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Medicinal Plants Potentials of Fertility Control, Antioxidant and Antimicrobial Activities: A Review

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ABSTRACT: Uncontrolled human population and emerging disease as significantly affects peoples of all walks life at global level. Population explosion directly or indirectly caused detorious effects on life and natural resources on the earth planet. Therefore, fertility control by means of natural, traditional medicinal plants to check human population might be significantly used to conserve living beings and natural resources as well as reproductive health care. Various medicinal plants like *Ficus religiosa, Leucas aspera*, *Holarrhena antidysenterica, Psidivm guajava* used traditionally to control and cure variety of diseases. The aim of this study was provide information of such plants with antimicrobial, antioxidant and fertility efficacy for controlling population as well as varieties of diseases. Some medicinal plant extract were investigated for their antimicrobial, antioxidant and fertility activity in animal models. This review covered scientific proven information on various medicinal plants used for regulation of fertility, antimicrobial and antioxidant activities. This review provides information of medicinal plants used traditionally in natural system for antimicrobial, antioxidant and antifertility activity.

Keywords: Medicinal Plants, Antimicrobial, Antioxidant, Antibacterial, fertility.

INTRODUCTION

Rapidly expanding human population due to unintended pregnancies and emerging new diseases is a major concern in all countries of the world. Medicinal plants generally have range of activities because they possess several constituents in active conditions that work through various modes of action. Nature is source of medicinal agents for long time and an impressive number of modern drugs have been isolated from natural sources, many based on their use in traditional medicine. In order to promote the use of medicinal plants as potential sources of antimicrobial compounds, it is pertinent to thoroughly investigate their composition and activity and thus validate their use (Preethi *et al*., 2010). Although they are extensively used for the design and development of new drugs in human medicine, plant antimicrobial compounds are also a promise for future plant disease controlling agents (Sevindik, 2018). In this paper review the literature of 1999-2023 on antimicrobial, antioxidant, antibacterial and fertility activities of medicinal plants. Medicinal drugs or preparations that used for control fertility in men and Women are called antifertility agents or contraceptives. These drugs affect and are involved in prevents spermatogenesis, inhibits testosterone or affects the gonadotrophin of the organs or mortality of sperm. Currently, population size is being controlled in many developing countries. About 75% of population in developing nations receive herbal medical health care. The antifertility properties of medicinal plants and their utility in human disease for which plants have now achieved a global reputation have been experimentally confirmed around the globe over a substantial number of years (Daniyal and Akram 2015). A Review of the literature indicates the remarkable use of a number of medicinal plants for regulation of fertility, antioxidant and antimicrobial activities.

Results clearly demonstrated antioxidant and antibacterial activities due to the presence of bioactive phytochemicals (Pant *et al*., 2023). Antioxidant and antimicrobial result reveal that C. sinensis could be a good antioxidant and novel safe and effective anti microbial agent could be use in treatment of many infectious disease as a chemotherapeutic agent (Saonere *et al*., 2023). The anti-microbial evaluation has proceeded for syringaldehyde and their Schiff bases I and II along with standard ampicillin against five bacteria viz., *Bacillus subtilis*, *Pseudomonas aeruginosa, Escherichia coli*, *Klebsiella* spp., and *Enterobacter* spp. Compound II was more effective than standard ampicillin against *P. aeruginosa* only (Sahni *et al*., 2022). The study showed that the extracts of

Suedea fruticosa have concentration dependent antimicrobial activities against *E. coli, S. aureus, P. aureginosa* and *K. Pneumoniae*. In *S. fruticosa*, all extracts showed a significant level of antioxidant activity, ranging from 11.98 mmol to 27.52 mmol Fe(II)/g in dry plant (Ahmad *et al*., 2021). The study shows valuable medicinal flora from Himachal Pradesh is useful to promote fertility control (Radha *et al*., 2021).

MEDICINAL PLANTS USED FOR REGULATION OF FERTILITY

A. Some medicinal plants exhibiting potent antifertility activity for males (Table 1)

The 50% ethanolic extract of seeds of *Abrus precatorius* have antifertility activities in males, the extract inhibit conception**,** altered the sperm morphology, reduced sperm motility and decreased testicular weight and sperm count and also causes degeneration in the testis during the later stages of spermatogenesis, in rats, rabbits and presbytis monkeys. Dry leaf powder of *Andrographis paniculata* generally caused cessation of spermatogenesis, degeneration in seminiferous tubules and regression of leydig cells and degeneration had also been seen in accessory sex organs and its fluid content. The plant leaf powder prevented cytokinesis of the dividing spermatogenic cell lines and decrease in sperm motility and sperm count and also provides abnormalities in sperms in rats.

The Seeds oil of *Azadirachta indica* **(**Neem) and ethanolic extract of leaves established for male infertility, caused disturbances in the structure and functions of testis and spermatozoa. It also produced histopathological and biochemical changes in the caput and cauda, reduced the serum testosterone level, produced mass atrophy in spermatogenic elements and arrested the spermatogenesis stage**,** it caused the morphological changes in the head of the sperm and its acrosome due to androgen deficiency and spermicidal activity in rats, mouse, monkeys, and humans.

The leaf extract *of Catharanthus roseus* affects principle and apical cells of caput and nuclear cells of cauda epididymis, leaf extract caused impairment of epididymal functions, affects spermatogenic cell lines other than spermatogonia in male rats.

Citrullus colocynthis reduced cauda epididymis sperm motility and density, pups number, fertility and circulatory levels of testosterone caused reversible effects in fertility of male albino rats (Borhade *et al*., 2013). Extract of berries of *Embelia ribes* was use as a fertility regulating agent, plant extract affects the sperm motility, quantity and quality of semen and lowered the hormonal level, caused profound morphological and histological changes in testis of male bonnet monkeys (Devi *et al.,* 2015).

The root bark tincture of *Gossipium herbaceum* was showed male conceptive activity, it reduced the level of serum testosterone and luteinizing hormone in dose dependent manner, induced the azoospermia or oligospermia by directly acting on the testis. It was found that it inhibits sperm motility by blocking the cAMP formation in the sperms., acts on the pituitary gonadal axis and decreased the secretory activity of accessory sex glands, it inhibited T-type Ca^{2+} currents in mouse spermatogenic cells in hamester and rats (Devi *et al.,* 2015). The 50% ethanolic extract of *Hibiscus rosasinensis* benzene and benzene/ether extract of flowers have antifertilty activity. The plant extract possessed antispermatogenic and antiandrogenic activity in rats, Nonscrotal bat and mice (Devi *et al.,* 2015).

