] Peralta MA, da Silva MA, Ortega MG, Cabrera JL and Paraje MG. Antifungal activity of a prenylated flavonoid from Dalea elegans against *Candida albicans* biofilms. Phytomedicine 2015, 22(11):975-980.

[13] Evensen NA and Braun PC. The effects of tea polyphenols on *Candida albicans*: inhibition of biofilm formation and proteasome inactivation. Can J Microbiol 2009, 55: 1033–1039.

[14] Braun PC. The effects of tea polyphenols on Candida albicans: inhibition of biofilm formation and proteasome inactivation. Canadian Journal of Microbiology, 2009, 55 (9): 1033 – 1039.

[15] Al-Snafi AE. Therapeutic properties of medicinal plants: a review of their dermatological effects (part 1). Int J of Pharm Rev & Res 2015, 5(4):328-337.

[16] Al-Snafi AE. Arabian medicinal plants with dermatological effects- plant based review (part 1) . IOSR Journal of Pharmacy 2018, 8(10): 44-73.

[17] Piyali G, Mukhopadhyay R and Gupta K. Antifungal activity of the extracts and extracted phenols from gametophytes and sporophytes of two species of *Adiantum*. Taiwania 2005, 50(4): 272-83.

[18] Al-Snafi AE. The chemical constituents and pharmacological effects of *Adiantum capillus-veneris* - A review. Asian Journal of Pharmaceutical Science and Technology 2015, 5(2): 106-111.

[19] Abd-Ellatif S, Abdel Rahman SM and Deraz SF. Promising antifungal effect of some folkloric medicinal plants collected from El-hammam habitat, Egypt against dangerous pathogenic and toxinogenic fungi. ARPN Journal of Agricultural and Biological Science 2011, 6(9): 25-32.

[20] Al-Snafi AE. *Alhagi maurorum* as a potential medicinal herb: An overview. International Journal of Pharmacy Review and Research 2015, 5(2):130-136.

[21] Starke H and Herrmann K. The phenolic compounds in fruit. Viii: Changes in flavonol contents during fruit development. Zeitschrift fur Lebensmittel-Untersuchung und –Forschung 1976, 161(2): 131-135.

[22] Adetumbi M, Javor GT and Lau BHS. *Allium sativum* (Garlic) inhibits lipid synthesis by Candida albicans. Antimicrob Agents Chemother 1986, 499-501.

[23] Caporaso N, Smith SM and Eng RHK. Antifungal activity in human urine and serum after ingestion of garlic (*Allium sativum*). Antimicrob Agents Chemother 1983, 23: 700-702.

[24] Hunan Medical CoUege. Garlic in cryptococcal meningitis. A preliminary report of 21 cases. Chin Med J, 93, 1980, 123- 126.

[25] Davis LE, Shen J, and Royer RE. In vitro synergism of concentrated *Allium sativum* extract and amphotericin B against Cryptococcus neoformans. Planta Med, 60, 1994, 546-549.

[26] Al-Snafi AE. Pharmacological effects of *Allium* species grown in Iraq. An overview. International Journal of Pharmaceutical and health care Research 2013, 1(4):132-147.

[27] Farnsworth NR and Bunyapraphatsara N. Thai medicinal plants. Recommended for primary health care system. Bangkok, Prachachon, 1992.

[28] Janssen AM and Scheffer JJC. Acetoxychavicol acetate, an antifungal component of *Alpinia galanga*. Planta Medica 1985, 6: 507–511.

[29] Ficker CE, Smith ML, Susiarti S, Leamanb DJ, Irawati C and Arnason JT. Inhibition of human pathogenic fungi by members of Zingiberaceae used by the Kenyah (Indonesian Borneo)., J Ethnopharmacol 2004, 85(5): 289-293.

[30] Trakranrungsie N, Chatchawanchonteera A and Khunkitti W. Ethnoveterinary study for antidermatophytic activity of Piper betle, *Alpinia galanga* and *Allium ascalonicum* extracts in vitro. Res Vet Sci 2008, 84(14): 80-84.

[31] Khattaka S, Rehmana S, Shahb HU, Ahmad W and Ahmad M. Biological effects of indigenous medicinal plants *Curcuma longa* and *Alpinia galangal*. Fitoterapia 2005, 76: 254-257.

[32] Taechowisan T and Lumyong S. Activity of endophytic actinomycetes from roots of *Zingiber officinale* and *Alpinia galanga* against phytopathogenic fungi. Annals Microbiol 2003, 53(3): 291-298.

[33] Al-Snafi AE. The pharmacological activities of *Alpinia galangal* - A review. International Journal for Pharmaceutical Research Scholars 2014, 3(1-1): 607-614.

[34] Lacy C. Drug information handbook. Lexicomp, Hudson, 2000.

[35] Al-Snafi AE. Chemical constituents and pharmacological activities of *Ammi majus* and *Ammi visnaga*. A review. International Journal of Pharmacy and Industrial Research 2013, 3(3):257-265.

[36] Ali-Shtayeh MS and Abu Ghdeib SI. Antifungal activity of plant extracts against dermatophytes. Mycoses 1999, 42: 665–672.

[37] Al-Snafi AE. The pharmacology of *Anchusa italica* and *Anchusa strigosa*- A review. International Journal of Pharmacy and Pharmaceutical Sciences 2014, 6(4): 7-10.

[38] Shad AA, Shah HU, Bakht J, Choudhary M and Ullah J. Nutraceutical potential and bioassay of *Apium graveolens* L. grown in Khyber Pakhtunkhwa-Pakistan. Journal of Medicinal Plants Research 2011, 5(20): 5160-5166.

[39] Al-Snafi AE. The Pharmacology of *Apium graveolens*- A review. International Journal for Pharmaceutical Research Scholars 2014, 3(1-1): 671-677.

[40] Sobolev VS , Khan SI , Tabanca N, Wedge DE, Manly SP, Cutler SJ, Coy MR, Becnel JJ, Neff SA and Gloer JB. Biological Activity of Peanut (*Arachis hypogaea*) Phytoalexins and selected natural and synthetic stilbenoids. J Agric Food Chem 2011, 59: 1673-1682.

[41] Al-Snafi AE. Traditional uses of Iraqi medicinal plants. IOSR Journal of Pharmacy 2018, 8 (8): 32-96.

[42] Schultz TP , Boldin WD, Fisher TH , Nicholas DD, McMurtrey KD, and Pobanz K. Structure-fungicidal properties of some 3- and 4-hydroxylated stilbenes and bibenzyl analogues. Phytochemistry2003, 31: 3801–3806.

[43] Al-Snafi AE. Chemical constituents and pharmacological activities of *Arachis hypogaea* - A review. International Journal for Pharmaceutical Research Scholars 2014, 3(1-1): 615-623.

[44] Temiz A, Akbas S, Panov D, Terziev N, Hakk M, Parlak S and Kose G. Chemical composition and efficiency of bio-oil obtained from giant cane (*Arundo donax* L.) as a wood preservative. Bio Resources 2013, 8(2): 2084-2098.

[45] Al-Snafi AE. The constituents and biological effects of *Arundo donax* - A review. International Journal of Phytopharmacy Research 2015, 6(1): 34-40.

[46] Hemavani C and Thippeswamy B. Evaluation of antimicrobial activity of root extract of Asclepias curassavica. Recent Research in Science and Technology 2012, 4(1): 40-43.

[47] Kurdekar RR, Hegde GR and Hebbar SS. Antimicrobial efficacy of *Bridelia retusa* (Linn.) Spreng. and Asclepias curassavica Linn. Indian Journal of Natural Products and Resources 2012, 3(4): 589-593.

[48] Moulin-Traffort J, Giordani R and Régli P. Antifungal action of latex saps from *Lactuca sativa* L. and Asclepias curassavica L. Mycoses 1990, 33(7-8): 383-392.

[49] Al-Snafi AE. Chemical constituents and pharmacological effects of *Asclepias curassavica* – A review. Asian Journal of Pharmaceutical Research 2015, 5(2): 83-87.

[50] Makoto S, Masayuki S, Makiko M and Watanabe K. An Antifungal Saponin from White Asparagus (*Asparagus officinalis* L) Bottoms. J Sci Food Agric 1996, 72: 430–434.

[51] Shimoyamada M, Suzuki M, Sonta H, Maruyama M and Okubo K. Antifungal activity of the saponin fraction obtained from Asparagus officinalis L and its active principle. Agric Biol Chem 1990, 54: 2553–2557.

[52] Al-Snafi AE. The pharmacological importance of *Asparagus officinalis* - A review. Journal of Pharmaceutical Biology 2015, 5(2): 93-98.

[53] Ali-Shtayeh MS and Abu Ghdeib SI. Antifungal activity of plant extracts against dermatophytes. Mycoses 1999, 42(11-12): 665-72.

[54] Sørensen HP, Madsen LS, Petersen J, Andersen JT, Hansen AM and Beck HC. Oat (*Avena sativa*) seed extract as an antifungal food preservative through the catalytic activity of a highly abundant class I chitinase. Appl Biochem Biotechnol. 2010 Mar, 160(6):1573-1584.

[55] Al-Snafi AE. The nutritional and therapeutic importance of *Avena sativa* - An Overview. International Journal of Phytotherapy 2015, 5(1): 48-56.

[56] Fraternale D and Ricci D. Essential oil composition and antifungal activity of aerial parts of *Ballota nigra* ssp foetida collected at flowering and fruiting times. Nat Prod Commun 2014, 9(7): 1015-1018.

[57] Ullah N, Ahmad I, Ayaz S. In vitro antimicrobial and antiprotozoal activities, phytochemical screening and heavy metals toxicity of different parts of Ballota nigra. Biomed Res Int 2014, (3):321803

[58] Al-Snafi AE. The Pharmacological Importance of *Ballota nigra* –A review. Ind J of Pharm Sci & Res 2015, 5(4): 249-256.

[59] Bader G, Kulhanek Y and Ziegler-Böhme H. The antifungal action of polygalacic acid glycosides. Pharmazie 1990, 45(8): 618-620.

[60] Al-Snafi AE. The Pharmacological importance of *Bellis perennis* - A review. International Journal of Phytotherapy 2015, 5(2): 63-69.

[61] Natarajan D, Lavarasan RJ, Chandra babu S, Sahib MACS, Refai T and Thameemul-Ansari LH. Antimicrobial studies on methanolic extract of *Benincasa hispida*. Ancient science of life 2003, 22(3): 98-100.

[62] Al-Snafi AE. The Pharmacological Importance of *Benincasa hispida*. A review. Int Journal of Pharma Sciences and Research 2013, 4(12): 165-170.

[63] Zhang Z , Elsohly HN, Jacob MR, Pasco DS, Walker LA and Clark AM. Natural products inhibiting *Candida albicans* secreted aspartic proteases from Tovomita krukovii. Planta Medica 2002, 68(1): 49-54.

[64] Al-Snafi AE. The medical importance of *Betula alba* - An overview. Journal of Pharmaceutical Biology 2015, 5(2): 99-103.

[65] Beltagy AM. Investigation of new antimicrobial and antioxidant activities of *Brassica rapa* L. Int J Pharm Pharm Sci 2014, 6(6): 84-88.

[66] Lin P, Wong JH, Xia L and Ng TB. Campesin, a thermostable antifungal peptide with highly potent antipathogenic activities. J Biosci Bioeng 2009, 108(3): 259-265.

[67] Pedras MS, Zheng QA, Gadagi RS and Rimmer SR. Phytoalexins and polar metabolites from the oilseeds canola and rapeseed: differential metabolic responses to the biotroph Albugo candida and to abiotic stress. Phytochemistry 2008, 69: 894-910.

