

A REVIEW ON ANTIMICROBIAL AND ANTIOXIDANT ACTIVITY OF *Rosa damascene* AGAINST DIFFERENT SPECIES OF MICROBES

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ABSTRACT

A diverse range of bioactive molecules produce by plants, making them a rich source of different types of medicines and healing properties. Rose is a woody perennial plant belonging to the genus *Rosa* in the family Rosaceae. Known for its sweet smell and beauty, commonly used in decoration, ornamental very few know its use as a medicinal herb. It is one of the herbs mentioned in all ancient scriptures of Ayurveda. Acetone and ethanol were used to extract the antibacterial and antioxidant compound from petal of *Rosa damascene* in through agar disk diffusion method, the antimicrobial potential of *Rosa indica* examined. Petals were collected, dried and its crude extract was obtained. antibacterial activity was tested against bacteria. the ethanol extract demonstrates a significant broad spectrum antimicrobial activity against both gram positive bacteria and gram-negative bacteria with the highest activity having a zone of inhibition (Deepika et al., 2019) The antioxidant properties were investigated using the DPPH [1,1-Diphenyl-2-picrylhydrazyl] assay process, which revealed the existence of alkaloids, amino acid, carbohydrates, glycosides, tannins, and other compounds. (Dr. ss vijayachali et al., 2017) the efficacy of ethanolic petal extract of *Rosa damascene* as an alternative antibiotic for the development of newer antibacterial agent. For making herbal drugs, extract of *Rosa indica* may prove to be useful as an advance step in future

Keywords- Antibiotics, Antimicrobial, Antioxidant, DPPH, Inhibition, Secondary metabolites

1. INTRODUCTION

Of the 2,50,000 higher plant species on earth, more than 80,000 are medicinal. India is one of the world's 12 biodiversity centers with the presence of over 45000 different plant species (PP joy et al., 1998) Since many years, plants have been used as valuable sources of natural products for maintaining the human health. One of them is *Rosa damascene*. Popularly known as Gulab, Sataptra, Rosapoo generally the rose varieties are cultivated for home and garden beautification and is rich perfumery fragrance in many parts of the world. Traditionally the plant pacifies vitiated VATA, PITTA, inflammation, burning sensation, cough, skin disease, cardiac disability, general weakness. Rose petals are characterized by a high content of various biologically active compound such as anthocyanins (glycosides, such as cyanidins, pelargonidins, and peonidins), flavonols (including derivatives of kaempferol and quercetin), flavan-3-ols, and their derivatives, procyanidins and proanthocyanidins a large group of ellagitannins and phenolic acids such as gallic, ellagic, quinic and essential oil. (Andrzej et al., 2017) Rose Petals contains Anthocyanins and proanthocyanidins; tellimagrandin I and rugosin B; carotenoids; plant acids; and essential oils. Petals of rose contain higher amount of anthocyanins and flavonoid compound which has antioxidant property which helps to prevent the plants from disease to prohibit oxidation (Haejo et al., 2017).

2. PLANT PROFILE

Roses have a long-storied history. Fossils show that wild roses existed more than 35 million years ago. That means the roses have been on earth longer than humans. It is commonly known as rose family. The plant of the family is worldwide in distribution and are abundant in Europe, N. America and eastern Asia. It contains 115 genera and 3200 species out of which

257 species are found india. Some species are

- ❖ *R.bella*
- ❖ *R.blanda*
- ❖ *R.canina*
- ❖ *R.fpetida*
- ❖ *R.damascena*
- ❖ *R.alpina*
- ❖ *R.alba*
- ❖ *R.carolina*
- ❖ *R.setipoda*
- ❖ *R.centifolia*

2.1. TAXONOMY CLASSIFICATION OF *Rosa damascene*: -

- Kingdome: Plantae
- Division: Magnoliphyta
- Class: Magnoliopsida
- Order: Rosales
- Family: Rosaceae
- Sub family: Rosoideae
- Genus: *Rosa* L.

Botanical name- *Rosa indica* (*Rosa centifolia*), *Rosa damascene*

Name of rose in different language

TABLE: - 1 Synonyms of rose in Indian language (Dr. B.K Prashanth M.D et. al., 2016)

Language	Name of rose
Hindi	Gulab
English	Rose
Kannada	Gulabihuvu
Telugu	Gulabipuvvu

TABLE: -2 Sanskrit Synonyms (Dr. B.K Prashanth M.D et. al., 2016)

Shatapatri	Having many petals
Karnika	Having big petals like ears
Laksha	Red colored like laksha
Gandhadya	Having good fragrance
Charukesara	Having good looking petals
Kantakpravrutta	having thorns

3. MORPHOLOGY

A rose plan is a woody perennial with the stem stuffed with sharp prickles. It consists of flower, fruit stem, root, leaves. Height of the normal rose plant up to 1.5-2 meter. Flowers are varying in color usually pink with many petals

4. USEFUL PARTS OF ROSA DAMASCENCE

Table: 3 Generally the Leaves, Root, Flower parts are used

s.no.	Part	Medical use	Reference
1	Leaves	Used treating wounds Antidepressant effect against heart problem, liver,HIV	(Sweta <i>et al.</i> , 2021)
2	Roots	Intestinal ulcers, rickets, diarrhea Antioxidant	(Kyejussa, yusufet <i>al.</i> , 2009)
3	Petal of rose	Diarrhea Ear eyes tonsils gums head mouth chest stomach rectum oral ulcers and uterus menstrual cramping, irregularly of menstrual cycle	(Mohaddesemahboubiet. <i>al.</i> , 2016)
4	Rose hip	Cough, asthma, fever ,Cephalic tonic cardiac and astrigents	(Sweta <i>et al.</i> , 2021)
5	Dry flower	Anti- inflammantory	(Mohaddesemahboubiet. <i>al.</i> , 2016)

