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Research Article

Evaluation of Anti-Microbial Activity in Prunus Domestica L.

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ABSTRACT

This study used an extracted fruit of prunus domestica l. was prepared by mixing of at doses of 1kg of material and 2liters of ethanol to examine the anti-microbial activity of P. domestica fruit ethanol extract. Antimicrobial activity can be evaluated in relation to several microorganisms/bacteria, such as Escherichia coli and Staphylococcus aureus. The deformation, inhibition, or cessation of microorganism development is the source of antimicrobial action. The antibacterial properties of prunes exhibit intriguing variations based on the microorganism's susceptibility. During maceration, the solvent penetrates the fruit tissues and dissolves the desired compounds, such as flavor compounds, pigments, or bioactive molecules. The Soxhlet apparatus is a standard laboratory apparatus used for the extraction of organic compounds from solid materials, including prunus fruits. After experimental process should be completed The plates were incubated for 48 hours at 32°c, after incubation period the zone of inhibition was measured.

INTRODUCTION

Herbal remedies have been utilized by humans since the beginning of time to cure a wide range of illnesses. Even though the field of synthetic medicine has made significant strides in recent years, plants still play a significant role in health care because the commonly used synthetic drugs are not only costly but also have side effects. As a result, new drugs derived from plants are still needed because they are inexpensive, have few side effects, and, according to the WHO, still account for about 80% of the world's drug consumption. Prunus domestica (Rosaceae), also called Plum, Alu-Bukhara, or Alucha, is a plant that is widely distributed throughout India, Pakistan, Afghanistan, and Persia (Nadkarni 1976 and Narayan 2003). Numerous medicinal properties have been documented for blood circulation, measles, digestive issues, anticancer,

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anti-diabetes, anti-obesity, cardiovascular issues, dyspepsia, nausea, vomiting, thirst, bilious fevers, headache, jaundice, hepatitis, leucorrhea, miscarriage, antioxidant, antihyperlipidemic, anxiolytic, asthma, and laxative properties. The major chemical constituents present in P. domestica are carbohydrates, amino acids, vitamin A, vitamin B complex, vitamin K, potassium, calcium, magnesium, zinc, copper, manganese, selenium, boron and dietary fibers, pectin, hemicellulose, cellulose, lignins, sorbitol, glucose, fructose and sucrose, malic, citric, tartaric, benzoic and boric acids, benzaldehyde, linalool, ethyl nonanoate, methyl cinnamate and γ-decalactone, benzaldehyde, 2-furancarboxyaldehyde, ethyl cinnamate.

Fig;-1PLUM FRUIT(prunus domestical.)

The necessity for the development of novel antimicrobial drugs is fueled by the growing global concern over antimicrobial resistance. One important source of bioactive substances with antibacterial qualities has been plants. The fruit-bearing plant Prunus domestica, also referred to as the European plum, has drawn attention because of its possible antibacterial properties. The evaluation of Prunus domestica's antibacterial activity will be examined in this essay, along with its importance and practical consequences for the medical and healthcare fields.

Taxonomy: Prunus domestica L. is a member of the Prunus genus, which is comprised of numerous **Fruit-** bearing plants, including apricot, cherry, and almond trees. The term "domestica" specifically refers to its lengthy history of cultivation. Depending on the cultivar and growing circumstances, the European plum tree can reach a maximum height of approximately 5 to 6 meters (16 to 20 feet). With dark green leaves that turn yellow in the fall, with a rounded crown. Early in the spring, the tree bears five-petaled white flowers that eventually turn into fruits.

Fruits: Depending on the cultivar, the small to medium-sized drupes can have a smooth or somewhat waxy skin that ranges in color from yellow to purple. Within is a single enormous seed or stone surrounded by delicious, succulent flesh.

Cultivation: Prunus domestica L. is grown mostly for its fruits in temperate climates across the world. It likes full sun and well-drained soil. The most frequent methods of propagation involve grafting or budding onto rootstocks. Many cultivars have been created, each with unique fruit characteristics like size, color, flavor, and harvesting period.

Benefits to Health: Plums are a nutritious addition to the diet because they are high in vitamins, minerals, and antioxidants. They have especially high levels of dietary fiber, potassium, vitamin K, and vitamin C. Plum consumption has been connected to a number of health advantages, such as enhanced immunological response, heart health, and digestion. Worldwide, plants are utilized as medicinal plants. Since ancient times, plants and their products have contributed to human culture. Native Americans have traditionally employed plants and plant-based items as medicine from the beginning of moments. Another medicinal plant that is used to treat a variety of illnesses is Prunus domestica. Prunus domestica belongs to the family of plum plants. Generally speaking, plum refers to the highest

point of the genus Prunus, which comprises Prunus insititia, Prunus domestica, Prunus salicina, and Prunus subcordiata, among others. There are currently over 40 identified species of plums, and plum fruit features a crease that runs down one side.