[68] Fierro JE, Jiménez P, Coy-Barrera ED. Antifungal activity of Brassica rapa-derived extracts against *F. oxysporum*. Planta Med 2013, 79: PS2.

[69] Al-Snafi AE. The pharmacological importance of Brassica nigra and *Brassica rapa* grown in Iraq. J of Pharm Biology 2015, 5(4): 240-253.

[70] Sagar K and Vidyasagar GM. Antimicrobial activity of α-(2-hydroxy-2-methylpropyl)-ω-(2-hydroxy-3-methylbut-2-en- 1-yl) polymethylene from Casalpinia bonducella flem. Indian journal of pharmaceutical Science 2010, 72(4): 497-500.

[71] Al–Snafi AE. Pharmacology and medicinal properties of *Caesalpinia crista* - An overview. International Journal of Pharmacy 2015, 5(2): 71-83.

[72] Golubovic T, Palic R, Kitic D and Zlatkovic. Chemical composition and antimicrobial activity of the essential oil of Acinos graveolens. Chemistry of Natural Compounds 2010, 46(4): 645-648.

[73] Efstratiou E, Hussain AI, Nigam PS, Moore JE, Ayub MA and Rao JR. Antimicrobial activity of Calendula officinalis petal extracts against fungi, as well as Gram-negative and Gram-positive clinical pathogens. Complement Ther Clin Pract 2012, 18(3): 173-176.

[74] Barnes J, Anderson LA and Phillipson D. Herbal Medicines. The Pharmaceutical Press, 2007: 121-123.

[75] Faria R L, Cardoso L M, Akisue G, Pereira C A, Junqueira J C, Jorge A O and Santos Júnior P V. Antimicrobial activity of Calendula officinalis, Camellia sinensis and chlorhexidine against the adherence of microorganisms to sutures after extraction of unerupted third molars. J Appl Oral Sci 2011, 19(5): 476-482.

[76] Gazim ZC, Rezende CM, Fraga SR, Svidzinski TE and Cortez DG. Antifungal activity of the essential oil from *Calendula officinalis* (asteraceae) growing in brazil. Braz J Microbiol 2008, 39: 61-63.

[77] Al-Snafi AE. The chemical constituents and pharmacological effects of *Calendula officinalis* - A review. Indian Journal of Pharmaceutical Science & Research 2015, 5(3): 172-185.

[78] Nenaah G. Antimicrobial activity of Calotropis procera Ait. (Asclepiadaceae) and isolation of four flavonoid glycosides as the active constituents. World J Microbiol Biotechnol 2013, 29(7): 1255-1262.

[79] Halu B and Vidyasagar GM. A comparative study : differential antimycoses activity of crude leaf extracts of *Calotropis* Spp. International Journal of Pharmacy and Pharmaceutical Sciences 2012, 4(3): 705-708.

[80] Lopes JL, Beltramini LM, de Oliveira RS, Oliveira JT and Ramos MV. Osmotin from *Calotropis procera* latex: new insights into structure and antifungal properties. Biochim Biophys Acta 2011, 8(10): 2501-2507.

[81] Al-Snafi AE. The constituents and pharmacological properties of *Calotropis procera* - An Overview. International Journal of Pharmacy Review & Research 2015, 5(3): 259-275.

[82] Askar AA. In vitro antifungal activity of three Saudi plant extracts against some phytopathogenic fungi. Journal of Plant Research 2012, 2(4): 458-462.

[83] Lam SK, Han QF and Ng TB. Isolation and characterization of a lectin with potentially exploitable activities from caper (*Capparis spinosa*) seeds. Biosci Rep 2009, 29(5): 293-299.

[84] Al-Snafi AE. The chemical constituents and pharmacological effects of *Capparis spinosa* - An overview. Indian Journal of Pharmaceutical Science and Research 2015, 5(2): 93-100.

[85] Park C J, Park C B, Hong S S, Lee H S, Lee S Y and Kim S C. Characterization and cDNA cloning of two glycine- and histidine-rich antimicrobial peptides from the roots of shepherd's purse, Capsella bursa-pastoris. Plant Mol Biol 2000, 44(2):187-197.

[86] Al-Snafi AE. The chemical constituents and pharmacological effects of *Capsella bursa-pastoris* - A review. International Journal of Pharmacology and toxicology 2015, 5(2):76-81.

[87] Erturk O. Antibacterial and antifungal activity of ethanolic extracts from eleven spice plants. Biologia Bratislava 2006, 61(3): 275-278.

[88] Al-Snafi AE. The pharmacological importance of Capsicum species (*Capsicum annuum* and *Capsicum frutescens*) grown in Iraq. Journal of Pharmaceutical Biology 2015, 5(3): 124-142.

[89] Begum J, Bhuiyan MNI, Chowdhury JU, Hoque MM and Anwar MN. Antimicrobial activity of essential oil from seeds of *Carum carvi* and its composition. Bangladesh J Microbiol 2008, 25(2): 85-89.

[90] Al-Snafi AE. The chemical constituents and pharmacological effects of *Carum carvi* - A review. Indian Journal of Pharmaceutical Science and Research 2015, 5(2): 72-82.

[91] Davariya VS and Vala AK. Antifungal activity of crude extracts of *Cassia occidentalis*. Int J Res Phytochem Pharmacol 2001, 1(2): 36-38.

[92] Al-Snafi AE. The therapeutic importance of *Cassia occidentalis* - An overview. Indian Journal of Pharmaceutical Science & Research 2015, 5 (3): 158-171.

[93] Javaid A and Amin M. Antifungal activity of methanol and n-hexane extracts of three *Chenopodium* species against *Macrophomina phaseolina*. Nat Prod Res 2009, 23(12): 1120-1127.

[94] Nayak DP, Swain PK , Panda OP , Pattanaik P and Srinivas B. Antimicrobial and anthelmintic evalution of *Chenopodium album*. IJPWR 2010, 1(4): 1-15.

[95] Al-Snafi AE. The chemical constituents and pharmacological effects of *Chenopodium album* - An overview. International J of Pharmacological Screening Methods 2015, 5(1): 10-17.

[96] Jamil M, ul Haq I, MirzaB and Qayyum M. Isolation of antibacterial compounds from *Quercus dilatata* L. through bioassay guided fractionation. Annals of Clinical Microbiology and Antimicrobial 2011, 11: 1-11.

[97] Bahraminejad S, Abbasi S and Fazlali M. In vitro antifungal activity of 63 Iranian plant species against three different plant pathogenic fungi. African Journal of Biotechnology 2011, 10(72): 16193-16201.

[98] Al-Snafi AE. The chemical constituents and pharmacological importance of *Chrozophora tinctoria*. Int J of Pharm Rev & Res 2015, 5(4): 391-396.

[99] Sujatha S , Prakash G and Vinayak K. Exploration of bioactive screening against the microbial organisms from the two different Chrysanthemum medicinal plant flower with two assorted extracts. International Journal of Pharmacy & Bio-Sciences 2015, 1(1):1-7.

[100] Chu KT, Liu KH and Ng TB. Cicerarin, a novel antifungal peptide from the green chickpea. Peptides 2003, 24: 659-663.

[101] Al-Snafi AE. The medical Importance of *Cicer arietinum* - A review. IOSR Journal of Pharmacy 2016, 6(3): 29-40.

[102] Ye XE and Ng TB. Isolation of a new cyclophilin-like protein from chickpeas with mitogenic, antifungal and anti-HIV-1 reverse transcriptase activities. Life Science. 2002, 70: 1129-1138.

[103] Kumar S, Kapoor V, Gill K, Singh K, Xess I, Das SN and Dey S. Antifungal and antiproliferative protein from *Cicer arietinum*: a bioactive compound against emerging pathogens.

[104] Bajwa R, Shafique S and Shafique S. Evaluation of antifungal activity of *Cicer arietinum* L. Pak J Bot 2006, 38(1):175-184.

[105] Mehmood N, Zubaır M, Rızwan K, Rasool N Shahid M and Ahmad VU. Antioxidant, antimicrobial and phytochemical analysis of *Cichorium intybus* seeds extract and various organic fractions. Iranian Journal of Pharmaceutical Research 2012, 11 (4): 1145-1151.

[106] Koner A, Ghosh S and Roy P. Isolation of antimicrobial compounds from chicory (*Cichorium intybus* L.) root. International Journal of Research in Pure and Applied Microbiology 2011, 1(2): 13-18.

[107] Mares D, Romagnoli C, Tosi B, Andreotti E, Chillemi G and Poli F. Chicory extracts from Cichorium intybus L. as potential antifungals. Mycopathologia 2005, 160 (1): 85–91.

[108] Al-Snafi AE. Medical importance of Cichorium intybus – A review IOSR Journal of Pharmacy 2016, 6(3): 41-56.

[109] Al-Snafi AE. Bioactive metabolites and pharmacology of *Cistanche tubulosa*- A review. IOSR Journal of Pharmacy 2020, 10(1): 37-46.

[110] Khatibi R and Teymorri J. Anticandidal screening and antibacterial of *Citrullus colocynthis* in South East of Iran. Journal of Horticulture and Forestry 2011, 3(13): 392-398.

[111] Al-Snafi AE. Chemical constituents and pharmacological effects of *Citrullus colocynthis* - A review. IOSR Journal of Pharmacy 2016, 6(3): 57-67.

[112] Amine GM, Aminata OEK, Bouabdallah G, Noureddine H, Nesrine DA, Amel B, Sawsen H, Mokhtar B and Houari ADE. Antimycotoxigenic and antifungal activities of *Citrullus colocynthis* seeds against Aspergillus flavus and Aspergillus ochraceus contaminating wheat stored. African Journal of Biotechnology 2013, 12(43): 6222-6231.

[113] Aibinu I, Adenipekun T, Adelowotan T, Ogunsanya T and Odugbemi T. Evaluation of the antimicrobial properties of different parts of *Citrus aurantifolia* (Lime fruit) as used locally. African Journal of Traditional, Complementary and Alternative medicines (AJTCAM) 2007, 4(2): 185-190.

[114] Pathan RK, Gali PR, Pathan P, Gowtham T and Pasupuleti S. In vitro antimicrobial activity of *Citrus aurantifolia* and its phytochemical screening. Asian Pacific Journal of Tropical Disease 2012: S328-S331.

[115] Oliveira SA, Zambrana JR, Iorio FB, Pereira CA and Jorge AO. The antimicrobial effects of *Citrus limonum* and Citrus aurantium essential oils on multi-species biofilms. Braz Oral Res 2014, 28:22-27.

[116] Sah AN, Juyal V and Melkani AB. Antimicrobial activity of six different parts of the plant *Citrus medica* Linn. Pharmacognosy Journal 2011, 21(3): 80-83.

[117] Menghani E and Sharma SK. Screening for folklore antimicrobial activity. Int J Pharm 2012, 2(3): 557-560.

[118] Javed S, Ahmad R, Shahzad K, Nawaz S, Saeed S and Saleem Y. Chemical constituents, antimicrobial and antioxidant activity of essential oil of *Citrus limetta* var. Mitha (sweet lime) peel in Pakistan. Afr J Microbiol Res 2013, 7(24) 3071-3077.

[119] Khushwaha A, Singh RP, Gupta V and Singh M. Antibacterial properties of peels of citrus fruits. International Journal of Universal Pharmacy and Life Sciences 2012, 2(2): 24-38.

[120] Dhiman A, Nanda A, Ahmad S and Narasimhan B. In vitro antimicrobial status of methanolic extract of *Citrus sinensis* Linn. fruit peel. Chronicles of Young Scientists 2012, 3(3): 204-208.

[121] Rajarajan AT, Vijayasree VG, Kenichi W, Kumar SV, Narasimman G and kumar SS. Anthelmintic and antimicrobial properties of peels of *Citrus sinensis*. Pharmacologyonline 2009, 1: 363-368.