5. CHEMICAL COMPOSITION

Table: 4 Several components were isolated from flowers, petals and hips (seed-pot) of *R. damascene*

S.no.	Components	References
1	Several of <i>R. damascena</i> including terpenes, glycosides, flavonoids, and anthocyanins	(Kumar <i>et al.</i> , 2006, Oka N <i>et al.</i> , 1998)
2	Carboxylic acid	(Green M <i>et al.</i> , 1999)
3	Mycerene	(Buckle <i>et al.</i> , 1997)
4	Vitamin C	(Libster M <i>et al.</i> , 2002)
5	Kaempferol and quercetin	(Mahmood N <i>et al.</i> , 1996).
6	Flowers also contain a bitter principle, tanning matter, fatty oil and organic acids	(Nyeem MAB <i>et al.</i> , 2006)
7	The medicinal functions of Rosaceae are partly attributed to their abundance of phenolics compound. Phenolics possess a wide range of pharmacological activities, such as antioxidants, free-radical scavengers anticancer, anti-inflammatory, antimutagenic, and antidepressant	(Hongratanaworakit <i>et al.</i> , 2009, Ng TB <i>et al.</i> , 2000, Butterweck <i>et al.</i> , 2000, Ren W <i>et al.</i> , 2003, Crespo ME <i>et al.</i> , 1999 Miyazawa M <i>et al.</i> , 2000).
8	found more than 95 macro- and micro-components in the essential oil of <i>R. damascena</i> from the Kashan regions of. Among them, eighteen compounds represented more than 95% of the total oil. The identified compounds were; β -citronellol (14.5-47.5%), nonadecane (10.5-40.5%), geraniol (5.5-18%), and nerol and kaempferol were the major components of the oil (2). Analyses of rose absolute showed that phenyl ethylalcohol (78.38%), citrenellol (9.91%), nonadecane (4.35%) and geraniol (3.71%) ethanol (0.00-13.43%), and heneicosane were the major compounds (35). In	(Loghmani-Khouzani <i>et al.</i> , (2007)

<p>another study, the composition of rose was phenyl ethylalcohol (72.73–73.80%), citrenellol (10.62–11.26%), nerol (2.42–2.47%), and geranial (5.58–5.65%) (36). Hydrosol was also found to contain four constituents; geraniol was the major compound (30.74%) followed by citrenellol (29.44%), phenyl ethylalcohol (23.74%), and nerol (16.12%) (9, 35).</p>	
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Constituents of Rose (**Vijayanchaliet al., 2017**)

5.1 Nutrients










-  Carbohydrate
-  Protein
-  Fat
-  Moisture
-  Ash
-  Crude Fiber
-  Calcium
-  Iron
-  Vitamin C

Table: 5 Average percentage of the centesimal composition and total caloric value of rose (Felipe de lima Franzen et al., 2019)

Nutrition** %	Rose
Moisture	84.56*c±0.122
Dry matter	15.44a±0.122
Ethereal extract	0.23c±0.005
Protein	1.88a±0.042
Raw fiber	3.20a±0.095
carbohydrate	9.41
Calorie value***	60.03

*Data are means ± standard deviation; * Means within the same line with different letters are significantly different at the 5% level, by the Tukey test (p<0.05):***=(g/100g);***=(kcal/100g)

5.2 Phytochemicals: - phytochemicals are the chemicals which are produce by plants through primary and secondary metabolism petals of rose

Its function is protecting against harmful substances that causes cell damage.

Phytochemical play a vital role in inhibit chronic diseases such as cancer dibates kidney failure cardiovascular disease (**Mamtasaxenaet al., 2013**)

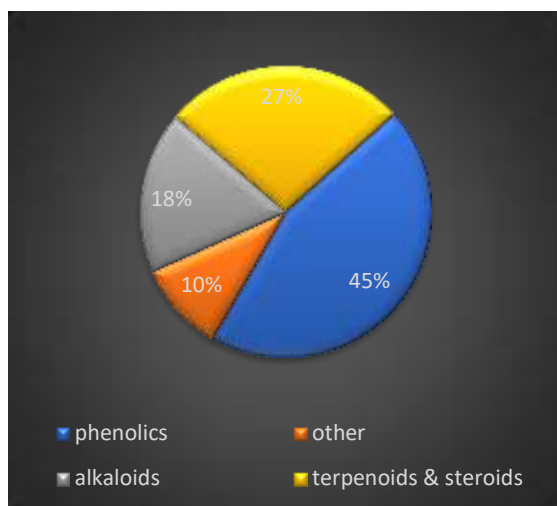


Fig 1 :Pie chart representing the major group of plants phytochemicals

Table 6 : showing phytochemicals present in rose its compounds activity and biological function

Phytochemicals	Activity	Biological function	Ref.
Flavonoids	Antioxidant	Capacity of water holding, binding toxins	(Ayati et al., 2018) (Mamtasaxna et al., 2013)
Anthocyanin Phenolic acid and derivatives	Antioxidant to free radical Induces detoxification	Protect against biotic and abiotic stresses therapeutic effect including obesity prevention, antibacterial , anti inflammantary, Anti cancer	(Ayati et al., 2018) (Rana Nassour et al., 2020)
Triterpenoids	Anticancer effect	Inhibitors of microbes	(Ayati et al., 2018) (Mamtasaxna et al., 2013)
Carotenes	Antioxidants to free radical		(Ayati et al., 2018)
Alkaloids	Antibacterial antifungal		(Curare et al., 2016)
Flavonones	Detoxifying agent	Inhibit tumourgenesis	(Mamtasaxna et al., 2013)

6. ANTIMICROBIAL EFFECT

It has been shown that *R. damascena* has wide spectrum antimicrobial activities. Essential oil, absolute and hydrosol are important products that showed these effects.