Prunus domestica, a member of the Rosaceae family, is likely to have originated close to the Caspian Sea, where it was discovered about 2000 years ago. The Rosaceae family is the 19th largest plant family and one of the most economically valuable plant families. This family includes thorny, climbing, or rhizomatous shrubs, plants, and trees. Rosaceae flowers bloom in groups of one to five and are often showy and bisexual, however they are also occasionally unisexual. Stamens of the Rosaceae family tree are typically 15 or more, however they might occasionally be 10 or less. Wonderful or hardly mixed filaments are added to the nectar disk. The Rosaceae family's hypanthium can be flat, cup-shaped, cylindrical, or detached from the carpels; it frequently enlarges in fruit. There are between 95 to 125 genera in this family. Plum trees often reach heights of 6 to 15 meters. The oblong, pubescent sepals of plum trees have an entire border and an acute apex. Petals are obovate, white or frequently multicolored, with a simple base and a rounded tip.

The fruit can be drupe-shaped, red, purple, green, or yellow, with a diameter ranging from 1 to 2.5 cm. It can occasionally be fashioned like a ball or rectangular shape, but it is rarely sub-globose. The two main apomorphies for systematic classification are the absence of endosperm and the presence of numerous stamens. Prunus domestica's taxonomical classification is displayed in Table 1.

Table1: Classification of the Prunus domestica L.

Kingdom	Plantae
Sub kingdom	Tracheobionta (Vascular plants)
Super- divison	Spermatophyta (Seed plants)
Divison	Magnoliophyta (Flowering plant)
Class	Magnoliopsida (Dicotyledons)
Subclass	Rosidae
Order	Rosales
Family	Rosaceae (Rose family)
Subfamily	Amygdaloideae
Tribe	Amygdaleae
Genus	*Prunus*
Sub-genus	*Prunus* sub g. *prunus*
Section	*Prunus* sect. *prunus*
Species	*Prunus domestica*

Cultivation Nature

In India, Prunus domestica is cultivated in Punjab plains, Himachal Pradesh, and Garhwal region of Uttarakhand. It is a shrubby, deciduous small tree usually cultivated at high hilly areas, as in Kashmir and division of Pakistan. Prunus domestica L. originated from the Caucasus region in West Asia and South Eastern Europe. It is also grown wildly in another region of the world like Kashmir (India) and Afghanistan.

The genus Prunus

Because many of the species of the genus Prunus are sources of fruits, oils, lumber, and ornamental items, it is an economically significant genus. There are around 400 species in this genus. This genus is widely dispersed in Asia, Africa, South America, Australia, and the temperate zone as well as the tropical and subtropical zones. Based on the fundamental shape of the fruit, the taxonomy of the genus Prunus has been disputed. Some studies have classified it into three, four, five, six, and even seven ranks of genera and subgenera within the generic ideas (Table 2).

Table 2 :-The genus prunes

Rank	Taxa Recognised	Author
Genera	Amygdalus, Armeniaca, Cerasus, Laurocerasus, Persica, and Prunus	Tournefort (1700)

Genera	Armeniaca, Cerasus, Padus, and Prunus	Linnaeus (1754)
Subgenera	Amygdalus, Amygdalopsis, Armeniaca, Ceraseides, Cerasus, Laurocerasus, and Prunus	Bentham and Hooker (1865)
Subgenera	Amygdalus, Cerasus, Chamaeamygdalus, Emplectocladus, Microcerasus, Padus, and Prunophora	Focke (1894)
Subgenera	Amygdalus, Cerasus, Padus, and Prunophora	Koehne (1911)
Subgenera	Amygdalus, Cerasus, Laurocerasus, Padus, and Prunophora	Rehder (1940)
Genera	Laurocerasus, Padus, and Prunus	Hutchinson (1964)
Genera	Amygdalus, Armeniaca, Cerasus, Laurocerasus, Padus, Persica, and Prunus	Komarov (1971)
Genera	Amygdalus, Armeniaca, Cerasus, Padus, Laurocerasus, and Prunus	Yu¨ et al. (1986)
Subgenera	Amygdalus, Cerasus, Laurocerasus, Padus, and Prunus	Ghora and Panigrahi (1995)