The 50% ethanol extract of *M. annua* root extract have been reported antifertility activity. Plant revealed significant decreases in the weights of testes, epididymides, seminal vesicle and ventral prostate, also reduced testicular and epididymal sperms count and motility, number of fertile males, the ratio between delivered and inseminated females and number of pups has been observed. Extract also show significant reduction in serum concentration of luteinizing hormone and testosterone support the antifertility activity of extract in rats (Kenwat *et al*., 2013). Aqueous extract of leaf of *Stephania hernandifolia* show deminution of the activities of testicular androgenic key enzymes and plasma testosterone with spermatogenesis in rats (Devi *et al*., 2015).

The ethanolic extract of roots and seeds of *Solanum surattens* caused disruptive changes in the acrosomal membrane of sperm and arrest spermicidal motility, plant extract also cause degenerative changes in seminiferous epithelium and spermatogonic elements in male rats (Devi *et al*., 2015). The crude extract of roots of *Tripterygium wilfordii* have antifertility potential. The extract caused degenerative changes in seminiferous tubular epithelium and decrease in plasma testosterone. Plant extract was inhibit the Ca^{2+} channel activity in mouse spermatogenic cells in rats and mice (Devi *et al*., 2015). Ethanolic extract of *Maytenus emargineta* showed Reversible contraceptive efficacy and methanolic extract showed Inhibition of spermatogenesis and degenerative changes in testes of albino rats (Chaudhary *et al*., 2011; Sharma and Mali 2017). Ethanolic extract of *Peganum harmala* showed contraceptive efficacy in male albino rats (Mali and Chaudhary 2022). Reversible contraceptive activities showed by *Cassia occidentalis* extract in male rats (Mali and Khan 2022).

Table 1: List of medicinal plants regulates fertility in males.

Sr. No.	Plant Name	Family	Activity	Ref.
1.	*Abrus precatorius*	Fabaceae	It reduced testicular weight and sperm count and also causes degeneration in the test is during the later stages of spermatogenesis.	(Devi *et al.,* 2015)
2.	*Andrographis paniculata*	Acanthaceae	Antispermatogenic	(Devi *et al.,* 2015)
3.	*Azadirachta indica*	Meliaceae	Morphological changes in the head of the sperm and its acrosome due to androgen deficiency.	(Devi *et al.,* 2015)
4.	*Cassia tora*	Laguminosae	Reversible antifertility effect Antiandrogenic effects	Kha and Mali 2017; 2019)
5.	*Catharanthus roseus*	Apocynaceae	Affect spermatogenic cell lines other than spermatogonia.	(Devi *et al.,* 2015)
6.	*Citrullus colocynthis*	Cucurbitaceae	Antispermatogenic Significantly reduced pups number, fertility and circulatory levels of testosterone. Reduced reversible infertility in male albino rats.	(Borhade *et al*., 2013; Mali *et al.,* 2001)
7.	*Embelia ribes*	Myrsinaceae	Affected sperm motility, quantity and quality of semen, lowered the hormonal level.	(Devi *et al.,* 2015)
8.	*Gossipium herbaceum*	Malvaceae	Antispermatogenic, induced oligosperma, inhibit sperm motility	(Devi *et al.,* 2015)
9.	*Hibiscus Rosasinensis*	Malvaceae	Antiandrogenic Antispermatogenic	(Devi *et al.,* 2015)
10.	*Martynia annua*	Martyniaceae	Decreases in the weights of testes, epididymides, seminal vesicle and ventral prostate.	(Kenwat *et al*., 2013)
11.	*Stephania hernandifolia*	Menispermaceae	Deminution of the activities of testicular androgenic key enzymes and plasma testosterone with spermatogenesis.	(Devi *et al.,* 2015)
12.	*Solanum surattens*	Solanaceae	Disruptive changes in the acrosomalmembrane of sperm and arrest spermicidal motility.	(Devi *et al.,* 2015)
13.	*Tephrosia purpurea*	Fabaceae	Antifertility and antispermatogenic in albino rats	(Luhadia and Mali 2016)
14.	*Tripterygium wilfordii:*	Celastraceae	Degenerative changes in seminiferous tubular epithelium and decrease in plasma testosterone.	(Devi *et al.,* 2015)
15.	*Vitex negundo*	Lamiaceae	Spermicidal	(Kumari *et al.,* 2023)
16.	*Withania somnifera*	Solanaceae	Antifertility activity	(Mali, 2013)

B. Some Medicinal plants exhibiting antifertility activity in females (Table 2)

Several medicinal plants associated with antifertility activity in females, these plants produce antifertility activity by acting through various mechanisms (Devi *et al*., 2015). Ethanol extract of *Acalypha indica Linn* showed estrogenic activity (Daniyal and Akram 2015). Leaves extract of *Aspilia Africana* reduced the number of ova observed in oviduct. It caused the inflammation of the fallopian tube, degeneration in the ovarian cortex in the stroma cell of the ovary and caused the alteration in estrous cycle by the prolonged proestrous and a reduced diestrous and estrous phase (Devi *et al*., 2015). Ethanolic extract of *Anethum graveolens* increased the duration of diestrous phases and total time of the estrous cycle in female rats (Devi *et al*., 2015).

Ethanolic extract of *Balanties roxburghii* fruits given for abortion, have significant abortifacient activity. It also significantly increases the uterine weight diameter of uterus, thickness of endometrium and height of endometrial epithelium in female rats (Devi *et al*., 2015).

The aqueous extract of *Cassia fistula* seeds was used for anti-estrogenic activity, it show anti-estrogenic activity in presence of a strong estrogen like estradiol valerate and significantly reduces the estrogen induced uterotrophic effect. It prevents pregnancy in the mated female rats (Devi *et al*., 2015).

Alcoholic extract of *Cannabis sativa* leaves used for abortifacient effect, plant extract produced significant decrease in ovarian and uterine weight whereas non-significant increase in body weight. The extract caused slight increment in serum

progesterone level and decrement in serum estrogen level and the level of LH and FSH significantly reduced after administration of extract in female rats (Devi *et al*., 2015). The 50% ethanolic extract of *Cichorium intybus* used for anti-implantation effect. In females (Daniyal and Akram 2015). The *Citrullus colocynthis* show adverse effect on reproductive system and fertility, it caused significant decrease in the relative ovarian weights and embryo weights, viable fetus's number (Borhade *et al*., 2013). The aqueous extract of *Coriandrum sativum* seeds used as abortifacient agent, the plant extract caused significant decrease in progesterone level of serum on day-5 of progesterone indicating abortifacient activity (Devi *et al*., 2015). Flower heads and mature seeds of *Daucus carota* used to prevent conception.