(Ulusoy et al., 2009) showed that essential oil and absolute have strong antibacterial activity against *Escherichia coli*, *Pseudomonas aeruginosa*, *B. E. coli* was also sensitive against rose essential. However, hydrosol had no antimicrobial activity against any of the microorganisms. Rose absolute also showed antibacterial activity against both gram-negative and gram-positive bacteria

In other study, the essential oil of *R. damascena* petals was evaluated for its antibacterial effects against three strains of *Xanthomonas axonopodis* spp. vesicatoria. The essential oil of *R. damascena* flower remarkably inhibited the growth of the tested strains of *X. axonopodis* vesicatoria (Basim E et al., 2003). Antibacterial activity of the both fresh flower (FF) and spent flower (SF) extracts of *R. damascena* flower against 15 species of bacteria: *Aeromonas hydrophila*, *B. cereus*, *Enterobacter aerogenes*, *Enterococcus faecalis*, *E. coli*, *Klebsiella pneumoniae*, *Mycobacterium smegmatis*, *Proteus vulgaris*, *Ps.*

aeruginosa, *Ps. fluorescens*, *Salmonella enteritidis*, *Salmonella typhimurium*, *Staph. aureus*, and *Yersinia enterocolitica* were studied. Both extracts were effective against all the bacteria except *E. coli*, although the FF extract was more effective than the SF extract. FF and SF extracts showed the strongest effects against *S. enteritidis* and *M. smegmatis*, respectively (Ozkan G et al., 2004).

The *in vitro* antibacterial activities of essential oil from *R. damascena* were also shown by disk diffusion testing against *E. coli*, *Staph. aureus* and *Ps. aeruginosa*. *R. damascena* showed antimicrobial activity against *Staph. aureus* in this study (Andogan BC et al., 2008).

The interaction between water extracts of *Psidium guajava*, *Rosmarinus officinalis*, *Salvia fruticosa*, *Majorana syriaca*, *Ocimum basilicum*, *Syzygium aromaticum*, *Laurus nobilis*, and *R. damascena* using both well-diffusion and microdilution methods against five *Staph. aureus* isolates; one Methicillin-resistant *Staph. aureus* (MRSA) and four Methicillin-sensitive *Staph. aureus* (MSSA) was studied. The results showed that synergism effect between antimicrobial agents and plant extracts was occurred in both sensitive and resistant strains but the magnitude of minimum fold inhibition in resistant strains especially MRSA strain was higher than the sensitive strains (Adwan G et al., 2008).

Essential oils of several plants including *R. damascena* were also tested for antimicrobial activity against gram-positive *Staph. aureus* (ATCC 25923), gram-negative *E. coli* (ATCC 25922), gram-negative *Ps. aeruginosa* (ATCC 27853), and yeast *Candida albicans* (ATCC 14053). The tested essential oils exhibited inhibitory and bactericidal activities against all tested microorganisms at low concentrations (Lisinet al., 1999).

Primary components of rose oil (citronellol, geraniol, and nerol) have been shown to have antibacterial properties. As a result, these components can play a significant role in rose oil's antibacterial properties. Rose absolute's antibacterial effects can be due to its high phenylethyl alcohol content. Alcohols have long been known to have antimicrobial effects (Mohammad hosseinboskabadvet al., 2011)

Table 7:- Showing Use of different part of plant in aspect of antibacterial

Plant's part used	Solvent used for extraction	Method	Test micro.	Ref .
Petals	Methanol and acetone	Disk diffusion method	<i>S. aureus</i> <i>B. cereus</i> <i>E. coli</i> <i>S. typhi</i>	(Deepika et al.,(2019)
Petals	Ethanol	Minimum inhibitory conc.	Oral and periodontal and fungi	(D. bahl et al., 2016)
Petals	Hexane methanol diethyl ester	Disk diffusin method	<i>S. typhi</i> <i>E. coli</i>	
Leaves	Ethanol and tris HCL buffer	Antibacterial susceptibility test	<i>S. aureus</i> <i>E. coli</i> <i>B.licheniformis</i> <i>P.aeuginosa</i>	(Umesh et al., 2012)
Stem	Ethanol and tris hcl buffer	Antibacterial susceptibility test	<i>S.auerus</i> <i>E.coli</i> <i>B.licheniformis</i> <i>P.aeuginosa</i>	(Umesh et al., 2012)
Roots	Ethanol and tris Hclbuffer[Antibacterial susceptibility test	<i>S.auerus</i> <i>E.coli</i>	(Umesh et al., 2012)