[122] Al-Snafi AE. Nutritional value and pharmacological importance of citrus species grown in Iraq. IOSR Journal of Pharmacy 2016, 6(8): 76-108.

[123] Chahal JK, Sarin R and Malwal M. Efficacy of *Clerodendrum inerme* (Garden quinine) against some human pathogenic strains. International Journal of Pharma and Bio Sciences International Journal of Pharma and Bio Sciences 2010, 1(4): 219-223.

[124] Al-Snafi AE. Chemical constituents and pharmacological effects of *Clerodendrum inerme*- A review. SMU Medical Journal 2016, 3(1): 129-153.

[125] Anitha R and Kannan P. Antifungal Activity of *Clerodendrum inerme* (L). and *Clerodendrum phlomidis* (L). Turk J Biol 2006, 30: 139-142.

[126] Mhaskar AV, Prakash K, Vishwakarma KS and Maheshwari VL. Callus induction and antimicrobial activity of seed and callus extracts of *Clitoria ternatea* L. Current Trends in Biotechnology and Pharmacy 2010, 4(1):561-567.

[127] Kamilla L, Mnsor SM, Ramanathan S and Sasidharan S. Antimicrobial activity of *Clitoria ternatea* (L.) extracts. Pharmacologyonline 2009, 1: 731-738.

[128] Al-Snafi AE. Pharmacological importance of *Clitoria ternatea* – A review. IOSR Journal of Pharmacy 2016, 6(3): 68-83.

[129] Ajesh K and Sreejith K . A novel antifungal protein with lysozyme-like activity from seeds of *Clitoria ternatea*. Appl Biochem Biotechnol 2014, 173(3):682-693.

[130] Kamilla L, Mansor SM, Ramanathan S and Sasidharan S. Effects of *Clitoria ternatea* leaf extract on growth and morphogenesis of Aspergillus niger. Microsc Microanal 2009, 15(4) :366-372.

[131] Kelemu S, Cardona C and Segura G. Antimicrobial and insecticidal protein isolated from seeds of *Clitoria ternatea*, a tropical forage legume. Plant Physiol Biochem 2004, 42(11):867-873.

[132] Baskaran C, Ratha Bai V, Sivamani P and Thiagarajan V. Phytochemical investigation and antimicrobial activity of *Corchorus aestuans* (tiliaceae). International Journal of Current Research 2011, 3(12):80-83.

[133] Ramadevi D and Swarnalatha D. Antimicrobial activity of leaf, capsule and roots of Corchorus aestuans. Journal of Global Trends in Pharmaceutical Sciences 2014, 5(4): 2030- 2033.

[134] Rume JM. Phytochemical, antimicrobial and biological investigations of methanolic extract of leaves of *Corchorus capsularis*. Thesis for bachelor degree of pharmacy, East West University 2010.

[135] Al-Snafi AE. The contents and pharmacological importance of *Corchorus capsularis*- A review. IOSR Journal of Pharmacy 2016, 6(6): 58-63.

[136] Baratta MT, Dorman HJD, Deans SG, Biondi DM and Ruberto G. Chemical composition, antimicrobial and antioxidative activity of laurel, sage, rosemary, oregano and coriander essential oils. J Ess Oil Res 1998, 10: 618-627.

[137] Al-Snafi AE. A review on chemical constituents and pharmacological activities of *Coriandrum sativum*. IOSR Journal of Pharmacy 2016, 6(7): 17-42.

[138] Ratha bai V and Kanimozhi D. Evaluation of antimicrobial activity of *Coriandrum sativum*. International Journal of Scientific Research and Reviews 2012, 1(3): 1-10.

[139] Bogavac M, Karaman M, Janjušević L, Sudji J, Radovanović B, Novaković Z, Simeunović J and Božin B. Alternative treatment of vaginal infections - in vitro antimicrobial and toxic effects of *Coriandrum sativum* L. and Thymus vulgaris L. essential oils. J Appl Microbiol 2015, 119(3):697-710.

[140] Soares BV, Morais SM, dos Santos Fontenelle RO, Queiroz VA, Vila-Nova NS, Pereira CM, Brito ES, Neto MA, Brito EH, Cavalcante CS, Castelo-Branco DS and Rocha MF. Antifungal activity, toxicity and chemical composition of the essential oil of *Coriandrum sativum* L fruits. Molecules 2012, 17(7): 8439-8448.

[141] Silva F, Ferreira S, Duarte A, Mendonça DI and Domingues FC. Antifungal activity of *Coriandrum sativum* essential oil, its mode of action against *Candida* species and potential synergism with amphotericin B. Phytomedicine 2011, 19(1):42-47.

[142] Freires Ide A, Murata RM, Furletti VF, Sartoratto A, Alencar SM, Figueira GM, de Oliveira Rodrigues JA, Duarte MC and Rosalen PL. *Coriandrum sativum* L (Coriander) essential oil: antifungal activity and mode of action on Candida spp., and molecular targets affected in human whole-genome expression. PLoS One 2014, 9(6):e99086.

[143] Furletti VF, Teixeira P, Obando-Pereda G, Mardegan RC, Sartoratto A, Figueira GM, Duarte RMT, Rehder VLG, Duarte MCT and Hofling JF. Action of *Coriandrum sativum* L essential oil upon oral Candida albicans Biofilm formation. Evidence-Based Comp Alter Med 2011, 20(11):1-9.

[144] Beikert FC, Anastasiadou Z, Fritzen B, Frank U and Augustin M. Topical treatment of tinea pedis using 6% coriander oil in unguentum leniens: a randomized, controlled, comparative pilot study. Dermatology 2013, 226(1):47-51.

[145] Sunita P, Jha S, Pattanayak SP , and Mishra SK. Antimicrobial activity of a halophytic plant *Cressa cretica* L. J Sci Res 2012, 4 (1): 203-212.

[146] Al-Snafi AE. The chemical constituents and therapeutic importance of *Cressa cretica*- A review . IOSR Journal of Pharmacy 2016, 6(6): 39-46.

[147] Vite MH, Grampurohit ND, Nangude SL, Gaikwad DD, Aher NB, Jadhav MS and Shelke SJ. Pharmacognostic profile and antimicrobial potential of fruits of *Cressa cretica* L. International Journal of Phytopharmacy Research 2012, 3(2): 72-75.

[148] Mandeel Q and Taha A. Assessment of in vitr. antifungal activities of various extracts of indigenous Bahraini medicinal plants. Pharmaceutical Biology 2005, 43(4): 340-348.

[149] Pirzada A J, Shaikh W, Ghani KU and Laghari KA. Study of antifungal activity and some basic elements of medicinal plant Cressa cretica Linn against fungi causing skin diseases. Sindh University Research Journal (Science Series) 2009, 41(2):15-20.

[150] Hussaini F, Abid M, Shaukat S, Farzana and Akbar M. Antifungal activity of some medicinal plants on different pathogenic fungi. Pak J Bot 2015, 47(5): 2009-2013.

[151] Al-Snafi AE. The contents and pharmacology of *Crotalaria juncea*- A review. IOSR Journal of Pharmacy 2016, 6(6): 77-86.

[152] Wanner J, Bail S, Jirovetz L, Buchbauer G, Schmidt E, Gochev V, Girova T, Atanasova T and Stoyanova A. Chemical composition and antimicrobial activity of cumin oil (*Cuminum cyminum*, Apiaceae). Natural Product Communications 2010, 5(9): 1355-1358 .

[153] Jirovetz L, Buchbauer G, Stoyanova AS, Georgiev EV, Stanka T and Damianova ST. Composition, quality control and antimicrobial activity of the essential oil of cumin (*Cuminum cyminum* L.) seeds from Bulgaria that had been stored for up to 36 years. Int J Food Sc Techn 2005, 40: 305-310.

[154] Dwivedi SK and Dubey NK. Potential use of the essential oil of *Trachyspermum ammi* against seed-borne fungi of guar (Cyamopsis tetragonoloba L. Taub). Mycopathologia 1993, 121(2): 101-104.

[155] Leopold J, Buchbauer G, Stoyanova AS, Georgiev EV and Damianova ST. Composition, quality control and antimicrobial activity of the essential oil of cumin (*Cuminum cyminum* L.) seeds from Bulgaria that had been stored for up to 36 years. International Journal of Food Science & Technology 2005, 40(3): 305-310.

[156] Hadian J, Ghasemnezhad M, Ranjbar H, Frazane M and Ghorbanpour M. Antifungal potency of some essential oils in control of postharvest decay of strawberry caused by *Botrytis cinerea, Rhizopus stolonifer* and *Aspergillus niger*. Journal of Essential Oil-Bearing Plants 2008, 11(5):553-562.

[157] Hu L, Chen C, Yi X, Feng J and Zhang X. Inhibition of p-isopropyl benzaldehyde and p-isopropyl benzoic acid extracted from *Cuminum cyminum* against plant pathogens. Acta Botanica Boreali-Occidentalia Sinica 2008, 28(11): 2349-2354.

[158] Karbin S, Rad AB, Arouiee H and Jafarn S. Antifungal activities of the essential oils on post-harvest disease agent *Aspergillus flavus*. Advances in Environmental Biology 2009, 3(3): 219-225.

[159] Marjanlo AA, Mostofi Y, Shoeibi S and Fattahi, M. Effect of cumin essential oil on postharvest decay and some quality factors of strawberry. Journal of Medicinal Plants 2009, 8(31): 25-43.

[160] Romagnol, C, Andreotti E, Maietti S, Rai M and Mares D. Antifungal activity of essential oil from fruits of Indian *Cuminum cyminum*. Pharmaceutical Biology 2010, 48(7): 834-838.

[161] Irkin R and Korukluoglu M. Growth inhibition of pathogenic bacteria and some yeasts by selected essential oils and survival of L. monocytogenes and *C. albicans* in apple-carrot juice. Foodborne Pathog Dis 2009, 6(3):387-394.

[162] Khosravi AR, Shokri H and Minooeianhaghighi M. Inhibition of aflatoxin production and growth of Aspergillus parasiticus by *Cuminum cyminum, Ziziphora clinopodioides,* and *Nigella sativa* essential oils. Foodborne Pathog Dis 2011, 8(12): 1275-1280.

[163] Kedia A, Prakash B, Mishra PK and Dubey NK. Antifungal and antiaflatoxigenic properties of *Cuminum cyminum* (L.) seed essential oil and its efficacy as a preservative in stored commodities. Int J Food Microbiol 2014, 168-169: 1-7.

[164] Naeini A, Naderi NJ and Shokri H. Analysis and in vitro anti-candida antifungal activity of *Cuminum cyminum* and Salvadora persica herbs extracts against pathogenic Candida strains. J Mycol Med 2014, 24(1): 13-18.

[165] El-Said AHM and El-Hady G. Antifungal activities of *Cuminum cyminum* and *Pimpinella anisum* essential oils. Int J Curr Microbiol App Sci 2014, 3(3): 937-944.

[166] Al-Snafi AE. The pharmacological activities of *Cuminum cyminum* - A review. IOSR Journal of Pharmacy 2016, 6(6): 46-65.

[167] Al-Othman AM, Hussain I, Khan H, Ur Rehman M, Abdeltawab AA, Ullah R, Rohullah, Noor S and Talha M. Phytochemical analysis and biological activities of selected medicinal plants. Journal of Medicinal Plants Research 2012, . 6(23): 4005-4010.

[168] Boukhris M, Regane G, Yangui T, Sayadi S and Bouaziz M. Chemical composition and biological potential of essential oil from Tunisian *Cupressus sempervirens* L. Journal of Arid Land Studies 2012, 22(1): 329-332.