The extract of *Melia azedarach* seeds use as abortifacient, the plant extract caused loss of implantation. It significantly reduces myometrial thickness, uterine gland diameter, luminal diameter of uterine glands and luminal epithelium cell height (Devi *et al*., 2015). The methanolic extract of *Momordica charantia* seeds caused disturbances in the estrous cycle**,** the extract exhibited irregular pattern of estrous cyclicity and increases the length of estrous cycle. The disruption of the estrous cycle was found to be executed by disturbance in ovarian function and estrous cyclicity through interplay of ovarian and extraovarian hormones (Devi *et al*., 2015). The ethanolic extract of *Rivea hycrateriformis* in rats disrupts the estrous cycle**,** after administration of extract, the level of cholesterol increased due to the inhibition of steroidogenesis. The myometrium and endometrium thickness and diameter to be increased indicating the uterotrophic effect**.** The number of graffian follicles declined and increased in number of atretic follicle indicating antiovulatory effect (Devi *et al*., 2015). The ethanolic extract of *Striga orobanchioides* showed Anti-implantation activity in female rats (Daniyal and Akram 2015). The aqueous and ethanol extract of *Rubia cordifolia* root used for antifertility effect. Alkaloids, steroids, flavonoids, saponins present in the *Rumex steudelli* extract might be responsible for its contraceptive activity. Sex hormones being steroidal compounds, the plant sterols were suspected to be responsible for its antifertility effects. The extracts exhibit pregnancy interceptive activity in female albino rat (Feroche, 2015). Extract of *Trianthema portulacastrum* use as abortifacient agent. The extract possessed significant abortifacient activity and produced significant increases in uterine weight, diameter of the uterus and thickness of endometrium which indicates its mild anti-estrogenic activity in female rats (Devi *et al*., 2015).

Table 2: List of medicinal plants regulates fertility in females.

Sr. No.	Plant	Family	Activity	References
1.	*Acalypha indica Linn*	Euphorbiaceae	Estrogenic	(Daniyal and Akram 2015)
2.	*Aspilia Africana*	compositae	Estrous cycle disruptors	(Devi *et al*., 2015)
3.	*Anethum graveolens*	Umbelliferae	Estrous cycle disruptors	(Devi *et al*., 2015)
4.	*Balantis roxburghii*	Zygophyllaceae	Abortifacient	(Devi *et al*., 2015)
5.	*Butea monosperma*	Fabaceae	Anti- estrogenic	(Devi *et al*., 2015); Sharma *et al*., 2020)
6.	*Cannabis sativa*	Cannabinaceae	Abortifacient	(Devi *et al*., 2015)
7.	*Cichorium intybus*	Esteraceae	Anti-implantation	(Daniyal and Akram 2015)
8.	*Citrullus colocynthis*	Cucurbitaceae	Adverse effect on reproductive system and fertility	(Borhade *et al*., 2013)
9.	*Citrus medica*	Rutaceae	Antifertility	(Patil *et al*., 2013)
10.	*Coriandrum sativum*	Apiaceae	Abortifacient	(Devi *et al*., 2015)
11.	*Cuscuta reflexa*	Convolvulaceae	Anti-implantation	(Daniyal and Akram 2015)
13.	*Melia azedarach*	Meliaceae	Abortifacient	(Devi *et al*., 2015)
14.	*Momordica charantia*	Cucurbitaceae	Estrous cycle disruptors	(Devi *et al*., 2015)
15.	*Rivea hypocrateriformis*	Convolvulaceae	Estrous cycle disruptors	(Devi *et al*., 2015)
16.	*Striga orobanchioides*	Scrophulariaceae	Anti-implantation	(Daniyal and Akram 2015)
17.	*Rumex steudelli*	Polygonaceae	Abortifacient	(Feroche, 2015)
18.	*Trianthema portulacastrum*	Aizoceae	Abortifacient	(Devi *et al*., 2015)
19.	*Urticadiocia*	Uricaceae	Anti-implantation	(Daniyal and Akram 2015)
20.	*Withania somnifera*	Solanaceae	Abortifacient	(Singh *et al.*, 2010)

C. Medicinal plants used for regulation of antimicrobial and antioxidant activity (Table 3)

Ethanolic extract of *A. ampeloprasum* showed strong antioxidant activity and antimicrobial activity (Anides *et al.*, 2019). *Aloysia citriodora* leaves Eos could be regarded as potential sources of natural antioxidant agents in food (Hosseini *et al*., 2019). Various extract of aerial part of *Anabasis aretioides* showed antioxidant activity and antimicrobial activity investigation found ethyl acetate extract showed maximum zone of inhibition, Lowest MIC value was obtained with methanolic and macerated methanolic extract (Senhaji *et al.,* 2020). Methanolic extract of *Arisaema jacquemontii blume* root have potential antioxidant and antibacterial activities (Baba and Malik 2015). Essential oils of aerial part of the *Artemisia annua* have antioxidant activity, the antimicrobial activity (Juteau *et al*., 2002). *Asparagus racemosus* leaves extract hveproperties of antioxidant, Methanolic extract of

the plant anti bacterial effects (Kaur and Mandal 2014). Many extracts of *Bauhinia variegate* derived from leaves showed significant antioxidant response, leaves extract of the plant have potential antibacterial activity. The ethanolic extract antbacterial effects on pathogenic bacteria (Mishra *et al*., 2013). *Bryophyllum pinnatum* extracts *viz* methanolic extract, EtOAc extract, n-hexane extract have antioxidant activity, the plant extract showed antimicrobial activity against tested microorganisms (Tatsimo *et al*., 2012). Crude extract of *C. angustifolia* have significant antioxidant activity. The plant extracts have the potential to inhibit microbial growth of microorganisms (Ahmed *et al*., 2016).

Leaves part of *Cassia auriculata* shown antioxidant and antimicrobial properties, total antioxidant level was higher in ethyl acetate extract. Hexane, chloroform, ethyl acetate, acetone and methanol extracts have antibacterial activity against ten human pathogens (Anushia *et al*., 2009). Leaves part of *Cassia fistula* shown antioxidant and antimicrobial properties, methanolic extract of the plant able to inhibit pathogen (Kaur and Mandal 2014). Leaves part of *Cassia occidentalis* have antimicrobial properties. Different organic and aqueous extracts of leaves of the plant shown antimicrobial activity against seven human pathogenic bacterial and two fungal strains, methanol and aqueous extracts showed significant antimicrobial activity against most of the tested microbes which included two gram-positive bacteria, five gram-negative bacteria *and* fungi (Arya *et al.,* 2010).