			<i>B.licheniformis</i> <i>P.aeuginosa</i>	
Flower		Agar diffusion method	<i>Aeromonas</i> <i>Hydrophila</i> <i>Bacillus cereus</i> <i>Enterobacter aerogenes</i> <i>Enterococcus faecalis</i> <i>E. coli</i> <i>Klebsiella pneumoniae</i> <i>Mycobacterium smegmatis</i> <i>Proteus vulgaris</i> <i>P. aeruginosa</i> <i>P. fluorescens</i> <i>Salmonella enteritidis</i> <i>Salmonella typhi</i> <i>Staphylococcus aureus</i> <i>Yersinia enterocolitica</i>	(G.ozkan et al., 2004)
Rose flower	MHA plate	Agar well diffusion method	<i>Bacillus cereus</i> <i>B. subtilis</i> <i>Staphylococcus aureus</i> <i>Vibrio cholera</i> <i>p. aeruginosa</i>	(Yusra et al., 2020)

7. TRADITIONAL USES

Treatment of abdominal and chest pain, strengthening of the heart (Wood G et al., 1839), treatment of menstrual bleeding and digestive problems (Sharaf khandyet al., 1990), and reduction of inflammation, particularly of the throat, are among the most therapeutic effects of *R. damascena* in ancient medicine (Buckle et al., 1993). To treat children's coughs, North American Indian tribes used a decoction of the root of the *R. damascena* herb (Libsteret al., 2002). This herb can also be used as a laxative. Depression, sadness, anxious discomfort, and tension are all relieved by rose oil. It aids in the reduction of thirst, the curing of old caught, the treatment of women's specific complaints, wound healing, and skin hygiene. Rose oil vapour treatment can assist with asthma, headaches, and migraine Momani et al., (1991)

8. ANTIOXIDANT EFFECTS

The *R. damascena* similar to many aromatic and medicinal plants exhibits antioxidant properties. Sources of natural antioxidant are primarily phenolics compound that are found in all parts of plants such as the fruits, vegetables, seeds, leaves, roots and barks (Pratt et al., 1900). The presence of phenolic compound in ethanolic extract of *R. damascena* has been shown by (Kumar et al., 2009). They determined antioxidant activity of this extract compare to standard antioxidant L-ascorbic acid by 1, 1-diphenyl-2-picryl hydrazyl (DPPH) free-radical method. This study showed that *R. damascena* has high antioxidant

activities (Kumar N *et al.*, 2009). The antioxidant activity of hydro-alcoholic extract of petals and essential oil of this plant was also evaluated by DPPH for measurement of free radical scavenging activity and by ferric ammonium thiocyanate method for evaluation of lipid peroxidation properties. Additionally, three flavonol glycosides of ethanolic extract including quercetin-3-O-glucoside, kaempferol-3-O-rhamnoside and kaempferol-3-O-arabinoside have antioxidant activity. However, the potential of this effect is maybe due to existence of quercetin 3-O-glucoside and other flavonoids in the extract (Yassa *et al.*, 2009). Both fresh flower (FF) and spent flower (SF) extracts of *R. damascena* flowers also showed antioxidant activity. However, the antioxidant activity of FF extract was higher than that of SF extract (Ozkan N *et al.*, 2004). The antioxidant effect of *R. damascena* and its inhibitory effect on lipid oxidation were evaluated in an *in vivo* study. The results showed a potent antioxidant and lipid peroxidation inhibitory effects comparable to -tocopherol and suggest that the plant can be considered as a medical source for the treatment and prevention of many free radical diseases (Shahriari S *et al.*, 2007)

Table 8:- There are different forms of rosa damascene

Rose water	<p>It is an abundant product of <i>R. damascena</i> in which contains 10-50% rose oil. The most usage of Rose water is in religious ceremonies. It is used in mosques especially at mourning ceremonies, to calm and relax people. The highest quality rose water is produced in Kashan. Kaaba (God House) in, is washed yearly by unique and special rose water of Kashan. Rose water is also of high value in the food industry and some special foods are prepared using this product (Nikbakht A <i>et al.</i>, 2008).</p> <p>It has antiseptic, antibacterial, anti-inflammatory antioxidant laxative and anti-aging properties (Muhammandakram <i>et al.</i>, 2019)</p>
Rose oil	<p>It is a volatile oil obtained by distillation of the fresh flowers of <i>R. damascena</i>. The chief producing countries are, and but not a major product in. The oil is prepared in copper alembic stills by the peasant or in large factories under careful scientific control. Some 3000 parts of flowers yields only one part of oil. The oil is very expensive and very liable to adulteration. The oil is, pale, yellow, and semisolid. The portion which is solid at ordinary temperatures forms about 15-20% and consists of odorless stearoptene containing principally saturated aliphatic hydrocarbons (C14-C23 normal paraffins) (Nikbakht A <i>et al.</i>, 2008, Moein M <i>et al.</i>, 2010). Because of the low oil content in <i>R. damascena</i> and the lack of natural and synthetic substitutes, essential rose oil is one of the most expensive ones in the world markets (Baydar H <i>et al.</i>, 2005).</p>
Dried flower	<p>Two kinds of dried flowers are produced in.</p> <p>A) Dried bud which is mostly for export.</p> <p>B) Dried petals for different purposes; its major use is for eating, as it can solve problems with digestive system. Some Iranians eat it with yogurt. Another reason for drying petals is to store them when distilleries cannot accept the whole produced flower anymore. They use them later for distillation (Nikbakht M <i>et al.</i>, 2008).</p>
Extraction from rose petals	<p>it is the pale yellow and semisolid oil extracted by various profitable method. It is expensive because it provides only one part of oil out of 3000 parts of flower. It helps in the reduction of thirst, healing old cough, headache</p>
Rose hip	<p>rose hip are berry like fruits under the petal of rose. Both dried and fresh hips of <i>R. damascena</i> processed or not processed, are used in Iran (Nikbakht A <i>et al.</i>, 2008).</p>

9. PHARMOCOLOGICAL EFFECT OF FLOWER

Table 9: - showing pharmacological effect of flower

TYPES OF SOLUTION	Effects	Method of study	Ref .