[169] Toroglu S. In vitro antimicrobial activity and antagonistic effect of essential oils from plant species. Journal of Environmental Biology 2007, 28(3): 551-559.

[170] Mahmood Z, Ahmed I, Saeed M and Sheikh MA. Investigation of physico-chemical composition and antimicrobial activity of essential oil extracted from lignin-containing *Cupressus sempervirens*. BioResources 2013, 8(2): 1625-1633.

[171] Ismail A, Lamia H, Mohsen H, Samia G and Bassem J. Chemical composition, bio-herbicidal and antifungal activities of essential oils isolated from Tunisian common cypress (*Cupressus sempervirens* L). Journal of Medicinal Plants Research 2013, 7(16): 1070-1080.

[172] Amri I, Hanana M, Gargouri S, Jamoussi B and Hamrouni L. Comparative study of two coniferous species (Pinus pinaster Aiton and *Cupressus sempervirens* L. var. dupreziana [*A. Camus*] Silba) essential oils: chemical composition and biological activity. Chilean Journal of Agricultural Res 2013, 73(3): 259-266.

[173] Al-Snafi AE. Medical importance of *Cupressus sempervirens*- A review. IOSR Journal of Pharmacy 2016, 6(6): 66-76.

[174] Alizadeh H, Ajalli, M and Hamzehe H. Antifungal effect of *Cydonia oblonga* extract on Aspergillus niger. Jundishapur Journal of Microbiology 2013, Special Edition: 4.

[175] Al-Snafi AE. The medical importance of *Cydonia oblonga*- A review. IOSR Journal of Pharmacy 2016, 6(6): 87-99.

[176] Sabry A, El-Zayat SA, El-Said1 AHM, Abdel-Motaal FF and Magraby TA. Mycoflora associated with Halfa-bar leaves and stems (*Cymbopogon schoenanthus* L. Spreng), in vitro the antimicrobial activity of the plant leaves and stems secondary metabolites. Int J Curr Microbiol App Sci 2014, 3(2): 874-882.

[177] Al-Snafi AE. The chemical constituents and pharmacological activities of *Cymbopagon schoenanthus*: A review. Chemistry Research Journal 2016, 1(5):53-61.

[178] Kanimozhi D and Ratha bai V. Evaluation of anti microbial activity of *Cynodon dactylon*. International Journal of Research in Pharmacy and Science 2012, 2(2): 34-43.

[179] Al-Snafi AE. Chemical constituents and pharmacological effects of *Cynodon dactylon*- A review. IOSR Journal of Pharmacy 2016, 6(7): 17-31.

[180] Bisht A, Bisht GRS, Singh M, Gupta R and Singh V. Chemical compsition and antimicrobial activity of essential oil of tubers of *Cyperus rotundus* Linn. collected from Dehradun (Uttarakhand). International Journal of Research in Pharmaceutical and Biomedical Sciences 2011, 2(2), 661-665.

[181] Ahmad M, Mahayrookh, Mehjabeen, Bin Rehman A and Jahan N. Analgesic, antimicrobial and cytotoxic effect of *Cyperus routunds* ethanolic extract. Pakistan Journal of Pharmacology 2012, .29(2):7-13.

[182] Al-Snafi AE. A review on *Cyperus rotundus* A potential medicinal plant. IOSR Journal of Pharmacy 2016, 6(7): 32-48.

[183] Kayed AM, EL- Sayed ME and El-Hela AA. New epoxy megastigmane glucoside from *Dactyloctenium aegyptium* L. P. Beauv Wild (Crowfootgrass). Journal of Scientific and Innovative Research 2015, 4(6): 237-244.

[184] Kumar V, Banu RF, Begum S, Kumar MS and Mangilal T. Evaluation of antimicrobial activity of ethanolic extract of *Dactyloctenium aegyptium*. IJPR 2015, 5(12): 338-343.

[185] Deveoglu O, Muhammed A, Fouad A, Torgan E and Karadag R. Chromatographic analysis of natural pigments produced from *Datisca cannabina* L. and Quercus infectoria Oliv. plants and their antimicrobial activity. J Chem Soc Pak 2012, 34(4): 890-895.

[186] Rajesh and Sharma GL. Studies on antimycotic properties of *Datura metel*. J Ethnopharmacol 2002, 80(2-3): 193-197.

[187] Dabur R, Ali M, Singh H, Gupta J and Sharma GL. A novel antifungal pyrrole derivative from Datura metel leaves. Pharmazie 2004, 59(7):568-570.

[188] Al-Snafi AE. Medical importance of *Datura fastuosa* (syn: *Datura metel*) and *Datura stramonium* - A review. IOSR Journal of Pharmacy 2017, 7(2):43-58.

[189] Gul H, Qaisrani RN, Khan MA, Hassan S and Younis N. Antibacterial and antifungal activity of different extracts of *Datura stramonium* (branches and leaves sample). Journal of Biotechnology and Pharmaceutical Research 2012, 3(9): 141-148.

[190] Iranbakhsh A, Ebadi M and Bayat M. The inhibitory effects of plant methanolic extract of *Datura stramonium* L. and leaf explant callus against bacteria and fungi. Global Veterinaria 2010, 4 (2): 149-155.

[191] Mdee LK, Masoko P and Eloff JN. The activity of extracts of seven common invasive plant species on fungal phytopathogens. South African Journal of Botany 2009, 75(2): 375-379.

[192] Gachande BD, Khillare EM. In vitro evaluation of *Datura* species for potential antimicrobial activity. Bioscience Discovery 2013, 4(1):78-81.

[193] Ahmed AA, Bishr MM, El-Shanawany MA, Attia EZ, Ross SA and Pare PW. Rare trisubstituted sesquiterpenes daucanes from the wild Daucus carota. Phytochemistry 2005, 66:1680–1684.

[194] Marzouki H, Khaldi A, Falconieri D, Piras A, Marongiu B, Molicotti P and Zanetti S. Essential oils of *Daucus carota* subsp. carota of Tunisia obtained by supercritical carbon dioxide extraction. Nat Prod Commun 2010, 5(12):1955-1958.

[195] Rokbeni N, M'rabet Y, Dziri S, Chaabane H, Jemli M, Fernandez X and Boulila A. Variation of the chemical composition and antimicrobial activity of the essential oils of natural populations of Tunisian *Daucus carota* L. (Apiaceae). Chem Biodivers 2013, 10(12): 2278-2290.

[196] Alves-Silva JM, Zuzarte M, Gonçalves MJ, Cavaleiro C, Cruz MT, Cardoso Sm and Salgueiro L. New claims for wild carrot (*Daucus carota* subsp. *carota*) essential oil. Evidence-Based Complementary and Alternative Medicine 2016, http://dx.doi.org/ 10.1155/2016/9045196

[197] Pavlyuk I, Stadnytska N, Jasicka-Misiak I, Górka B, Wieczorek PP and Novikov V. A study of the chemical composition and biological activity of extracts from wild carrot (*Daucus carota* L.) seeds waste. Research Journal of Pharmaceutical, Biological and Chemical Sciences 2015, 6(2): 603-611.

[198] Misiaka IJ, Lipoka J, Nowakowska EM, Wieczoreka PP, Mlynarz P and Kafarski P. Antifungal activity of carrot seed oil and its major sesquiterpene compounds. Zeitschrift für Naturforschung 2004, 59: 791-796.

[199] Zain ME, Awaad AS, Othman MRA and Al-Dosary SK. Antibacterial, antifungal activity and phytochemical analysis of some desert plants against human pathogenic bacteria and fungi. Life Sci J 2014, 11: 343-349.

[200] Al-Snafi AE. Pharmacological and therapeutic importance of *Desmostachya bipinnata*- A review. Indo Am J P Sci 2017, 4(01): 60-66.

[201] Curir P, Dolci M, Dolci P, Lanzotti V and De Cooman L. Fungitoxic phenols from carnation (*Dianthus caryophyllus*) effective against Fusarium oxysporum f. sp. dianthi. Phytochem Anal 2003, 14(1):8-12.

[202] Al-Snafi AE. Chemical contents and medical importance of *Dianthus caryophyllus*- A review. IOSR Journal of Pharmacy 2017, 7(3): 61-71.

[203] Patel M and Coogan MM. Antifungal activity of the plant *Dodonaea viscosa* var. angustifolia on *Candida albicans* from HIV-infected patients. Journal of Ethnopharmacology 2008, 118(1): 173-176.

[204] Al-Snafi AE. A review on *Dodonaea viscosa*: A potential medicinal plant. IOSR Journal of Pharmacy 2017, 7(2): 10-21.

[205] Kannaian UPN, Selvci CR, Sasikala V and Bhuvaneswari S. Phytochemistry and bio-efficacy of a weed, *Dodonaea viscose*. Int J Pharm Pharm Sci 2012, 4(2): 509-512.

[206] Esmaeel ZA and Al-Jobori KM. Antimicrobial effect of *Dodonaea viscose* Jacq extracts against some pathogenic microorganisms. Iraqi Journal of Science 2011, 52(4):425-439.

[207] Pirzada AJ, Shaikh W, Usmanghani K and Mohiuddin E. Antifungal activity of *Dodonaea viscosa* Jacq extract on pathogenic fungi isolated from superficial skin infection. Pak J Pharm Sci 2010, 23(3):337-340.

[208] Khurram M, Hameed A, Amin MU, Gul A, Ullah N, Hassan M, Qayum A, Chishti KA and Manzoor W. Phytochemical screening and *in vitro* evaluation of anticandidal activity of *Dodonaea viscosa* (L.) Jaeq. (Sapindaceae). African Journal of Pharmacy and Pharmacology 2011, 5(11): 1422-1426.

[209] Nasrin F, Bulbu IJ, Begum Y and Khanum S. *In vitro* antimicrobial and cytotoxicity screening of n-hexane, chloroform and ethyl acetate extracts of *Lablab purpureus* (L.) leaves. Agric Biol J N Am 2012, 3(2): 43-48.

[210] Ye XY, Wang HX and Ng TB. Dolichin, a new chitinase-like antifungal protein isolated from field beans (*Dolichos lablab*). Biochem Biophys Res Commun 2000, 269(1): 155-159.

[211] Fakhoury AM and Woloshuk CP. Inhibition of growth of Aspergillus flavus and fungal alpha-amylases by a lectin-like protein from *Lablab purpureus*. Mol Plant Microbe Interact 2001, 14(8):955-961.

[212] Al-Snafi AE. The pharmacology and medical importance of *Dolichos lablab* (*Lablab purpureus*)- A review. IOSR Journal of Pharmacy 2017, 7(2): 22-30.

[213] Nolde SB, Vassilevski AA, Rogozhin EA, Barinov NA, Balashova TA, Samsonova OV, Baranov YV, Feofanov AV, Egorov TA, Arseniev AS and Grishin EV. Disulfide-stabilized helical hairpin structure and activity of a novel antifungal peptide EcAMP1 from seeds of barnyard grass (*Echinochloa crus-galli*). The Journal of Biological Chemistry 2011, 286(28): 25145–25153.

[214] Al-Snafi AE. Pharmacology of *Echinochloa crus-galli* - A review. Indo Am J P Sci 2017, 4(01): 117-122.

[215] Ghanem S and El-Magly UIA. Antimicrobial activity and tentative identification of active compounds from the medicinal *Ephedra alata* male plant. J T U Med Sc 2008, 3(1): 7-15.

[216] Al-Snafi AE. Pharmacological and therapeutic importance of *Echium italicum*- A review. Indo Am J P Sci 2017, 4(02): 394-398.

[217] Ghanem S and El-Magly UIA. Antimicrobial activity and tentative identification of active compounds from the medicinal *Ephedra alata* male plant. J T U Med Sc 2008, 3(1): 7-15.