Ethanolic and aqueous extracts from the leaves of *Cassiatora* have antibacterial activity; maximum antibacterial activity is shown by aqueous extract (Sharma *et al.,* 2010).

Stem part of *Cissus quadrangularis* showed antioxidant and antimicrobial activities. The antioxidant activity of methanol extract and aqueous extract, ethyl acetate extract and *n*-hexane extract have the least activity. The ethyl acetate extract and methanol extract of both fresh and dry stem have antimicrobial activity against tested microorganisms (Murthy *et al.*, 2003). *Citrullus colocynthis* root, stem, seed, leaves, fruit parts used for antioxidant and antimicrobial agent. Antimicrobial activity investigation found aqueous and diluted acetone extract of the plant antibacterial activity against both Gram positive and Gram negative bacterial strains (Borhade *et al*., 2013). *Citrus limon* (lemon peel) essential oil showed antioxidant activity and have significant antibacterial activity against selected microorganisms (Moosavy *et al*., 2017). *Coffea undulat* leaves pulp showed significant antioxidant activity and antibacterial activity (Duangjal *et al*., 2016). The leaves extract of *Combretum micronthum* showing potential antioxidant activity. *Combretum micronthum* showed antimicrobial activity against tested bacterial strains (Karou *et al*., 2005). The water, ethanol and water: ethanol extracts of *Coptis chinensis* root have antioxidant properties. Water extract of goldthread rhizome and medicated leaven showed some degree of antioxidant activity. Although it was half of that measured in their ethanol: water extract, ethanol extract not showed antioxidant potential. The plant showed antibacterial activity against bacterial pathogens (Duffy and Power 2001).

Datura metel leaves, stem bark, root part shown antioxidant and antimicrobial activities; aqueous and ethanol extracts have antioxidant activity. The antibacterial efficacy of crude aqueous extract and ethanol extract of leaf, stem bark and roots of the plant assayed against eight clinical bacterial strains. Leaf and stem bark was antagonistic against tested bacteria species. Maximum inhibitory zone displayed by drug streptomycin (Akharaiyi, 2011). Ethanol extract of sapwood part of *Dracontomelon dao* have antioxidant activity and have antimicrobial activity against both Gram positive and Gram negative bacteria and fungi (Pena *et al.,* 2019). Methanolic extract of Leaves *Euphorbia serrata* have antioxidant activity. Bioactives of the plants are potential sources of natural antioxidant. Methanolic extract and aqueous extract have antimicrobial activity (Alghazeer *et al.,* 2012). Extracts of *Ficus religiosa* leaves showed antioxidant activity. Methanolic, aqueous and ethanol extracts of the plant showed antimicrobial activity (Preethi *et al*., 2010).

Malus domestica (Golden delicious) ripe fruits showed antioxidant and antimicrobial activity. Methanolic, Ethanolic, Acetone, Ethyl acetate, Chloroform extract showing potential antioxidant capacity, antimicrobial activity of the EAE, phloridzin and phloretin evaluated. EAE displayed good inhibitory activities against microorganisms (Zhang *et al.,* 2016). The Aqueous Methanolic extract of *Hibiscus sabdariffa* have antioxidant and antimicrobial potential, the extract exhibited antibacterial activity against microorganisms (Olaleye, 2007). Leaves extract of *Holarrhena antidysenterica* showed antioxidant and antimicrobial activity**.** Methanolic extract, Aqueous extract and Ethanol extract, methanolic extract of the plant showed high antimicrobial activity, aqueous extract and ethanol extract of plant showed low antimicrobial activity (Preethi *et al*., 2010). Essential oil from *Hottuynia cordata* showed potential antioxidant activity and showed antibacterial activity against pathogenic bacteria (Svoboda and Hampson 1999). Ethanol extract of Female flower of *Humulus lupulus* showed potential antioxidant activity**,** and have antibacterial activity (Arsene *et al.,* 2015). *Lentinus tigrinus* (mushroom) showed oxidant/antioxidant and antimicrobial activity. Methanolic extract, Dichloromethane extract and Ethanol extract and different standard antibiotics (Ampicillin, Amikacin, Ciprofloxacin, Fluconazole, Amphotericin B.) showed

antimicrobial activity against test bacterial and fungal strains (Sevindik, 2018).

Leaves extracts of *Leucas aspera* showed antioxidant activity Methanolic extract of the plant showed high activity while aqueous extract and ethanol extract showed low activity (Preethi *et al*., 2010). Methanolic extract, Aqueous extract of Leaves of *Martynia annua* have antioxidant potential, methanolic extract showed higher antioxidant activity than the aqueous extract. Methanolic extract, Ethyl acetate and Chloroform extract of plant leaves showed antibacterial activity against nine gram negative and six gram positive bacterial strains (Kenwat *et al*., 2013). Essential oil from *M. alternifolia* showed potential antioxidant activity. Eos from the plant potentially inhibited the growth of different microorganism (Zhang *et al.,* 2018). Volatile oils from nonwoody part of *Myristica fragrans* showed antimicrobial activities and inhibited the growth of microorganisms included animal and plant pathogens, food poisoning and spoilage bacteria, plant volatile oils showed antibacterial activity against 25 different genera of bacteria with various degree of inhibition (Doeman and Deans 2000). *Nigerian zingiber officinale***,** the antioxidant activity of the plant shown on 25 Wistar rats into five groups, each group has five animals. Methanolic extract of plant showed *In-vitro* potential antioxidant activity. Plant methanolic extract showed antibacterial activity against test microorganisms (Yusuf *et al.,* 2018). Extract of *Ocimum sanctum* Shown significant antioxidant activity and antimicrobial activity. Methanolic extract of plant active against Gram positive and Gram negative bacterial strain (Kaur and Mandal 2014).