Chemistry

Prunes (Prunus domestica) are thought to be an excellent source of glycerol-producing organic acids of industrial importance that are produced by yeast. Prunes (Prunus domestica fruit) are also thought to be a rich source of carotenoids and polyphenols. However, little is known about the phenolic contents of the leaves. This suggests that the leaves may be a cheap, easily accessible, and obtainable source of naturally occurring antioxidants and phenolic compounds, which may find widespread use in the development of herbal medicines and the food industry. Fruits and vegetables naturally contain organic acids. They significantly impact the flavor, color, and aroma of fruits and vegetables as well as the organoleptic qualities. They are also utilized as a food additive in the production of fruit and vegetable juices and drinks. Ascorbic acid, an antioxidant, and acidulants like citric, malic, and tartaric acid are the principal acids used to enhance the quality of beverages. Byproducts from Prunus domestica are utilized as a novel, affordable source of bioactive peptides. Fruits like Prunus domestica L. have stones that conceal the seeds. Because of the high protein and fat content of this underutilized seed, it may be a cheap source of materials with potential use in the culinary, cosmetic, and pharmaceutical industries. There has already been research done on plum seed lipid content. According to reports, the fruits of Prunus domestica are used medicinally in India in conjunction with other medications to treat conditions like leucorrhoea, irregular menstruation, and debility after miscarriage. Prunus domestica mature fruit is used to boost immunity, enhance vision, and fend off conditions like asthma, rheumatoid arthritis, hypercholesterolemia, Alzheimer's, anemia, and cardiovascular illnesses. Numerous studies demonstrate the high concentration of antioxidants in Prunus domestica fruit, which includes neurological function. Prunus domestica fruit includes a wide variety of phenolic chemicals, the most common of which are isomers of caffeoylquinic acid. According to reports, the latter alone in ethanol extract has a 28.4% oxygen radical absorbance capacity (ORAC), which is evidence of the fruits' health-promoting qualities [46]. Anthocyanins, flavonoids, dihydroflavonols, abscisic acid, lignans, quinic acid, bipyrroles, carotenoid pigment, and tannins are only a few of the many natural substances found in plums. (1)

Overview of Anti-microbial activity in Prunus domestica L.

Numerous phytochemicals, including phenolic compounds, flavonoids, tannins, and organic

acids, are present in Prunus domestica. It has been observed that these chemicals exhibit antibacterial activity against a variety of pathogens, such as viruses, fungi, and bacteria.

Evaluation of Antimicrobial Activity:

Researchers use a variety of in vitro assays, including agar well diffusion, microdilution, and disc diffusion methods, to assess the antibacterial activity of Prunus domestica. These tests aid in evaluating how well-suited isolated chemicals or extracts from Prunus domestica are to combat particular microbial strains.

Antimicrobial Activity Against Bacteria:

Effectiveness Against Gram-Positive Bacteria:

Research has indicated that extracts from Prunus domestica are effective against gram-positive bacteria, including Streptococcus pyogenes and Staphylococcus aureus. Prunus domestica's antibacterial effectiveness against various diseases is due to the presence of tannins and phenolic chemicals.

Activity Against Gram-Negative Bacteria:

Regarding gram-negative bacteria, such as Pseudomonas aeruginosa and Escherichia coli, Prunus domestica has additionally demonstrated encouraging antibacterial action. Prunus domestica is a viable option for treating strains of bacteria that are resistant to drugs since it can damage the integrity of the cell membrane of these bacteria. (2)

Antifungal Activity:

Inhibition of Fungal Growth:

Extracts from Prunus domestica have demonstrated noteworthy antifungal properties against a range of fungal species, including Aspergillus fumigatus and Candida albicans. Prunus domestica's capacity to damage fungal cell walls and membranes is related to its ability to limit fungal growth.

Potential Applications in Fungal Infections:

Prunus domestica has antifungal qualities that make it a viable natural therapy option for fungal infections, particularly when traditional antifungal medications are unproductive or have unfavorable side effects.

Antiviral Activity

Activity Against Viral Pathogens:

Prunus domestica may have antiviral qualities against specific viral infections, according to recent studies. Preliminary research has shown that extracts from Prunus domestica can prevent viruses like the influenza and herpes simplex bacteria from replicating.

Implications in Viral Infections:

Prunus domestica may have antiviral properties, which could lead to the creation of new antiviral drugs made from natural sources. To fully understand Prunus domestica's methods of action and possible therapeutic uses in viral infections, more research is necessary. (5)

Antibacterial Activity:

Prunus domestica extracts from various sections have demonstrated antibacterial activity against a range of pathogenic microorganisms. For example, a 2016 study that was published in the *International Journal of Pharmacognosy and Phytochemical Research* discovered that Prunus domestica leaf extract exhibited strong antibacterial activity against *Pseudomonas*

aeruginosa, *Escherichia coli*, and *Staphylococcus aureus*. (5)

Mode of Action:

The plant extract's bioactive substances could damage microbial cell membranes, reduce the activity of enzymes, or obstruct vital biological functions, all of which would prevent microbial growth.

Significance and Future Directions:

Potential Therapeutic Applications:

Prunus domestica's antibacterial activity presents a substantial therapeutic potential for the management of infectious illnesses. By using Prunus domestica's bioactive components, scientists may be able to create novel antimicrobial agents that can fight diseases that are resistant to drugs.