And essential oil			
Extract (ethanol, aqueous) Fraction (ethyl acetate, aqueous-butanol)	Hyponic	Extract (ethanol, aqueous) Fraction (ethyl acetate, aqueous-butanol)	(Rakhshandah H <i>et al.</i> , 2006) (Rakhshandah H <i>et al.</i> , 2006)
Extract (hydroalcoholic, ethanolic)	analgesic	Hot plate, tailflick, acetic acid and formalin test	(Haihashemi V <i>et al.</i> , 2010) (Rakhshandah <i>et al.</i> , 2006)
Essential oil	Anticonvulsant	Pentylentetrazol and kindling method	(Kheirabad <i>et al.</i> , 2008) (Ramezani R <i>et al.</i> , 2008) (Muhammad <i>et al.</i> , 2019)
Ethanolic and aqueous extract	antitussive	Citric acid method	Shafei MN <i>et al.</i> , 2003)
Ethanolic extract, essential oil Fraction (ethyl acetate, aqueous-butanol)	broncho dilatory	Tracheal chain	(Boskabady MNet <i>et al.</i> , 2006)
Aqueous-ethanolic extract	Potentiation of HR and contractility	Isolated heart (langendroff mode)	(Boskabady MN <i>et al.</i> , 2011)
Compound purifies from methanol extract	Reduce diabetes	Capacity of a glucosidase action	(Muhammad <i>et al.</i> , 2019)
Essential oil and absolute extract	antibacterial	Disk method, well diffusion method, microdilution method	(Mahmood N <i>et al.</i> , 1996) (AndoganBcet <i>et al.</i> , 2008) (Adwan G <i>et al.</i> , 2008)
extract (hydroalcoholic, ethanolic, fresh flower, spent	antioxidant	Measurement of free- radical- scavenging activity	(Ozkan G <i>et al.</i> , 2004) (Kumar N <i>et al.</i> , 2009)

flower), essential oil			(Shahriari S <i>et al.</i> , 2007)
Herbal eye drop containing R. damascene	Ophthalmic	Clinical investigation	(Muhammad akramet <i>al.</i> , 2019)
Rose's bud contains cyanidin-3-OB glucosides	Cardiovascular role	ACE (angiotensinverting enzyme) inhibitor	(Muhammad akramet <i>al.</i> , 2019)
Flavonoid compounds	Anti-HIV	Effect on H9 human T cells chronically infected with IIIIB and C8166 human T lymphoblastoid cells in HIV-1MN	(Mohammad Hossein Boskabady <i>et al.</i> , 2011)
Aqueous and Ethanol extracts	Relieve cough Anti- ageing Anti- inflammatory Bronchodilator	Sulfur dioxide gas induces mouse model Death rate in adult Drosophila flies Carrageenan induces rat paw size Inhibit calcium channels of guinea pig tracheal chain	(Muhammad akramet <i>al.</i> , 2019)

10. RECENT RESEARCH WORK RELETED TO ROSE

10.1 Cardiotonic Activity

(Mohammed Ishaqet *al.*, 2014). reported that the therapeutic effect of extract of *Rosa centifolia* Linn was observed dosage dependent and equivalent to that of Digoxin. Also, it has Cardiotonic action. It may also be a safe alternative to Digoxin in the treatment of congestive heart failure, according to the researchers. The therapeutic index of an alcoholic extract of *Rosa centifolia* Linn was equivalent to that of cardiac glycosides.

10.2 Physiological and psychological effects on nervous system

(Kenichi *et al.*, 2017) according to research, Fresh rose petals have a sedative effect on humans and it may be used as a substitute for essential rose oil.

10.3 Anti-Arthritic activity

R. Kumar *et al.*, (2015) showed that *Rosa centifolia* aqueous extracts could be explored further as a potentially safer alternative for the treatment of Rheumatoid Arthritis.

10.4 Anti-inflammatory and Anti-arthritis Activity

(Battiwala *et al.*, 2013) stated in their study that aqueous extract of *Rosa Centifolia* (Linn.) flowers possess anti-inflammatory and antiarthritic activity may be because of presence of flavonoids in it.

10.5 Analgesic Activity

(Samyaket *et al.*, 2015) The whole test extracts of *Rosa Centifolia* displayed strong analgesic efficacy, according to this study. The most powerful extract was determined to be methanol, followed by ethyl acetate and benzene extracts. The analgesic efficacy of *R. indica* leaf was revealed in Swiss albino mice in this early investigation.

10.6 Antibacterial activity

(Mishra *et al.*, 2011) found rose flower as the best source for antibacterial activity against the microorganisms. Methanolic extracts of rose petals, leaves, and stems were reported to exhibit strong antibacterial activity against all of the test pathogens (*E. coli*, *P. aeruginosa*, and *S. aureus*), but ethyl acetate extract was exclusively active against *P. aeruginosa*.

10.7 Antibacterial Properties of *Rosa indica* against Various Pathogens.

(Jahir Alam Khan *et al.*, 2011) states that the methanolic extracts of Red rose petals found effective against all the pathogens used (*Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*). They gave a zone of inhibition of 27 mm against *E. coli*, 26 mm against *Pseudomonas aeruginosa*, and 25 mm against *Staphylococcus aureus*, which was much better than the usual antibiotic's zone of inhibition.