Volatile oils from nonwoody plant material of *Pelargonium graveolens* showed antimicrobial activities and inhibited the growth of microorganisms included animal and plant pathogens, food poisoning and spoilage bacteria, plant volatile oils showed antibacterial activity against 25 different genera of bacteria with various degree of inhibition (Doeman and Deans 2000). Methanolic extract of of *Piper betel* leaves shown significant antioxidant activity and antimicrobial activity (Kaur and Mandal 2014). Volatile oils from nonwoody plant material of *Piper nigrum* showed antimicrobial activities and inhibited the growth of microorganisms included animal and plant pathogens, food poisoning and spoilage bacteria, plant volatile oils showed antibacterial activity against twenty five genera of bacteria with various degree of inhibition (Doeman and Deans 2000). Peel part of *Punica granatum* have antioxidant and antibacterial activities (Yuan *et al*., 2015). Methanolic extract of leaves of *Retama raetem* have antioxidant potential and the bioactive ingredients of *plant* shown to be potential sources of natural antioxidant. Plant methanolic extract and aqueous extract have antimicrobial potential, and showed activity against narrow spectrum of susceptible bacterial strain, plant extract of showed antimicrobial activity against bacteria (Alghazeer *et al.,* 2012). Essential oil from *Datura metel* shown significant antioxidant activity and showed antibacterial activity against reference bacterial strain and shown antifungal activity against *C.albicans* (Jaradat *et al*., 2017). Aerial of *Sidaacuta* shown antibacterial activity against gram positive bacteria (*Escherichia coli, Sh. Dysenteriae*) exposure to the *Sidaacuta* alkaloid extract (Karou *et al.,* 2006). Eos from leaves of *Syzygium aromaticum* could be regarded as potential sources of natural antioxidant agents in food processing with the exception of Beta-carotene-Linoleic acid bleaching test (Hosseini *et al.,* 2019). Volatile oils from *Syzygium aromaticum* inhibited the growth of microorganisms, animal and plant pathogens, food poisoning and spoilage bacteria. Volatile oils from plant showed antibacterial activity against 25 genera of bacteria with different degree of inhibition (Doeman and Deans 2000). Hexane, chloroform and methanol extracts of leaves of *Tecomella undulate* used for the antibacterial activity study. Methanolic extract showed antibacterial activity, whereas less inhibitory effect was noted for chloroform and hexane extracts (Sharma *et al.,* 2013). Aerial part of *Tephrosia purpurea* have antimicrobial potential, The plant alcohol extract showed antibacterial and antifungal activity against used strain (Nivedithadevi *et al.*, 2012). Hexane, chloroform, methanol, acetone, ethylacetate, water, ascorbic acid, BHA, TBHQ extract the Bark of *Terminalia chebula* showed antioxidant activity, acetone extract show remarkable free radical scavenging potential compare to other extract. Hexane, chloroform, methanol, ethylacetate, water, acetone extract have the antibacterial activity potential (Venkatesan *et al.,* 2017). Methanolic extract of *Thapsia garganica* leaves have potential antioxidant and antimicrobial activities (Alghazeer *et al.,* 2012.) Essential oil from dry *Thymbra spicata* (zahter) isolated showed good antioxidant activity. Extract of zahter did not showed antimicrobial activity, essential oil from the plant showed antimicrobial activity (Gedikoglu *et al*., 2019). *Thymus vulgaris* (thyme)*;* the antioxidant activity of essential oil is good. Extract of thyme did not showed antimicrobial activity. Essential oils of the plant showed antimicrobial activity in bacteria (Gedikoglu *et al*., 2019). Methanolic extract of *Vitis vinifera* fruit have potential antioxidant activity while acetone extract have antibacterial potential. Raisin of the plant acts as promising natural preservative and antioxidant food (Abouzeed *et al.,* 2018).

Table 3: List of medicinal plants regulates antioxidant and antimicrobial activity.