[218] Al-Qarawi AA, Abd Allah FFand Abeer H. Effect of *Ephedra alata* Decne. on lipids metabolism of Aspergillus flavus Link. Bangladesh J Bot 2013, 42(1): 45-49.

[219] Al-Snafi AE. Therapeutic importance of *Ephedra alata* and *Ephedra foliata*- A review. Indo Am J P Sci 2017, 4(02): 399-406.

[220] Uslu ME, Erdogan I, Oguzbayraktar O and Ates M. Optimization of extraction conditions for active components in *Equisetum arvense* extract. Romanian Biotechnological Letters 2013, 18(2): 8115-8131.

[221] Al-Snafi AE. The pharmacology of Equisetum arvense- A review. IOSR Journal of Pharmacy 2017, 7(2): 31-42.

[222] Shakirullah M, Ahmad H, Shah MR, Ahmad I, Ishaq M, Khan N, Badshah A and Khan I. Antimicrobial activities of conyzolide and conyzoflavone from *Conyza canadensis*. Journal of Enzyme Inhibition and Medicinal Chemistry 2011, 26(4): 468–471.

[223] Shah NZ, Khan MA, Muhammad N and Azeem S. Antimicrobial and phytotoxic study of *Conyza canadensis*. Middle-East Journal of Medicinal Plants Research 2012, 1(3): 63-67.

[224] Al-Snafi AE. Pharmacological and therapeutic importance of *Erigeron canadensis* (Syn: *Conyza canadensis*). Indo Am J P Sci 2017, 4(02): 248-256.

[225] Veres K, Csupor-Löffler B, Lázár a and Hohmann J. Antifungal activity and composition of essential oils of *Conyza canadensis* herbs and roots. Scientific World Journal 2012, doi: 10.1100/2012/489646

[226] Curini M, Bianchi A, Epifano F and Bruni R. Composition and *in vitro* antifungal activity of essential oils of *Erigeron canadensis* and *Myrtus communis* from France. Chemistry of Natural Compounds 2003, 39(2) : 191-194.

[227] Stojanović-Radić Z, Čomić L, Radulović N, Dekić M, Ranđelović V and Stefanović. O. Chemical composition and antimicrobial activity of *Erodium* species: *E. ciconium* L., *E. cicutarium* L., and *E. absinthoides* Willd. (Geraniaceae). Chemical Papers 2010, 64(3): 368-377.

[228] Al-Snafi AE. A review on *Erodium cicutarium*: A potential medicinal plant. Indo Am J P Sci 2017, 4(01): 110-116.

[229] Ali-Shtayeh MS and Abu Ghdeib SI. Antifungal activity of plant extracts against dermatophytes. Mycoses 1999, 42: 665–672.

[230] Al-Snafi AE. Chemical constituents and pharmacological effects of *Eryngium creticum*- A review. Indo Am J P Sci 2017, 4(01): 67-73.

[231] Rahimi-Nasrabadi M, Nazarian S, Farahani H, Koohbijari GRF, Ahmadi F and Batooli H. Chemical composition, antioxidant, and antibacterial activities of the essential oil and methanol extracts of *Eucalyptus largiflorens* F. Muell. International Journal of Food Properties 2013, 16(2): 369-381.

[232] Al-Snafi AE. The pharmacological and therapeutic importance of *Eucalyptus* species grown in Iraq. IOSR Journal of Pharmacy 2017, 7(3): 72-91.

[233] Falahati M, Tabrizib NO and Jahaniani. Anti dermatophyte activities of *Eucalyptus camaldulensis* in comparison with griseofulvin. Iranian Journal of Pharmacology & Therapeutics 2005, 4(2): 80-83.

[234] Barra A, Coroneo V, Dessi S, Cabras P and Angioni A. Chemical variability, antifungal and antioxidant activity of *Eucalyptus camaldulensis* essential oil from Sardinia. Nat Prod Commun 2010, 5(2): 329-335.

[235] Mahmoud SN. Antifungal activity of *Cinnamomum zeylanicum* and *Eucalyptus microtheca* crude extracts against food spoilage fungi. Euphrates Journal of Agriculture Science 2012, 4 (3): 26-39.

[236] Qanbar FH and Al-Mizraqchi AS. The antimicrobial effect of aqueous & alcoholic extracts of Eucalyptus leaves on oral Mutans streptococci, Lactobacilli & *Candida albicans* (an *in vitro* study. J Bagh Coll Dentistry 2009, 21(4): 109-112.

[237] Purcaru T, Alecu A, Diguta C and Matei F. *In vitro* evaluation of *Eupatorium cannabium* antimicrobial activity. Agro Life Scientific Journal 2015, 4(2): 92-97.

[238] Mehdiyeva NP, Serkerov SV and Bahshaliyeva KF. Chemical composition and antifungal activities of the essential oils of from the flora Azerbaijan. Chemistry of Plant Raw Material 2010, 2:139–142.

[239] Al-Snafi AE. Chemical constituents, pharmacological and therapeutic effects of *Eupatorium cannabinum*- A review. Indo Am J P Sci 2017, 4(01): 160-168.

[240] Enerva LT, Atienza TV, Glifonea ZR, Villamor OB and Villa NA. Cytotoxicity and antimicrobial property of the leaf extract of *Euphorbia hirta* (Tawa-Tawa). Open Journal of Social Sciences 2015, 3: 162-170.

[241] Al-Snafi AE. Pharmacology and therapeutic potential of *Euphorbia hirta* (Syn: *Euphorbia pilulifera*) - A review. IOSR Journal of Pharmacy 2017, 7(3): 7-20.

[242] Jenifer S, Laveena DK, Priya S, Singh SJS and Jeyasree J. Antimicrobial screening of *Euphorbia hirta* L. and *Pedalium murex* L. A comparative study. World Journal of Pharmacy and Pharmaceutical Sciences 2014, 3(12): 1221-1226.

[243] Lacuna MLDG, Carmona ML, Amparado BB, Daclan MAF and Ranido LA. Antimicrobial activity of supercritical fluid extracts of two Philippine medicinal plants, *Psidium guajava* and *Euphorbia hirta*: Implications to community health. Advances in Agriculture & Botanics - International Journal of the Bioflux Society 2013, 5(1): 1-12.

[244] Gayathri A and Ramesh KV. Antifungal activity of *Euphorbia hirta* L. inflorescence extract against *Aspergillus flavus*- A mode of action study. Int J Curr Microbiol App Sci 2013, 2(4):31-37.

[245] Kirbag S, Erecevit P, Zengin F and Guvenc AN. Antimicrobial Activities of Some *Euphorbia* Species. Afr J Tradit Complement Altern Med 2013, 10(5): 305–309.

[246] Mahmoudi S, Roustaei M, Zaini F, Kordbacheh P and Safara M. *In vitro* antifungal activities of *Euphorbia macroclada* and fluconazole against pathogenic *Candida* species. Curr Med Mycol 2015, 1(2): 7-12.

[247] Al-Mughrabi K. Antimicrobial activity of extracts from leaves, stems and flowers of *Euphorbia macroclada* against plant pathogenic fungi. Phytopathol Mediterr 2003, 42: 245–250.

[248] Leung EH and Ng TB. A relatively stable antifungal peptide from buckwheat seeds with antiproliferative activity toward cancer cells. J Pept Sci 2007, 13(11): 762-767.

[249] Al-Snafi AE. A review on *Fagopyrum esculentum*: A potential medicinal plant. IOSR Journal of Pharmacy 2017, 7(3): 21-32.

[250] Aref HL, Salah KB, Chaumont JP, Fekih A, Aouni M and Said K. In vitro antimicrobial activity of four *Ficus carica* latex fractions against resistant human pathogens (antimicrobial activity of Ficus carica latex). Pak J Pharm Sci 2010, 23(1): 53-58.

[251] Mavlonov GT, Ubaidullaeva KA, Rakhmanov MI, Abdurakhmonov IU and Abdukarimov A. Chitin-binding antifungal protein from *Ficus carica* latex. Chem Natural Comp 2008, 44: 216-219.

[252] Al-Snafi AE. Nutritional and pharmacological importance of *Ficus carica* - A review. IOSR Journal of Pharmacy 2017, 7(3): 33-48.

[253] Rajiv P and Sivaraj R. Screeening for phytochemicals and antimicrobial activity of aqueous extract of *Ficus religiosa* Linn. International Journal of Pharmacy and Pharmaceutical Sciences 2012, 4(5):207-209.

[254] Al-Snafi AE. Pharmacology of *Ficus religiosa*- A review. IOSR Journal of Pharmacy 2017, 7(3): 49-60.

[255] Poudel A, Satyal P and Setzer WN. Composition and bioactivities of the leaf essential oil of *Ficus religiosa* Linn. American Journal of Essential Oils and Natural Products 2015, 2 (3): 16-17.

[256] Upadhyay RK. GC-MS analysis and in vitro antimicrobial susceptibility of *Foeniculum vulgare* seed essential oil. American Journal of Plant Sciences 2015, 6: 1058-1068.

[257] Al-Snafi AE. The chemical constituents and pharmacological effects of *Foeniculum vulgare* - A review. IOSR Journal of Pharmacy 2018, 8(5): 81-96.

[258] Dahak K and Taourirte M. Comparative study of in vitro antimicrobial activities of *Foeniculum vulgare* Mill. (umbelliferae) extract. OnLine Journal of Biological Sciences 2013, 13(4): 115-120.

[259] Singh G, Maurya S, de Lampasona MP and Catalan C. Chemical constituents, antifungal and antioxidative potential of *Foeniculum vulgare* volatile oil and its acetone extract. Food Control 2006, 17: 745–752.

[260] Skrobonj JR, Delić DN, Karaman MA, Matavulj MN and Bogavac MA. Antifungal properties of *Foeniculum vulgare, Carum carvi* and *Eucalyptus* sp. essential oils against Candida albicans strains. Jour Nat Sci Matica Srpska Novi Sad 2013, 124: 195-202.

[261] Al-Snafi AE. Chemical constituents and pharmacological effects of *Fraxinus ornus*- A review. Indo Am J P Sc 2018, 5(3): 1721-1727.

[262] Hilal SH, Aboutabl EA, Youssef SAH, Shalaby MA and Sokkar NM. Lipoidal matter, flavonoid content, uterine stimulant and gonadal hormone-like activities of *Fumaria parviflora* Lam growing in Egypt. Plantes Medicinales et Phytotherapie. 1993, 26:383–396.

[263] Al-Snafi AE. *Fumaria parviflora*- A review. Indo Am J P Sc 2018, 5(3): 1728-1738.

[264] Goryacha OV, Ilyina TV, Kovalyova AM and Kashpur NV. Phytochemical research of *Galium aparine* L. lipophilic complex and study of its antibacterial activity. The Pharma Innovation Journal 2014, 3(1): 7-10.

[265] Vasilevna IT, Volodymyrivna GO, Leonidivna TE, Aleksandrovna KI and Mihaylovna KA. Antimicrobial Activity of the genus *Galium* L. Pharmacogn Commn 2016, 6(1) 42-47.

[266] Al-Snafi AE. Chemical constituents and medical importance of *Galium aparine* - A review. Indo Am J P Sc 2018, 5(3): 1739-1744.

[267] Ilyina TV, Goryachaya OV, Toryanik EL, Kulish IA and Kovaleva AM. Antimicrobial activity of the genus *Galium* L. Pharmacognosy Communications 2016, 6(1):42-47.

[268] Al-Snafi AE. Medical importance of *Glossostemon bruguieri* – A review. IOSR Journal of pharmacy 2019, 9(5): 34-39.