10.8 Antibacterial Properties of Different Varieties of Rose

(Amit Pandey *et al.*, 2011) showed in this study that the antibacterial property of *Rosa indica* of red and orange color against 3 bacterial pathogens- *E. coli*, *S. aureus* and *P. aeruginosa*. The least concentration were obtained 2.314 mg/ml for ethanolic extract of orange rose leaves against *E. coli* and 0.01 mg/ml for ethanolic extract of red rose leaves, ethanolic extract of red rose petals, ethanolic extract of orange rose petals against *P. aeruginosa*.

11. CONCLUSION

In the review we have stated some of medicinal application of *R. damascena* and its various possible beneficial effects on human ailments. *Rosa damascena* is a vital Rosaceae species probably most famous for its perfuming qualities, and various chemical components are identified from different parts of the plants of the plant like essential oil, alcohol, aldehydes

The modern research on *R. damascene* have been confirmed the antiviral, anti-inflammatory, antioxidant, antimicrobial, analgesic, antibacterial, anticonvulsant, antidepressant, anticancer, relaxant, and hypnotic features,

however according research. It's used to diagnose a range of stomach problems, menstrual bleeding, chest pain, constipation.

Phytochemical studies of the of the plant have been done enough. Herbal formulation and development part of the plant must also be explored in the future. Biological standardization of the isolated compounds and their synthesis in laboratory should also be explored as potential drug candidates.

12. REFERENCES

1. Adwan G, Mhanna M. *et al.*, (2008) Synergistic effects of plant extracts and antibiotics on *Staphylococcus aureus* strains isolated from clinical specimens. Middle East j sci res. Vol.3, page no.134–139.
2. Andoğan BC, Baydar H, Kaya S, Demirci M, Özbaşar D, Mumcu E. *et al.*, (2008) Antimicrobial activity and chemical composition of some essential oils. Arch Pharm Res. Vol.25, page no.860–864
3. Andrzej Cendrowski, Iwona scibisz, Marta mitek *et al.*, (2017) Profile of the phenolic compounds *Rosa rugosa* petals, journal of food quality, vol. 2017, page 10
4. B. mohammedshaq *et al.*, (2014) Phytochemical investigation and cardiotoxic activity of *rosa centifolia* (Linn.) flowers. AJCPR, vol. 72, page no. 161-174
5. Baser KHC *et al.*, (2003) Studies on Turkish Rose Concrete, Absolute and Hydrosol. Chemistry of Natural Compounds. Vol.39, page no.375–379.
6. Basim E, Basim H. *et al.*, (2003) Antibacterial activity of *Rosa damascena* essential oil. Fitoterapia. Vol.74, page no. 394–396.
7. Battiwala A, Chandragopal SS, Kumaret al., (2013) Evaluation of anti-inflammatory and anti-arthritis activity of *Rosa centifolia* (Linn) flowers in experimental rats. International journal for pharmaceutical research scholars, vol. 2, page no. 414-26
8. Baydar H, Baydar N *et al.*, (2005) The effects of harvest date, fermentation duration and Tween 20 treatment on essential oil content and composition of industrial oil rose (*Rosa damascena* Mill.) Ind Crop Prod. Vol.21, page no. 251–255.
9. Boskabady MH, Kiani S, Rakhshandah H. *et al.*, (2006) Relaxant effects of *Rosa damascena* on guinea pig tracheal chains and its possible mechanism(s) J Ethnopharmacol. Vol.106, page no.377–382.
10. Boskabady MH, Vatanprast A, Parsee H, Ghasemzadeh M. *et al.*, (2011) Effect of aqueous-ethanolic extract from *Rosa damascena* on guinea pig isolated heart. Iran J Basic Med Sci. vol.14, page no.116–121.