Sr. No.	Name of plant	Family	Activity	References
1.	*Allium ampeloprasum*	Amaryllidaceae	Phytochemical antioxidant, Antimicrobial	(Anides *et al.*, 2019)
2.	*Aloysia citriodora*	Verbenaceae	Antioxidant, Antibacterial	(Hosseini *et al.,* 2019)
3.	*Anabasis aretioides*	Amaranthaceae	Antioxidant	(Senhaji *et al.,* 2020)
4.	*Arisaema jacquemontii blume*	Araceae	Antimicrobial, Antioxidant	(Baba and Malik 2015)
5.	*Artemisia annua* L.	Asteraceae	Antibacterial, Antioxidant	(Juteau *et al*., 2002)
6.	*Asparagus racemosus*	Asparagaceae	Antioxidant, Antimicrobial	(Kaur and Mandal 2010)
7.	*Bauhinia variegata*	Fabaceae	Antibacterial, Antioxidant	(Mishra *et al*., 2013)
8.	*Bryophyllum pinnatum*	Crassulaceae	Antioxidant, Antimicrobial	(Tatsimo *et al*., 2012)
9.	*Cassia angustifolia*	Caesalpiniaceae	Antimicrobial, Antioxidant	(Ahmed *et al*., 2016)
10.	*Cassia auriculata*	Fabaceae	Antibacterial, Antioxidant	(Anushia *et al*., 2009)
11.	*Cassia fistula*	Fabaceae	Antioxidant Antimicrobial	(Kaur and Mandal 2010)
12.	*Cassia occidentalis*	Caesalpiniaceae	Antimicrobial	(Arya *et al.,* 2010)
13.	*Cassia tora*	Leguminosae	Antibacterial	(Sharma *et al.,* 2010)
14.	*Cissus quadrangularis*	Vitaceae	Antimicrobial, Antioxidant	(Murthy *et al.*, 2003)
15.	*Citrullus colocynthis*	Cucurbitaceae	Antibacterial, Antioxidant	(Borhade *et al*., 2013)
16.	*Citrus limon*	Rutaceae	Antimicrobial, Antioxidant	(Moosavy *et al*., 2017)
17.	*Coffea arabica*	Rubiaceae	Antioxidant, Antimicrobial	(Duangjal *et al*., 2016)
18.	*Combretum micronthum*	Combretaceae	Antioxidant, Antimicrobial	(Karou *et al*., 2005)
19.	*Coptis chinensis*	Ranunculaceae	Antioxidant, Antimicrobial	(Duffy and Power 2001)
20.	*Datura metel*	Solanaceae	Antibacterial, Antioxidant	(Akharaiyi, 2011)
21.	*Dracontomelon dao*	Anacardiaceae	Antimicrobial, Antioxidant	(Pena *et al.,* 2019)
22.	*Euphorbia serrata*	Euphorbiaceae	Antioxidant, Antimicrobial	(Alghazeer *et al*., 2012)
23.	*Ficus religiosa*	Moraceae	Antimicrobial, Antioxidant	(Preethi *et al.* 2010)
24.	*Golden delicious*	Rosaceae	Antioxidant, Antibacterial	(Zhang *et al.,* 2016)
25.	*Hibiscus sabdariffa*	Malvaceae	Antibacterial, Cytotoxicity	(Olaleye, 2007)
26.	*Holarrhena antidysenterica*	Apocynaceae	Antimicrobial, Antioxidant	(Preethi *et al.,* 2010)
27.	*Hottuynia cordata*	Saururaceae	Antibacterial, Antioxidant.	(Svoboda and Hampson 1999)
28.	*Humulus lupulus*	Cannabaceae	Antioxidant, Antimicrobial	(Arsene *et al.,* 2015)
29.	*Lentinus tigrinus*	Polyporaceae	Antioxidant, Antimicrobial	(Sevindik, 2018)
30.	*Leucas aspera*	Lamiaceae	Antimicrobial, Antioxidant	(Preethi *et al.,* 2010)
31.	*Martynia annua*	Martyniaceae	Antioxidant, Antibacterial.	(Kenwat *et al*., 2013)
32.	*Melaleuca alternifolia*	Myrtaceae	Antimicrobial, Antioxidant	(Zhang *et al.,* 2018)
33.	*Myristica fragrans*	Myristicaceae	Antibacterial, Antimicrobial	(Doeman and Deans 2000)
34.	*Nigerian zingiberofficinale*	Zingiberaceae	Antioxidant, Antimicrobial	(Yusuf *et al.,* 2018)
35.	*Ocimumsactum*	Lamiaceae	Antioxidant , Antimicrobial	(Kaur and Mandal 2010)
36.	*Pelargonium graveolens*	Geraniaceae	Antibacterial, Antimicrobial	(Doeman and Deans 2000)
37.	*Piper betel*	Piperaceace	Antioxidant, Antimicrobial	Kaur and Mandal 2010)
38.	*Piper nigrum*	Piperaceae	Antibacterial, Antimicrobial	(Doeman and Deans 2000)
39.	*Punica granatum*	Lythraceae	Antimicrobial, Antioxidant	(Yuan *et al*., 2015)
40.	*Retama raetem*	Fabaceae	Antioxidant, Antimicrobial	(Alghazeer *et al*., 2012)
41.	*Ruta chalepensis*	Rutaceae	Antimicrobial, Antioxidant	(Jaradat *et al*., 2017)
42.	*Sida acuta*	Malvaceae	Antibacterial, Antimicrobial	(Karou *et al.,* 2006)
43.	*Syzygium aromaticum*	Myrtaceae	Antibacterial	(Doeman and Deans 2000; Hosseini *et al*., 2019)
44.	*Tecomella undulata*	Bignoniaceae	Antimicrobial, Antihistamine	(Sharma *et al.,* 2013)
45.	*Tephrosia purpurea*	Fabaceae	Antioxidant, Antibacterial	(Nivedithadevi *et al.*, 2012)
46.	*Terminalia chebula*	Combretaceae	Antioxidant, Antimicrobial	(Venkatesan *et al.,* 2017)
47.	*Thapsia garganica*	Apiaceae	Antioxidant, Antimicrobial	(Alghazeer *et al*., 2012)
48.	*Thymbra spicata*	Lamiaceae	Antioxidant, Antimicrobial	(Gedikoglu *et al*., 2019)
49.	*Thymus vulgaris*	Lamiaceae	Antibacterial	(Gedikoglu *et al*., 2019)
50.	*Vitis vinifera*	Vitaceae	Antioxidant, Antibacterial	(Abouzeed *et al.,* 2018)
51.	*Withania somnifera*	Solanaceae	Antimicrobial	(Mali and Singh 2013)

CONCLUSIONS

Medicinal plants have different activities without any boundaries across the world. In this review collect and provide important information about medicinal plants which is possess potentials to regulate different types of biological activities such antioxidant, antimicrobial and fertility to control various diseases and population.

REFERENCES

Ahmad, I., Gul, H., Noureen, A., Ujjan, J. A., Manzoor, S., & Muhammad, W. (2021). Antimicrobial, Antioxidant and Antidiabetic Potential of *Suaeda fruticosa* L. *International Journal on Emerging Technologies*, *12*(2), 155-160.

Arsene, A. L., Rodino, S., Butu, A., Petrache, P., Iordache, O., and Butu, M. (2015). Study on

antimicrobial and antioxidant activity and phenolic content of ethanolic extract of *Humulus lupulus*. *Farmacia, 63*, 6.

Anides, J. A., Dapar, M. L. G., Aranas, A. T., Mindo, R. A. R., Manting, M. M. E., Torres, M. A. J. and Demayo, C. G. (2019). Phytochemical, antioxidant and antimicrobial properties of the white variety of sibujing (*Allium ampeloprasum*). *Pharmacophore, 10*(1), 1-12.

Ahmed, S. I., Hayat, M. Q, Tahir, M., Mansoor, Q., Ismail, M., Keck, K., and Bates, R. B. (2016). Pharmacologically active flavonoids from the anticancer, antioxidant and antimicrobial extracts of *Cassia angustifolia* vahl. *BMC Compl. and Alt Med., 16,* 460.

Abouzeed, Y. M., Zgheel, F., Elfahem, A. A., Almagarhe, M. S., Dhawi, A., Elbaz, A., Hiblu, M. A., Kammon, A. and Ahmed, M. O. (2018). Identification of phenolic compounds, antibacterial and antioxidant activities of raisin extracts. *Open Vet. J., 8*(4), 479-484.

Anushia, C., Sampathkumar, P., and Ramkumar, L. (2009). Antibacterial and antioxidant activities in *Cassia auriculata*. *Glo J Pharmacol., 3*(3), 127-130.

Akharaiyi, F. C. (2011). Antibacterial, phytochemical and antioxidant activities of *Daturametel. Int. J. Pharm Tech. Res., 3*(1), 478-483.

Alghazeer, R., El-Saltani, H., Al-Najjar, N. S. A., and Hebail, F. (2012). Antioxidant and antimicrobial properties of five medicinal Libyan plants extracts. *Natural Science, 4*(5), 324-335.

Arya, V., Yadav, S., Kumar, S., and Yadav, J. P. (2010). Antimicrobial activity of *Cassia occidentalis*(leaf) against various human pathogenic microbes. *Life Sci and Med Res.,* 9.

Borhade, P., Deshmukh, T., Patil, V. and Khandelwal, K. (2013). Review on *Citrullus colocynthis*. *IJRPC, 3*(1).