[269] Chopra PKPG, Saraf BD, Inam F and Deo SS. Antimicrobial and antioxidant activities of methanol extract roots of *Glycyrrhiza glabra* and HPLC analysis. Int J Pharm Pharmacol Sci 2013, 5:157-160.

[270] Abbas A, Zubair M, Rasool N and Rizwan K. Antimicrobial potential of *Glycyrrhiza glabra*. Journal of Drug Design and Medicinal Chemistry 2015, 1(2): 17-20.

[271] Al-Snafi AE. *Glycyrrhiza glabra*: A phytochemical and pharmacological review. IOSR Journal of Pharmacy 2018, 8(6): 1-17.

[272] Al-Snafi AE. The medical benefit of *Gnaphalium luteoalbum*-A review. IOSR Journal of pharmacy 2019, 9(5): 40-44.

[273] Tabassum N and Vidyasagar GM. In vitro antimicrobial activity of edible oils against human pathogens causing skin infections. IJPSR 2014, 5(10): 4493-4498.

[274] Chung RPT, Neumann GM and Polya GM. Purification and characterization of basic proteins with in vitro antifungal activity from seeds of cotton, *Gossypium hirsutum*. Plant Science 1997, 127(1): 1-16.

[275] Al-Snafi AE. Chemical constituents and pharmacological activities of *Gossypium herbaceum* and *Gossypium hirsutum* - A review. IOSR Journal of Pharmacy 2018, 8(5): 64-80.

[276] Sabry OM, El Sayed AM and A Sleem A. Potential anti-microbial, anti-inflammatory and anti-oxidant activities of *Haplophyllum tuberculatum* growing in Libya. J Pharmacogn Nat Prod 2016, 2:1, http://dx.doi.org/ 10.4172/2472-0992. 1000116

[277] Acheuk F, Djouahra-Fahem J, Ait Kaci K and Fazouane F. Antibacterial effect of alkaloids and polyphenols of algerian medicinal plant: *Haplophyllum tuberculatum* (fORSSK.) A. JUSS. 11th International Symposium on the Chemistry of Natural Compounds (SCNC 2015) . Antalya- Turkey 1-4 Oct 2015.

[278] Al-Snafi AE. Pharmacological importance of *Haplophyllum* species grown in Iraq- A review. IOSR Journal of Pharmacy 2018, 8(5): 54-62.

[279] Favel A, Steinmetz MD, Regli P, Vidal-Ollivier E, Elias R and Balansard G. In vitro antifungal activity of triterpenoid saponins. Planta Med 1994 , 60 (1) : 50-53.

[280] Al-Snafi AE. Pharmacological and therapeutic activities of *Hedera helix*- A review IOSR Journal of Pharmacy 2018, 8(5): 41-53.

[281] Prescott TA, Rigby LP, Veitch NC and Simmonds MS. The haploinsufficiency profile of α-hederin suggests a caspofungin-like antifungal mode of action. Phytochemistry 2014, 101:116-120.

[282] Chena F, Longa X, Yua M, Liua Z and Liua L. Phenolics and antifungal activities analysis in industrial crop Jerusalem artichoke (*Helianthus tuberosus* L.) leaves. Industrial Crops and Products 2013, 47:339– 345.

[283] Liu HW, Liu ZP, Liu L and Zhao GM. Studies on the antifungal activities and chemical components of extracts from *Helianthus tuberosus* leaves. Nat Prod Res Dev 2007, 19: 405–409.

[284] Al-Snafi AE. Medical importance of *Helianthus tuberosus*- A review. Indo Am J P Sc 2018, 5 (4): 2159-2166.

[285] Seleman VT, Jarjes VY, Mahmood ZE, Ahmed SS and Qader MK. Study effects of plant extracts on the growth of clinical species of bacteria and fungi. American Journal of Food Science and Health 2016, 2(6): 156-160.

[286] Obeidat M. Antimicrobial activity of some medicinal plants against multidrug resistant skin pathogens. Journal of Medicinal Plants Research 2011, 5(16): 3856-3860.

[287] Al-Snafi AE. Pharmacological and toxicological effects of *Heliotropium undulatum* (*H. bacciferum*) and Heliotropium europaeum- A review. Indo Am J P Sc 2018, 5 (4): 2150-2158.

[288] Ahmad S, Ahmad S, Bibi I, AbdEl-Salam NM , Hussain H , Ishaq MS , AdnanM , Tariq A and Ullah R. Antibacterial and antifungal activities of the extract and fractions of aerial parts of *Heliotropium bacciferum*. African Journal of Traditional, Complementary and Alternative Medicines 2015, 12(2):32–35.

[289] Kumari OS, Rao NB and Reddy VK. Phyto-chemical analysis and anti-microbial activity of *Hibiscus rosa sinensis*. World Journal of Pharmacy and Pharmaceutical Sciences 2015, 4(5): 766-771.

[290] Al-Snafi AE. Chemical constituents, pharmacological effects and therapeutic importance of *Hibiscus rosa-sinensis*- A review. Journal of Pharmacy 2018, 8 (7): 101-119.

[291] Rathi SG, Patel KR, Bhaskar VH. Isolation of herbal plants: antifungal and antibacterial activities. JPSBR 2012, 2(1):25-29.

[292] Abd-Ulgadir KS, Suliman SI, Zakria IA and Hassan NA. Antimicrobial potential of methanolic extracts of *Hibiscus sabdariffa* and *Ricinus communis*. Advancement in Medicinal Plant Research 2015, 3(1): 18-22.

[293] Alshami I and Alharbi AE. *Hibiscus sabdariffa* extract inhibits in vitro biofilm formation capacity of Candida albicans isolated from recurrent urinary tract infections. Asian Pac J Trop Biomed 2014, 4(2):104-108.

[294] Alshami Iand Alharbi AE. Antibacterial effect of *Hibiscus sabdariffa* (Roselle) extract in synergism with voriconazole and fluconazole against fluconazole-resistant *Candida albicans* isolates: An in vitro study. Biomedical Research 2014, 25 (3): 401-404.

[295] Al-Snafi AE. Pharmacological and therapeutic importance of *Hibiscus sabdariffa*- A review. International Journal of Pharmaceutical Research 2018, 10(3): 451-475.

[296] Dulger B, Hagioglu N, Goncu BS and Gucin F. Antifungal activity of seeds of *Hyoscyamus niger* L. (Henbane) against some clinically relevant fungal pathogens. Asian Journal of Chemistry 2010, 22(8): 6321-6324.

[297] Lunga I, Chintea P, Shvets S, Favel A and Pizza C. Steroidal glycosides from the seeds of *Hyoscyamus niger* and their antifungal activity. Chemistry Journal of Moldova 2007, 2 (1): 108-113.

[298] Al-Snafi AE. Therapeutic importance of Hyoscyamus species grown in Iraq (*Hyoscyamus albus, Hyoscyamus niger* and *Hyoscyamus reticulates*)- A review. IOSR Journal of Pharmacy 2018, 8(6): 18-32.

[299] Rouis Z, Abid N, Koudja S, Yangui T, Elaissi A, Cioni PL, Flamini G and Aouni M. Evaluation of the cytotoxic effect and antibacterial, antifungal, and antiviral activities of *Hypericum triquetrifolium* Turra essential oils from Tunisia. BMC Complementary and Alternative Medicine 2013, 13:24, http://www. biomedcentral. com/1472-6882/13/24

[300] Al-Snafi AE. Chemical constituents and pharmacological effects of *Hypericum triquetrifolium*. Indo Am J P Sc 2018, 5(3): 1757-1765.

[301] Kızıl G, Toker Z, Özen H and Aytekin C.The Antimicrobial activity of essential oils of *Hypericum scabrum*, *Hypericum scabroides* and *Hypericum triquetrifolium*. Phytotherapy Research 2004, 18: 339–341.

[302] Aghel N, Mahmoudabadi A Z and Darvishi L. Volatile constituents and anti candida activity of the aerial parts essential oil of *Dittrichia graveolens* [L.] Greuter grown in Iran. African Journal of Pharmacy and Pharmacology 2011, 5[6]: 772-775.

[303] Al-Snafi AE. Chemical constituents and pharmacological effect of *Inula graveolens* (Syn: *Dittrichia graveolens*)- A review. Indo Am J P Sc 2018, 5 (4): 2183-2190.

[304] Benoit-Vical F, Imbert C, Bonfils JP and Sauvaire Y. Antiplasmodial and antifungal activities of iridal, a plant triterpenoid. Phytochemistry 2003, 62 (5): 747-751.

[305] Rama G and Ampati S. Evaluation of flowers of *Jasminum officinale* antibacterial activity. JAPS 2013, 3(1): 428-431.

[306] Al-Snafi AE. Pharmacology and medicinal properties of *Jasminum officinale*- A review. Indo Am J P Sc 2018, 5 (4): 2191-2197.

[307] Hussain M, Bakhsh H, Abdul Majeed A, Abdul Mujeeb KIA and Farooq U. Comparative In vitro study of antimicrobial activities of flower and whole plant of *Jasminum officinale* against some human pathogenic microbes. Journal of Pharmacy and Alternative Medicine 2013, 2(4): 33-44.

[308] Santhanam J, Abd Ghani FN and Basri DF. Antifungal activity of *Jasminum sambac* against *Malassezia* sp. and non-*Malassezia* sp. isolated from human skin samples. Hindawi Publishing Corporation Journal of Mycology 2014, Article ID 359630, http://dx.doi.org/10.1155/2014/359630

[309] Al-Snafi AE. Pharmacological and therapeutic effects of *Jasminum sambac*- A review. Indo Am J P Sc 2018, 5(3): 1766-1778.

[310] Alka M, Shrivastava A and Jain SK. Screening of some plant extracts against *Alternaria* sp. isolated from foot infections in cancer patients. International Journal of PharmTech Research 2010, 2(2): 1165-1170.

[311] Garbaczewska S, Cieniecka-Roslonkiewicz A and Michalczyk A. The use of components of the extract from the leaves of walnut *Juglans regia* L against the fungus Ascosphaera apis. Chemik 2014, 68(2): 117–122.

[312] Sytykiewicz H, Chrzanowski G, Czerniewicz P, Leszczyński B, Sprawka I, Krzyżanowski R and Matok H. Antifungal activity of Juglans regia (L.) leaf extracts against *Candida albicans* isolates. Pol J Environ Stud 2015, 24(3):1339-1348.

[313] Al-Snafi AE. Chemical constituents, nutritional, pharmacological and therapeutic importance of *Juglans regia*- A review. IOSR Journal of Pharmacy 2018, 8(11): 1-21.

[314] Gliic SB, Milojevic SZ, Dimitrijevic SI, Orlovic AM and Skala DU. Antimicrobial activity of the essential oil and different fractions of *Juniperus communis* L. and a comparison with some commercial antibiotics. Journal of Serbian Chemical Society 2007, 72 (4): 311–320.

[315] Al-Snafi AE. Medical importance of *Juniperus communis* - A review. Indo Am J P Sc 2018, 5(3): 1979-1792.

[316] Nawar LS and Al-Manazalawy EAM. Screening of antibacterial and antifungal activities of five medicinal plants from Saudi Arabia environment. Journal of Applied Sciences Research 2012, 8(4): 2356-2365.

[317] Aiboud A, Moussaif A, El Abbadi N, Ettabia A, El hessni A, Ouichou A, Chakit M and Mesfioui A. In vitro antidermatophytic activity of *Allium sativum* L, Nicotina tabacum and cade oil against Trichophyton rubrum. World Journal of Pharmaceutical Research 2015, 4(1): 414-423.