11. **Buckle DR, Arch JRS, Boering NE, Foster KA, Taylor JF, Taylor SG, et al., (1993)**Relaxation effect of potassium channel activators BRL 38227 and Pinacidil on guinea-pig and human airway smooth muscle, and blockade of their effects by Glibenclamide and BRL 31660. *PulmPharmacol.* Vol.;6 page no.77–86.
12. **Butterweck V, Jurgenliemk G, Nahrstedt A, Winterhoff H. et al., (2000)**Flavonoids from *Hypericum perforatum* show antidepressant activity in the forced swimming test. *Planta Med.* Vol. 66 page no.3–6.
13. **Crespo ME, Galvez J, Cruz T, Ocete MA, Zarzuelo A. et al., (1999)**Anti-inflammatory activity of diosmin and hesperidin rat colitis induced by TNBS. *Planta Med.* Vol. 65 page no.651–653.
14. **D.bahl, swati karanda, R. devkaret al., (2016)**determination of antibacterial and antifungal properties of rose extract, international journal of pharmacognosy and phytochemical research, vol.8, pages 1695-1697
15. **Deepika Pathak kruti M. dave et al., (2019)**antimicrobial properties of *Rosa indica* (a new start with nature), biosci. Biotech. Res. Asia ,Vol. 16(2), page no. 403-409
16. **Dr. B.K prashanth M.D et al., (2016)** Ayurvedic remedies of rose plant and essential oil, easyayurveda
17. **Dr. SS vijayanchali et al., (2017)**Nutrient, Phytonutrient and Antioxidant Activity of the Dried Rose Petals, journal of research, extension and development, vol. 6, page no. 4
18. **Felipe de Lima Franzen, et al., (2019)**-Chemical composition of rose, sunflower and calendula flower petals for human food use *CiencTecnolAgropecuaria, Mosquera (Colombia)*, vol. 20(1), page no: 149-168
19. **Green M. et al., (1999)**The Rose. *Aromatic thymes*, vol. 7, page no. 11–15.
20. **Haejo yang, youngjae shin et al., (2017)**antioxidant compounds and activities of edible roses(*rosahybrida* spp.) from different cultivares grown in korea, applied biology chemistry. Volume 60, page no.129-136
21. **Hajhashemi V, Ghannadi A, Hajiloo M. et al., (2010)**Analgesic and anti-inflammatory effects of *Rosa damascena* hydroalcoholic extract and its essential oil in animal models. *Iran J Pharm Res.* Vol.9, page no.163.
22. **Hongratanaworakit T. et al., (2009)**Relaxing effect of rose oil on humans. *Nat Prod Commun.* vol. 4 page no.291–296
23. **Kenichi et al., (2017)**physiological and psychological effects of rose wishing flowers and their hydrosols on the human autonomic nervous system and mood state. *The horticulture journal* vol. 86(1) page no. 105-112
24. **Kheirabadi M, Moghimi A, Rakhshande H, Rassouli MB. et al., (2008)**Evaluation of the anticonvulsant activities of *Rosa damascena* on the PTZ induced seizures in wistar rats. *J Biol Sci.* vol.8, page no.426–430.
25. **Kumar N, Bhandari P, Shamsheer S, Bari B. et al., (2009)**Antioxidant activity and ultra-performance LC-electrospray ionization-quadrupole time-of-flight mass spectrometry for phenolics-based fingerprinting of Rose species: *Rosa damascena, Rosa bourboniana and Rosa brunonii*. *Food Chem Toxicol.* Vol.47, page no.361–367.
26. **Kumar N, Bhandari P, Shamsheer S, Bari B. et al., (2009)**Antioxidant activity and ultra-performance LC-electrospray ionization-quadrupole time-of-flight mass spectrometry for phenolics-based fingerprinting of Rose species: *Rosa damascena, Rosa bourboniana and Rosa brunonii*. *Food Chem Toxicol.* Vol.47, page no.361–367.
27. **Kumar N, Singh B, Kaul VK. et al., (2006)**-Flavonoids from *Rosa damascena* Mill. *Nat Prod Commun.* Vol.1 page no. 623–626.
28. **Kwon EK, Lee DY, Lee H, Kim DO, Baek NI, Kim YE, et al., (2010)**Flavonoids from the Buds of *Rosa damascena* inhibit the Activity of 3-Hydroxy-3-methylglutaryl-coenzyme A Reductase and Angiotensin I-Converting Enzyme. *J Agric Food Chem.* Vol.58, page no.882–886.
29. **Kyejussa, yusuf et al., (2009)**Isolation and characterization of antioxidant compound in yellow rose root extract M.S master of science ,middle east technical university
30. **Libster M. et al., (2002)***Delmar's Integrative Herb Guide for Nurses.* Albany: Delmar ThamsonLearning; pp. 360–370.
31. **Lisin G, Safiyev S, Craker LE. et al., (1999)** Antimicrobial activity of some essential oils. *Acta Horticulturae (ISHS)* vol.501 page no. 283–288
32. **Mahmood N, Piacente S, Pizza C, Burke A, Khan AL, Hay AJ et al., (1996)** The anti-HIV activity and mechanisms of action of pure com-pounds isolated from *Rosa damascena*. *BiochemBiophys Res Commun.* vol. 229 page no.73–79.
33. **Mamtasaxena et al., (2013)**-
Phytochemistry of medical plants journal of pharmacognosy and phytochemical, vol. 1 no. 6, page no. 170
34. **Miyazawa M, Okuno Y, Nakamura SI, Kosaka H. et al., (2000)**Antimutagenic activity of flavonoids from *Pogostemoncablin*. *J Agri Food Chem.* Vol. 48, page no. 642–647.
35. **Moein M, Karami F, Tavallali H, GhasemiYet al., (2010)**Composition of the essential oil of *rosa damascena* Mill. From south of Iran. *Iran J Pharmaceut Sci.* vol.6, page no. 59–62
36. **Mohaddesemahboubiet. al., (2016)***Rosa damascena* as holy ancient herb with novel applications, journal of traditional and complementary medicine vol. 6 page no. 10-16