Baba, S. A., Malik, S. A. (2015). Determination of total phenolic and flavonoid content, antimicrobial and antioxidant activity of a root extract of *Arisaema jacquemontii blume*. *J. Taibah Univ for Sci., 9*(4), 449-454.

Chaudhary, R., Singh, A. R. and Mali, P. C. (2011). Reversible contraceptive efficacy and safety evaluation of ethanolic extract of *Maytenus emargineta* in male albino rats. *J Pharm Res., 4*(1), 213-216.

Daniyal, M., and Akram, M. (2015). Antifertility activity of medicinal plants. *Journal of The Chinese Medical Association, 78,* 382-388.

Duangjal, A., Suphrom, N., Wungrath, J., Ontawong, A., Nuengchamnong, N. and Yosboonruang, A. (2016). Comparison of antioxidant, antimicrobial activities and chemical profiles of three coffee (*Coffea arabica* L.) pulp aqueous extracts. *Inter Med. Res., 5*, 324-331.

Doeman, H. J. D., and Deans, S. G. (2000). Antimicrobial agents from plants: antibacterial activity of plant volatile oils. *J Appl Microbiol, 88*, 308-316.

Devi, P., Kumar, P., Nidhi, and Dhamija, I. (2015). Antifertility activity of medicinal plants on male and female reproduction. *Int. J. Pharmaceut. Sci. Res., 6*(3), 988-1001.

Duffy, C. F, and Power, R. F. (2001). Antioxidant and antimicrobial properties of some Chinese plant extracts. *Int. J. Antimicrobial Agents, 17,* 527-529.

Feroche, A. T. (2015). Evaluation of abortifacient efficacy of *Rumex steudelli* (Tult) root traditionally used medicinal plant in south west Ethiopia. *The J Phytopharmacol., 4*(4), 221-223.

Gedikoglu, A., Sokmen, M., and Civit, A. (2019). Evaluation of *Thymus vulgaris* and *Thymbra spicata* essential oils and plant extracts for chemical composition, antioxidant and antimicrobial properties. *Food Sci Nutr., 7*, 1704-1714.

Hosseini, M., Abdollah, Raeisi, M., and Azizzadeh, M. (2019). The antibacterial and antioxidant effects of clove (*Syzygium aromaticum*) and lemon verbena (*Aloysia citriodora)* essential oils. *J Human, Env and Health Pro., 5*(2), 86-93.

Juteau, F., Masotti, V., Bessiere, J. M., Dherbomez, M., and Viano, J. (2002). Antibacterial and antioxidant activities of *Artemisia annua* essential oil. *Fitoterapia, 73*, 532-535.

Jaradat, N., Adwan, L., Aibni, S. K., Zaid, A. N., Shtaya, M. J. Y, Shraim, N., and Assali, M. (2017). Variability of chemical compositions and antimicrobial and antioxidant activities of *Rutachalepensis* leaf essential oils from three Palestinian regions. *Hindawi Bio Med Res Int.,*1-9.

Karou, D., Savadogo, A., Canini, A., Yameogo, S., Montesano, C., Simpore, J., Colizzi, V., and Traare, A. S. (2006). Antibacterial activity of alkaloids from *Sidaacuta*. *African Journal of Biotechnology, 5*(2), 195-200.

Khan, S. and, Mali, P. C. (2019). Evaluation of Antiandrogenic effects in castrated rats treated with *Cassia tora* extract SSR Inst*. Int. J. Life. Sci., 5*(2), 2259-2268.

Khan, S. and Mali, P. C. (2017). Reversible antifertility effect of *Cassia tora* Linn in male rats. *Int. J. Life. Sci. Scienti. Res., 3*(5), 1415-1423.

Kumari, S., Kansotiya, A. K., Neha Bharti, N., Yadav, P. and Mali, P. C. (2023). Herbal Nanoparticles to Control Fertility and Regulation: A Review. *Int J Emerging Technologies, 14*(1), 1-8.

Karou, D., Dicko, M. H., Simpore, J., and Traore, A. S. (2005). Antioxidant and antibacterial

activities of polyphenols from ethnomedicinal plants of Burkina faso. *Afr J Biotech., 4*(8), 823-828.

Kaur, S. and Mandal, P. (2014). Study of total phenolic and flavonoid content, antioxidant activity and antimicrobial properties of medicinal plants. *J Microbiol Exp., 1*(1), 00005.

Kenwat, R., Prasad, P., Satapathy, T. and Roy, A. (2013). *Martynia annua*: An overview. *UK J Pharmaceu and Biosci., 1*(1), 7-10.

Luhadia, G. and Mali, P. C. (2016). Antifertility and antispermatogenic effects of ethanolic extract of *Tephrosia purpurea* fruits in albino rats. *Int J Life-Sciences Scientific Research, 2*(3), 262-268.

Mali, P. C., Chaturvedi, M., Ansari, A. S. and Dixit, V. P. (2001). Antispermatogenic effects of ethanolic extract of *Citrullus colocynthis* Schard root in male albino rats: *A preliminary study Pharmaceu Biol., 39*(2), 113-119.

Mali, P. C. and Singh, A. R. (2013). Isolation, characterization and evaluation of antimicrobial activity of Withanolide-A of *Withania somnifera. Int J. of Pharmacol. Res., 3*(3), 48-52.

Mali, P. C. (2013). Control of fertility in male Wistar rats treated with hydro alcoholic extract of *Withania somnifera* fruits. *Int. J. Pharmacol. Bio. Sci., 7*(3), 13-21.

Mali, P. C. and Chaudhary, R. (2022). Evaluation of contraceptive efficacy in male albino rats treated with ethanolic extract of *Peganum harmala*. Adv. *Pharmacol. Toxicol., 23*(2), 21-41.

Mali, P. C. and Khan, S. (2022). Reversible contraceptive activities of *Cassia occidentalis* extract treatment in male rats. *Int. J. Pharmacol. Bio. Sci., 16*(2), 7-21.

Mishra, A., Sharma, A. K., Kumar, S., Saxena, A. K., and Pandey, A. K. (2013). Bauhinia variegate leaf extracts exhibit considerable antibacterial, antioxidant and anticancer activities. *Hindawi Publishing Corporation BioMed Research International*, 1-10.

Murthy, K. N. C., Pharm, M., Vanitha, A., Swamy, M. M., and Ravishankar, G. A. (2003). Antioxidant and antimicrobial activity of *Cissus quadrangularis* L. *J Med Food, 6*(2).