[318] Karaman I, Sahin F, Güllüce M, Ogütçü H, Sengül M and Adigüzel A. Antimicrobial activity of aqueous and methanol extracts of *Juniperus oxycedrus* L. J Ethnopharmacol 2003, 85(2-3):231-235.

[319] Al-Snafi AE. Pharmacological and therapeutic effects of *Juniperus oxycedrus*- A review. Indo Am J P Sc 2018, 5 (4): 2198-2205.

[320] Al-Snafi AE. A review on *Lagerstroemia indica*: A potential medicinal plant. IOSR Journal of Pharmacy 2019, 9(6): 36-42.

[321] Ajaib M, Arooj T, Mohammed Khan K and Farid S. Phytochemical, antimicrobial and antioxidant screening of fruits, bark and leaves of *Lagerstroemia indica*. Journal of the Chemical Society of Pakistan 2016, 38(3):538-545.

[322] Bhaumik A, Ramu B, Rahman F, Basheer S and Mastanaiah J. The bioactive compounds of fruit of *Lagerstroemia speciosa* L. act as potential antimicrobial agent. International Journal of Pharma Research and Health Sciences 2014, 2(6):476-480.

[323] *Lallemantia royleana*, Chapter 4, http://shodhganga.inflibnet.ac.in/bitstream/10603/ 93051 /5/chapter-%204.pdf

[324] Al-Snafi AE. Pharmacological and Therapeutic effects of *Lallemantia royleana*- A review. IOSR Journal of Pharmacy 2019, 9(6):43-50.

[325] Pradhan RR, Hati DK and Samal S. Pharmacognostical, phytochemical and antimicrobial studies on the leaves of Lantana camara Linn. Der Pharmacia Lettre, 2012, 4 (6):1648-1656.

[326] Saraf A, Quereshi S , Sharma K, Khan NA. Antimicrobial activity of *Lantana camara* L. Journal of Experimental Sciences 2011, 2(10): 50-54.

[327] Naz R and Bano A. Phytochemical screening, antioxidants and antimicrobial potential of *Lantana camara* in different solvents. Asian Pac J Trop Dis 2013, 3(6): 480-486.

[328] Fayaz M, Bhat MH, Fayaz M, Kumar A and Jain AK. Antifungal activity of *Lantana camara* L. leaf extracts in different solvents against some pathogenic fungal strains. Pharmacologia 2017, 8(3): 105-112.

[329] Al-Snafi AE. Chemical constituents and pharmacological activities of *Lantana camara*- A review. Asian J Pharm Clin Res 2019, 12912):10-20

[330] Kannahi M and VinothaInt K. Antimicrobial activity of *Lawsonia inermis* leaf extracts against some human pathogens. J Curr Microbiol App Sci 2013, 2(5): 342-349.

[331] Musa AE, Selv ATi, Vindhan RA, Madhan B, Fat hima A , Rao JR and Sekara n BC. Evaluation of antimicrobial activity of *Lawsonia inermis* (henna) against microbial strains isolated from goat skin/leather. JALCA 2011, 106: 170-175.

[332] Saadabi MAA. Evaluation of *Lawsonia inermis* Linn. (Sudanese Henna) leaf extracts as an antimicrobial agent. Res J Biol Sci 2007, 2(4): 419-423.

[333] Elmanama AA, Alyazji AA, Abu Gheneima NA. Antibacterial, antifungal and synergistic effect of Lawsonia *inermis, Punica granatum* and *Hibiscus sabdariffa*. Annals of Alquds Medicine 2011, 7:33-41.

[334] Sujanamulk B, Chintamaneni R, Chennupati A, Nahar P, Chaluvadi RS, Vemugunta R and Prabhat MV. Evaluation of antifungal efficacy of ethanolic crude lawsone and listerine mouthwash in oncontrolled diabetics and denture wearers - A randomized clinical trial. J Clin Diagn Res 2016, 10(6):ZC90-95.

[335] Mudi SY, Ibrahim H and Bala, MS. Acute toxicity studies of the aqueous root extract of *Lawsonia inermis* Linn. in rats. J Med Plant Res 2011, 35: 5123-5126.

[336] Mardani M, Badiee P, Gharibnavaz M, Jassebi A, Jafarian H and Ghassemi F. Comparison of anti-Candida activities of the ancient plants *Lawsonia inermis* and *Ziziphus spina* christi with antifungal drugs in Candida species isolated from oral cavity. J Conserv Dent 2018, 21(4):359-362.

[337] Ravichandran S and Muthuraman S. Examining the anti-candidal activity of 10 selected Indian herbs and investigating the effect of Lawsonia inermis extract on germ tube formation, protease, phospholipase, and aspartate dehydrogenase enzyme activity in Candida albicans. Indian J Pharmacol 2016, 48(1):47-52.

[338] Yaralizadeh M, Abedi P, Namjoyan F, Fatahinia M and Nezamivand Chegini S. A comparison of the effects of *Lawsonia inermis* (Iranian henna) and clotrimazole on *Candida albicans* in rats. J Mycol Med 2018, 28(3):419-423.

[339] Gozubuyuk GS, Aktas E and Yigit N. An ancient plant *Lawsonia inermis* (henna): Determination of in vitro antifungal activity against dermatophytes species. Journal de Mycologie Médicale 2014, 24(4): 313-318.

[340] Sharma KK, Saikia R, Kotoky, Kalita JC and Devi R. Antifungal activity of *Solanum melongena* L, *Lawsonia inermis* L. and *Justicia gendarussa* B. against dermatophytes. International Journal of PharmTech Research 2011, 3(3): 1635-1640.

[341] Rahmoun N, Boucherit-Otmani Z, Boucherit K, Benabdallah M and Choukchou-Braham N. Antifungal activity of the Algerian *Lawsonia inermis* (henna). Pharmaceutical Biology 2013, 51(1): 131-135.

[342] Al-Snafi AE. A review on *Lawsonia inermis*: A potential medicinal plant. International Journal of Current Pharmaceutical Research 2019, 11(5):1-13.

[343] Al-Snafi AE. *Lemna minor*: Traditional uses, chemical constituents and pharmacological effects- A review. IOSR Journal of Pharmacy 2019, 9(8): 6-11.

[344] Hussein HM. Analysis of trace heavy metals and volatile chemical compounds of *Lepidium sativum* using atomic absorption spectroscopy, gas chromatography-mass spectrometric and fourier-transform infrared spectroscopy. Research Journal of Pharmaceutical, Biological and Chemical Sciences 2016, 7(4): 2529-2555.

[345] Abuelgasim AI, Ali MI and Hassan A. Antimicrobial activities of extracts for some of medicinal plants. International Journal of Advanced and Applied Sciences 2015, 2(2): 1-5.

[346] Bhasin P, Bansal D, Punia A and Sehrawat AR. Antimicrobial activities of *Lepidium sativum*: Medicinal plant used in folklore remedies in India. Journal of Pharmacy Research 2012, 5(3):1643-1645.

[347] Adam SIA, Salih SAM and Abdelgadir WS. In vitro antimicrobial assessment of *Lepidium sativum* L. seeds extracts. Asian Journal of Medical Sciences 2011, 3(6): 261-266.

[348] George RE, Thomas S, Kunjumon M and Thankamani V. Analysis of phytoconstituents and in vitro antifungal evaluation of methanolic extract of *Lepidium sativum* Linn. seeds. International Journal of Pharma and Bio Sciences 2015, 6(3):P490-P497.

[349] Al-Snafi AE. Chemical constituents and pharmacological effects of *Lepidium sativum*- A review. International Journal of Current Pharmaceutical Research 2019, 11(6):1-10.

[350] Abuelgasim AI, Ali MI and Hassan A. Antimicrobial activities of extracts for some of medicinal plants. International Journal of Advanced and Applied Sciences 2015, 2(2): 1-5.

[351] Ravikumar VR and Sudha T. Phytochemical and microbiological observations on *Phyla nodiflora*. IJRPC 2011, 1(2): 117-120.

[352] Priya SE and Ravindhran R. Phytochemical analysis and antimicrobial properties of extracts from aerial parts of *Phyla nodiflora* (L) Greene. Int J Curr Microbiol App Sci 2015, 4(2): 347-358.

[353] Zare Z, Ahmed M, Sattari TN, Iranbakhsh A and Mehrabian S. Antimicrobial activity of leaf and flower extracts of *Lippia nodiflora* L. (verbenacea). Journal of Plant Protection Research 2012, 52(4): 401-403.

[354] Regupathi T, Chitra K, Ruckmani K, Nagarajan S and Lalitha KG. Antimicrobial potential of *Lippia nodiflora* Linn. Int J Pharm Phytopharmacol Res 2014, 4 (3): 145-149.

[355] Durairaj AK, Vaiyapuri TS, Mazumder UK and Gupta M. Antimicrobial and lipid peroxide scavenging activity of *Lippia nodiflora* (Verbenaceae). Pharmacologyonline 2007, 3: 177-189.

[356] Niranjan K. In vitro screening of herbal plant extracts on human nail fungus. Vingnanam Journal of Science 2016, 13(1-2):73-77.

[357] Al-Snafi AE. Pharmacological and therapeutic effects of *Lippia nodiflora* (Phyla nodiflora). IOSR Journal of Pharmacy 2019, 9(8):15-25.

[358] Papageorgiou VP, Assimopoulou AN, Couladouros EA, Hepworth D, Nicolaou KC. The chemistry and biology of alkannin, shikonin, and related naphthazarin natural products. Angew Chem Int Ed Engl 1999, 38: 270–301.

[359] Al-Snafi AE. Chemical constituents and pharmacological effects of *Lithospermum officinale*. IOSR Journal of Pharmacy 2019, 9(8): 12-21.

[360] Menghani E, Ojha CK, Negi RS , Agarwal Y and Pareek A. Screening of Indian medicinal plants and their potentials as antimicrobial agents. Global Journal of Science Frontier Research 2011, 11(2): http://creativecommons.org/licenses/by-nc/3.0/

[361] Jaysingrao J and Sunil CN. Evaluation of antimicrobial activity of *Luffa acutangula* (L.) Roxb. var. amara (Roxb.) Clarke. International Journal of Advanced Research 2013, 1(10) 323-326.

[362] Valerie AS, Anna I, Christal T, Felicia AU, Jelani FB and Bamanga R. Antimicrobial and physicochemical evaluation of *Luffa acutangular* leaf extracts. Biochemistry and Molecular Biology 2017, 2(6): 80-85.

[363] Torvi JR and Hunashal RD. A study on antimicrobial activity of extracts of *Luffa acutangula* var amara fruits. International journal of pharma and biosciences 2012, 3(4): 678-685.

[364] Al-Snafi AE. A review on *Luffa acutangula*: A potential medicinal plant. IOSR Journal of Pharmacy 2019, 9(9):56-67.

[365] Muthumani. P and Meera R. Phytochemical Screening and Anti inflammatory, Bronchodilator and Antimicrobial activities of the Seeds of *Luffa cylindrica*. RJPBCS 2010, 1(4): 11-22.

[366] Aboh M, Okhale SE and Ibrahim K. Preliminary studies on *Luffa cylindrica*: Comparative phytochemical and antimicrobial screening of the fresh and dried aerial parts. African Journal of Microbiology Research 2012, 6(13): 3088-3091.

[367] Indumathy R, Satheesh DK, Kolagani P, Sashikala GD. Antimicrobial activity of whole plant of *Lufa cylindrica* (Linn) against some common pathogenic microorganisms. Int J Pharm Sci Drug Res 2011, 3:29-31.

[368] Devi GS, Muthu AK, Kumar DS, Rekha S, Indhumathy and Nandhini R. Studies on antibacterial and antifungal activities of the ethanolic extracts of *Luffa cylindrica* (Linn) fruit. Int J Drug Dev and Res 2009, 1(1):105-109.