37. **Mohammad Hossein Boskabady, Mohammad Naser Shafei, Zahra Saberi, et al., (2011)**Effect of aqueous-ethanolic extract from *Rosa damascena* on guinea pig isolated heart Iran J Basic Med Sci. vol. 14(4) page no. 295–307.
38. **Momeni T, Shahrokhi N. et al., (1991)**
A study on the relationships between Iranian people and Damask rose and its therapeutic and healing properties, Iran: Tehran University. Vol. 790, page no. 251-254
39. **Muhammad akram Muhammad riazet al., (2019)**Chemical constituent, experimental and clinical pharmacology of *Rosa damascena* journal of pharmacology vol 72 page no. 161-174
40. **Mung hee-lee, Tae Gyu Nm et al., (2018)** Skim anti inflammatory activity of rose petal extract(*rosa gallica*) through reduction pf MAPK sihnlaling pathway food Sci Nutr. Vol.6(8), page no. 2560–2567.
41. **Ng TB, Liu F, Wang ZT. et al., (2000)** Antioxidative activity of natural products from plants. Life Sci. vol. 66 page no. 709–723.
42. **Nikbakht A, Kafi M. et al., (2008)**A Study on the Relationships between Iranian People and *Damask Rose* (*Rosa damascena*) and its Therapeutic and Healing Properties. Acta Hort (ISHS) vol.790, page no. 251–254.
43. **Nyeem MAB, Alam MA, Awal MA, Mostofa M, Uddin M, Islam SJN, et al., (2006)**Depressant Effect of the Crude Ethanolic Extract of the Flowering Tops of *Rosa damascena*. Iran J Pharm Res. Vol. 5 page no.171–174.
44. **Oka N, Ikegami A, Ohki M, Sakata K, Yagi A, Watanabe N et al., (1998)-**
Citronellyl disaccharide glycoside as an aroma precursor from rose flowers. Phytochemistry. Vol.47, page no.1527–1529.
45. **özkan G, Sagdiç O, Baydar H.et al., (2004)**Antioxidant and antibacterial activities of *Rosa Damascena* flower extracts. Int J Food Sci Technol, vol.10, page no.277–281.
46. **PP joy, J Thomas, Samuel Mathewet al., (1998)** Aromatic and medicinal plants research station, tropical horticulture. nayaprokash vol. 2, page no. 4-6
47. **Pratt DE, Hudson JE. Et al., (1990)**Natural antioxidants not exploited commercially. In: Hudson BJJ, editor. Food Antioxidants. Amsterdam UK: Elsevier; 1990. pp. 171–192.
48. **R.kumaret al., (2015)** in vivo antiarthritic activity of *rosa centifolia* L. flower extracts international quarterly journal of research in Ayurveda vol. 36(3), page no. 341-5
49. **Rakhshandah H, Boskabady MH, Mossavi Z, Gholami M, Saberi Z. et al., (2010)**The Differences in the relaxant effects of different fractions of *Rosa damascena* on guinea pig tracheal smooth muscle. Iran J Basic Med Sci. vol.13 page no.126–132.
50. **Rakhshandah H, Dolati K, Hosseini M.et al., (2008)**Antinoceptive effect of *Rosa Damascena* in mice. J Biol Sci. vol. 8 page no.176–180.
51. **Rakhshandah H, Hosseini M, Dolati K. et al., (2004)**Hypnotic effect of *Rosa damascena* in Mice. Iran J Pharmac Res. Vol. 3 page no. 181–185.
52. **Rakhshandah H, Hosseini M.et al., (2006)**Potentiation of pentobarbital hypnosis by *Rosa damascena* in mice. Indian J Exp Biol. Vol. 44 page no.910–912.
53. **Ramezani R, Moghimi A, Rakhshandeh H, Ejtehadi H, Kheirabadi M.et al., (2008)**The effect of *Rosa damascena* essential oil on the amygdala electrical kindling seizures in rat. Pak J Biol Sci. vol.11, page no. 746–751.
54. **Rana Nassour et al.,(2020)**Anthocyaninpigments; structure and biological importance Journal of Chemical and Pharmaceutical Science vol.13 ,page no. 45-57
55. **Ren W, Qiao Z, Wang H, Zhu L, Zhang L.et al., (2003)**Flavonoids: promising anticancer agents. Med Res Rev. vol. 23 page no.519–534.
56. **Shafei MN, Rakhshandahb H, Boskabady MH. Et al., (2003)**Antitussive effect of *Rosa damascena* in Guinea pigs. IJPR. Vol.2 page no. 231–234.
57. **Shahriari S, Yasa N, Mohammadirad A, Khorasani R, Abdollahi M. et al., (2007)** In vitro antioxidant potential of *Rosa damascena* extract from guilan, Iran comparable to -tocopherol. *Int J Pharmacol.* Vol.3, page no.187–190.
58. **Sharafkhandy A. Ave-Sina et al., (1990)**Pharmacological effects of *Rosa damascena*Law in Medicine. Interpreter. Teheran: Ministry of Guidance publication; Page no. 129–131.
59. **Sweta kumariet al., (2021)**medicinal use of rose. Vigyan varta vol.2(3) page no.49-51
60. **Ulusoy S, Boşgelmez-Tinaz G, Seçilmiş-Canbay H. et al., (2009)**Tocopherol, carotene, phenolic contents and antibacterial properties of rose essential oil, hydrosol and absolute. Curr Microbiol. Vol.59 page no.554–558.
61. **Umesh kumar, kunalkumaret al., (2012)**study of antimicrobial activity of *rosa indica* against gram positive and gram negative bacteria, international journal of microbiology research, vol 4, page no. 186-189
62. **Vijayanchali, S.S et al., 2017)**Nutrient, phytonutrient and antioxidant activity of the dried rose petal, journal of research, extension and development, vol.6, page no. 2

63. **Wood G, Bache F. et al., (1839)**Antinoceptive effect of *Rosa damascene* in mice, journal of biological sciences,vol. 8,page no. 176-180
64. **Yassa N, Masoomi F, Hadjiakhoondi A. et al., (2009)**Correspondence chemical composition and antioxidant activity of the extract and essential oil of *Rosa damascena* from Iran, Population of Guilan. Daru. Vol.17 page no. 175–180.
65. **Yusra safdar ,Taqdees malik et al., (2020)**Antibacterial activity of rose extract, Open Acc J Med, vol. 2(4) page no. 194-201
66. **Zahra Ayati, mohammad S amiriet al., 2018)**Phytochemistry, traditional uses and pharmacological profile of rose Hip: a review All current pharmaceutical design, vol. 24, page no. 00