Moosavy, M. H., Hassanzadeh, P., Mohammadzadeh, E., Mahmoudi, R., Khatibi, S. A., and Mardani, K. (2017). Antioxidant and antimicrobial activities of essential oil of lemon (*Citrus limon*) peel *in vitro* and in a food model. *Journal of Food Quality and Hazards Control, 4*, 42-48.

Nivedithadevi, D., Manivannan, P., and Somasundaram, R. (2012). Evaluation of antimicrobial and anti-histamine activity of the aerial parts of *Tephrosia purpurea L. Int Res J Pharm., 3*(3).

Olaleye, Tolulope M. (2007). Cytotoxicity and antibacterial activity of methanolic extract of *Hibiscus sabdariffa*. *J Med Plants Res., 1*(1), 09-13.

Pant, P. Khulbe, K. and Pant, C. C. (2023). In vitro Antioxidant, Antibacterial activity and Phytochemical Characterization of Senecio nudicaulis Buch. -Ham. er D. Don leaves extracts. *Biological Forum – An International Journal, 15*(5), 205-215.

Pena, J. F. D, Dapar, M. L.G., Arans, A. T., Mindo, R. A. R., Cabrido, C. K., Torres, M. A. J., Manting, M. M. E., and Demayo, C. G. (2019). Assessment of antimicrobial, antioxidant and cytotoxic properties of the ethanolic extract from *Dracontomelon dao* (Blanco) merr. & rolfe. *Phamacophore, 10*(2), 18-29.

Patil, S. J., Banagar, S. R., Banagar, R. R., Venkatesh, S., Vishwanatha, T. and Patil, S. B. (2013). Withdrawal antifertility effect of petroleum ether extract of *Citrus medica* seeds in female albino rats. *Medicinal Plants, 5*(2), 75-81.

Preethi, R., Devanathan V. V., and Loganathan M. (2010). Antimicrobial and antioxidant efficacy of some medicinal plants against food borne pathogens. *Adv. Biol Res., 4*(2),122-125.

Radha, I., Janjua, S., Ali, M., Thakur, M., Jamwal, R., Rathour, S., ... & Pundir, A. (2021). Documenting traditional knowledge before they are forgotten: a study on the ethnomedicinal uses of wild plants by rural people of Jubbarhatti in District Shimla. *International Journal of Theoretical & Applied Sciences, 13*(1), 37-51.

Sahni, T., Sharma, S., Verma, D., Sharma, P. and Kaur, S. (2022). Antioxidant and Antibacterial Evaluation of 2,6-dimethoxy-4-((phenylamino) methyl) Phenol and 2,6-Dimethoxy-4-((4′-nitrophenylimino)methyl) Phenol. *Biological Forum – An International Journal, 14*(1), 01-07.

Saonere, J. A., Channawar, M. A., Kochar, N. I., Mohale, D. and Chandewar, A. V. (2023). Evaluation of Antioxidant and Antimicrobial Potential of Herbal Phenolics. *Biological Forum – An International Journal, 15*(2), 1114-1118.

Sevindik, M. (2018). Investigation of antioxidant/oxidant status and antimicrobial activities of *Lentinus trigrinus*. *Adv in Pharmacol Sciences, 2018*, 1-4.

Sharma, R J., Kulkarni, S. S., Jadhav, N. S., and Pisal, V. H. (2020). Assessment of anti-fertility activity of *Butea monosperma* seed's aqueous extract using *Capra hircus* in-vitro uterus system. *IJRAR, 7*(1).

Senhaji, S., Lamchouri, F., and Toufik, H. (2020). Phytochemical content, antibacterial and antioxidant potential of endemic plant *Anabasis aretioides*coss. & moq.

(Chenopodiaceae). *Adv in Pharmacol Sci., 2020,* 1-16.

Singh, G., Sharma, P. K., Dudhe, R., and Singh, S. (2010). Biological activities of *Withania somnifera*. *Annals of Biol Res., 1*(3), 56-63.

Sharma, A., Patil, U., Kakkar, S., and Bhot, M. (2013). Evaluation of antibacterial activity of *Tecomella undulata* leaves crude extracts. *Int. Res. J. Biol. Sci., 2*(6), 60-62.

Sharma, S., Dangi, M. S., Wadhwa, S., Daniel, V., and Tiwari, A. (2010). Antibacterial activity of *Cassia tora* leaves. *Int J of Phama Bio Arch., 1*(1), 84-86.

Sharma, D. K. and Mali, P. C. (2017). Inhibition of spermatogenesis and degenerative changes in testes of albino rats following methanolic extract of *Maytenus emarginata* treatment. *Advances in Pharmacology and Toxicology, 18*(3), 55-67.

Svoboda, K. P., and Hampson J. B. (1999). Bioactivity of essential oils of selected temperate aromatic plants: antibacterial, antioxidant, anti-inflammatory and other related pharmacological activities. Plant Biology Department, SAC Auchincruive, Ayr, Scotland, UK, KA6 5HW.

Tatsimo, S. J. N., Tamokou, J. D. D., Havyarimana, L., Csupor, D., Hohmann, P. F. J., Roger, J., and Tane, P. (2012). Antimicrobial and antioxidant activity of kaempferolrhamnoside derivatives from *Bryophyllum pinnatum*. *BMC Research Notes, 5,* 158.

Venkatesan, A., Kathirvel, A., Prakash, S., and Sujatha, V. (2017). Antioxidant, antibacterial activities and identification of bioactive compounds from *Terminalia chebula* bark extracts. *Free Radicals and Antioxidants, 7*(1), 43-49.

Yuan, G., Lv H., Yang, B., Chen, X., and Sun, H. (2015). Physical properties, antioxidant and antimicrobial activity of chitosan films containing carvacrol and pomegranate peel extract. *Molecules, 20,* 11034-11045.

Yusuf, A. A., Lawal, B., Abubakar, A. N., Berinyuy, E. B., Omonije, Y. O., Umar, S. I., Shebe, M. N., and Alhaji, Y. M. (2018). *In vitro* antioxidant, antimicrobial and toxicological evaluation of *Nigerian zingiber officinale*. *Clinical Phytoscience, 4*, 2.

Zhang, X., Guo, Y., Guo, L., Jiang, H., and Qianhua, J. (2018). *In vitro* evaluation of Antimicrobial activities of *Melaleuca alternifolia* essential oil. *Bio. Med. Res. Int.*, 1-8.

Zhang, T., Wel, X., Miao, Z., Hassan, H., Song, Y., and Fan, M. (2016). Screening for antioxidant and antibacterial activities of phenolics from *Golden delicious* apple pomace. *Che Cent J., 10,* 47.

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