[369] Ahmad B and Khan AA. Antibacterial, antifungal and phytotoxic activities of *Luffa cylindrica* and *Momordica charantia*. Journal of Medicinal Plants Research 2013, 7(22): 1593-1599.

[370] Ismail, Hussain MM, Dastagir MG, Billah M and Quader A. Phytochemical and antimicrobial investigation of *Luffa cylindrica*. Boletín Latinoamericano y del Caribe de Plantas Medicinales y Aromáticas 2010, 9 (5): 327 – 332.

[371] Al-Snafi AE. Constituents and pharmacology of *Luffa cylindrica*- A review. IOSR Journal of Pharmacy 2019, 9(9):68-79

[372] Radulović N, Gencic M and Stojanović-Radić Z. Antimicrobial phenolic abietane diterpene from *Lycopus europaeus* L. (Lamiaceae). Bioorganic & medicinal chemistry letters 2010, 20(17):4988-4991.

[373] Al-Snafi AE. A review on *Lycopus europaeus*: A potential medicinal plant. IOSR Journal of Pharmacy 2019, 9(7): 80-88.

[374] Vafi F, Bahramsoltani R, Abdollahi M, Manayi A, Hossein Abdolghaffari A, Samadi N, Amin G, Hassanzadeh G, Jamalifar H, Baeeri M, Heidari M and Khanavi M. Burn wound healing activity of *Lythrum salicaria* L. and *Hypericum scabrum* L. Wounds 2016, 28(12): 448 - 458.

[375] Bencsik T. Comparative histological, phytochemical, microbiological, and pharmacological characterization of some *Lythrum salicaria* L. populations. Ph.D. dissertation. Department of Pharmacognosy, Medical School University of Pécs, Hungary, 2014.

[376] Al-Snafi AE. Chemical constituents and pharmacological effects of *Lythrum salicaria* - A review. IOSR Journal of Pharmacy 2019, 9(6): 51-59.

[377] Manayi A, Saeidnia S, Faramarzi MA, Samadi N, Jafari S, Vazirian M, Ghaderi A, Mirnezami T, Hadjiakhoondi A, Ardekani MR and Khanavi M. A comparative study of anti-candida activity and phenolic contents of the calluses from *Lythrum salicaria* L. in different treatments. Appl Biochem Biotechnol 2013, 170(1):176-184.

[378] Dorta E, González M, Lobo MG and Laich F. Antifungal activity of mango peel and seed extracts against clinically pathogenic and foodspoilage yeasts. Nat Prod Res 2016, 30(22):2598-2604.

[379] Kanwa Q, Hussain I, Siddiqui HL and Javaid A. Antifungal activity of flavonoids isolated from mango (*Mangifera indica* L.) leaves. Natural product research 2010, 24(20):1907-1914.

[380] Islam MR, Mannan MA, Kabir MHB, Islam A and Olival KJ. Analgesic, anti-inflammatory and antimicrobial effects of ethanol extracts of mango leaves. J Bangladesh Agril Univ 2010, 8(2): 239–244.

[381] Ahmed SOM, Omer MAA, Almagboul AZ and Abdrabo AN. In vitro antimicrobial activity of *Mangifera indica* L. Gezira Journal of health sciences 2005, 1 (2): 82-91.

[382] Al-Snafi AE, Ibraheemi ZAM, Talab TA. A review on components and pharmacology of *Mangifera indica*. International Journal of Pharmaceutical Research 2021, 13(2): 3043- 3066.

[383] Zarai Z, Kadri A, Chobba IB, Mansour RB, Bekir A, Mejdoub H and Gharsallah N. The in vitro evaluation of antibacterial, antifungal and cytotoxic properties of *Marrubium vulgare* L essential oil grown in Tunisia. Lipids in Health and Disease 2011, 10(161):1-8.

[384] Radojević I, Stanković M, Stefanović O, Čomić L, Topuzović M, Vasić S and NikolićM. Exploring antimicrobial activity of Horehound, *Marrubium peregrinum* L extracts. Kragujevac J Sci 2013, 35: 99-106.

[385] Al-Snafi AE. Al-Saedy HA , Talab TA, Majid WJ, El-Saber Batiha G, Jafari-Sales Abolfazl. The bioactive ingredients and therapeutic effects of *Marrubium vulgare* - A review. International Journal of Biological and Pharmaceutical Sciences Archive 2021, 1(2):9–21.

[386] Cheplogoi PK. Extraction of essential oils, and active compounds from *Matricaria chamomilla* and their application in toilet soap. MSc thesis. University of Nairobi 1997.

[387] Al-Snafi AE and Hasham LF. Bioactive constituents and pharmacological importance of *Matricaria chamomilla*: A recent review. GSC Biological and Pharmaceutical Sciences 2023, 22(2): 79–98.

[388] Al-Snafi AE. Khadem HS, Al-Saedy HA, Alqahtani AM, El-Saber Batiha G. Jafari-Sales Abolfazl. A review on *Medicago sativa*: A potential medicinal plant. International Journal of Biological and Pharmaceutical Sciences Archive 2021, 1(2):22-33.

[389] Sadowska B, Budzynska A, Wieckowska-Szakiel M, Paszkiewicz M, Stochmal A, Moniuszko-Szajwaj B, Kowalczyk M and Rozalska B. New pharmacological properties of *Medicago sativa* and *Saponaria officinalis* saponin-rich fractions addressed to Candida albicans. Journal of Medical Microbiology 2014, 63: 1076-1086.

[390] Nacsa-Farkas E, Pauliuc I, Krisch J and Vagvolgyi C. Anticandidal effect of the extracts from *Melilotus officinalis* and Aristolochia clematitis. Review on Agriculture and Rural Development 2013, 2(1): 473-477.

[391] Nasser NM, Al-Araji M and Al-Ani WMK. Antifungal activity of *Mellilotus officinalis* of Iraq. Journal of Chemical and Pharmaceutical Research 2014, 6(11): 611-617.

[392] Nacsa-Farkas E, Kerekes E, Kerekes EB, Krisch J, Roxana P, Vlad DC, Ivan P and Vágvölgyi C. Antifungal effect of selected European herbs against *Candida albicans* and emerging pathogenic non-albicans Candida species. Acta Biol Szeged 2014, 58(1):61-64.

[393] Al-Snafi AE. Chemical constituents and pharmacological effects of *Melilotus officinalis*- A review. IOSR Journal of Pharmacy 2020, 10(1):26-36.

[394] Kiran kumar V, Ravi Sankar N, Ramya S, Sahaja RV , Saritha K ,Govinda Reddy K, Naidu NV. Phytochemical screening and antimicrobial activity of the leaf extract of *Mirabilis jalapa* against pathogenic microorganisms. International Journal of Phytomedicine 2010, 2: 402-407.

[395] Al-Snafi AE. Talab TA, Jabbar WM, Alqahtani AM. Chemical constituents and pharmacological activities of *Mirabilis jalapa*- A review. International Journal of Biological and Pharmaceutical Sciences Archive 2021, 1(2):34-45.

[396] Lu HP, Jia YN, Peng YL, Yu Y, Sun SL, Yue MT, Pan MH, Zeng LS and Xu L. Oxyresveratrol, a stilbene compound from *Morus alba* L. twig extract active against *Trichophyton rubrum*. Phytother Res 2017, 31(12): 1842-1848.

[397] Batiha G, Al-Snafi AE · Thuwaini MM, Teibo JO, Shaheen HM, Akomolafe AP, Teibo TKA, Al-kuraishy HM, Al-Garbeeb AI, Alexiou A and Papadakis M. *Morus alba*: a comprehensive phytochemical and pharmacological review. Naunyn-Schmiedeberg's Archives of Pharmacology 2023, https://doi.org/10.1007/s00210-023-02434-4

[398] Al-Snafi AE. Constituents and pharmacology of *Narcissus tazetta*. IOSR Journal of Pharmacy 2020, 10(9): 44-53.

[399] Malta wild plants, *Narcissus tazetta* subsp. tazetta, http://www. maltawildplants . com / AMRY/Narcissus_tazetta_subsp_tazetta.php

[400] Abdul Kareem MW and Al Dhaher ZA. Evaluation of The antifungal activity of *Nasturtium officinale* (watercress) oil with calcium hydroxide against Candida albicans isolated from root canal. J Bagh Coll Dent 2021, 33(4):1-5.

[401] Al-Snafi AE. A review on *Nasturtium officinale*: A potential medicinal plant. IOSR Journal of Pharmacy 2020, 10(9): 33-43.

[402] El Sawi NM , Geweely NS, Qusti S, Mohamed M and Kamel A. Cytotoxicity and antimicrobial activity of *Nerium oleander* extracts. Journal of Applied Animal Research 2011, 37(1): 25-31.

[403] Saranya S, Archana D and Santhy KS. Antimicrobial and antioxidant effects of *Nerium oleander* flower extracts. International Journal of Current Microbiology and Applied Sciences 2017, 6):1630-1637.

[404] Al-Snafi AE. Bioactive ingredients and pharmacological effects of *Nerium oleander*. IOSR Journal of Pharmacy 2020, 10(9): 19-32.

[405] Anumudu CK, Nwachukwu MI, Obasi CC, Nwachukwu IO and Ihenetu FC. Antimicrobial activities of extracts of tobacco leaf (*Nicotiana tabacum*) and its grounded snuff (utaba) on Candida albicans and Streptococcus pyogenes. J Trop Dis 2019, 7:2, doi: 10.4172/2329-891X.1000300

[406] Itankar P and Murkute AV. Evaluation of In vitro antidandruff activity of biotransformed material (extract) of *Nicotiana tabacum* leaves Journal of Natural Remedies 2015, 15(2): 65-70.

[407] Al-Snafi AE. Pharmacological and toxicological effects of *Nicotiana tabacum*. World Journal of Advanced Pharmaceutical and Medical Research 2022, 3(1):6–18.

[408] Altuner EM, Ceter T and Işlek C. Investigation of antifungal activity of *Ononis spinosa* L. ash used for the therapy of skin infections as folk remedies. Mikrobiyol Bul 2010, 44(4): 633-639.

[409] Orhan DD, Ozcelik B, Hosbas S and Vural M. Assessment of antioxidant, antibacterial, antimycobacterial, and antifungal activities of some plants used as folk remedies in Turkey against dermatophytes and yeast-like fungi. Turk J Biol 2012, 36: 672-686.

[410] Mahasneh AM and El-Oqlah AA. Antimicrobial activity of extracts of herbal plants used in the traditional medicine of Jordan. J Ethnopharmacol 1999, 64: 271–276.

[411] Al-Snafi AE. The traditional uses, constituents and pharmacological effects of *Ononis spinosa*. IOSR Journal of Pharmacy 2020, 10(2):53-59.

[412] Najat A. Bokhari. In vitro inhibition potential of *Phoenix dactylifera* L. extracts on the growth of pathogenic fungi. J Med Plants Res 2012, 6(6). Available at: http://doi.org/10.5897/JMPR11.1545

[413] Al-Snafi AE, Thuwaini MM. *Phoenix dactylifera*: traditional uses, chemical constituents, nutritional benefit and therapeutic effects. Traditional Medicine Research 2023, 8(4):20. https://doi.org/10.53388/TMR20221110001

[414] Al-Snafi AE. Constituents and biological effects of *Reseda lutea* and *Reseda odorata* grown in Iraq. International Journal of Biological and Pharmaceutical Sciences Archive 2022, 3(1): 56–63.

[415] Moghaddam NS, Eryılmaz M, Altanlar N, Yıldırım O. Antimicrobial screening of some selected Turkish medicinal plants. Pak J Pharm Sci. 2019, 32(3):947-951.