Integration with Conventional Therapies:

The potential synergistic effects of Prunus domestica extracts with traditional antibacterial drugs require more investigation. Combinatorial methods have the potential to improve the effectiveness of current therapies and tackle the problems caused by resistance to antibiotics. The spread of diversified antimicrobial-opposing pathogenic microorganisms has been recognised for one World Organisation for Animal Health (OIE), the Food and Agriculture Organization (FAO) and the World Health Organization (WHO) as a weighty all-encompassing human and animal well-being problem. The growth of bacterial antimicrobial fighting is neither an surprising nor a new wonder. It is, however, an more and more worrisome position by way of the commonness with that new arising opposition phenotypes are happening among many bacterial pathogens and even commensal creatures. Historically, many contaminations may be medicated successfully in accordance with the clinician's past dispassionate occurrence (that is practical therapy); nevertheless, this should more the irregularity than the rule (Walker, 2007). Resistance has happened observed to basically all of the antimicrobial powers now certified for use in human and veterinary dispassionate cure. This, linked accompanying the type of antimicrobial agents now usable, create the election of an appropriate agent an more and more challenging task. This position live well clinicians more dependent on dossier from in-vitro antimicrobial susceptibility experiment, and focal points the significance of the diagnostic lab in dispassionate practice. A number of antimicrobial susceptibleness experiment (AST) methods are applicable to decide bacterial susceptibleness to antimicrobials. The collection of a method is established many determinants in the way that common sense, elasticity, automation, cost, reproducibility, veracity, and individual option. Standardisation and harmonisation of AST methodologies, secondhand in epidemiological following of antimicrobial drug resistance, are fault-finding if dossier search out be distinguished among governmental or worldwide following/listening programmes of OIE Members. It is essential that AST forms provide reproducible results in ordinary lab use what the dossier be comparable accompanying those results acquired by an confirmed 'golden standard' reference form. In the dearth of standardised arrangements or remark processes, susceptibility results from various labs cannot be dependably distinguished. The method used to select samples for addition in antimicrobial fighting following programmes, in addition to the methods secondhand for basic bacterial seclusion, are still main factors that bear be standardised or harmonised to admit direct corresponding of dossier between various domains; concern of these issues is tried in an OIE document (Dehaumont, 2004). As the science of

AST has advanced, a better understanding of the diversified determinants that take care of affect the overall effect of susceptibility experiment has enhance clearer. This document specifies directions and standardisation for AST methods, and understanding of antimicrobial susceptibility test results.

REVIEW OF LITERATURE

Jose Manuel Silvan, Anna Michalska-Ciechanowska, Adolfo J. Martinez-Rodriguez

Fruit-rich diets are good for human health since they include polyphenolic compounds. In this sense, plums (Prunus domestica L.) are a great source of these elements, which can greatly aid in the prevention of a number of illnesses. Five common foodborne pathogens (C. jejuni, S. typhimurium, E. coli, S. aureus, and L. monocytogenes) were tested for PEP's antibacterial activity. Every extract exhibited antibacterial activity against at least one of the pathogens under investigation, and this activity was associated with the drying process that was employed to preserve the extracts. PEP demonstrated a strain-dependent variation in the degree of growth inhibition against the foodborne pathogens. FD extract had the most significant antibacterial activity out of all the powders under study. Actually, all the bacteria investigated had their growth significantly ($p < 0.05$) suppressed by this extract, with the exception of the E. coli strain. The range of growth inhibition displayed by this extract varied based on the type of bacteria, ranging from 22 to 52%. Three of the five foodborne bacteria were reduced in their growth by the VD 60°C extract (Lactobacillus jejuni and Escherichia coli) having inhibition ranges of 46–58% and 26–46%, respectively. Otherwise, only the L. monocytogenes strain's growth was suppressed by SPD extract (17% of inhibition). Considering the type of microbe, the outcomes demonstrated that, irrespective of the drying method employed, L. monocytogenes was inhibited by all PEP in the range of 17%–46%. A variety of powders were shown to be more efficient against gram-positive bacteria than others in preventing the growth of certain foodborne pathogens. This is explained by the existence of particular polyphenolic chemicals, such as hyperoside, which has antibacterial properties. Because of variations in the structure of their cell membranes, gram-positive bacteria are typically more vulnerable. Even though Campylobacter jejuni is gram-negative, several polyphenolic substances can still inhibit growth. The makeup of these chemicals can change during the drying process, which could impact the powders' antibacterial effectiveness.

FAWZIAH M. ALBARAKATY et al.

The eco-friendly phytochemical, antibacterial, and antifungal properties of peel extracts from plum (Prunus domestica L.) against a range of animal microorganisms. Al Mukarramah, Makkah, Saudi Arabia: Umm Al-Qura University, Department of Biology, Faculty of Applied Science. There is evidence that many plant species are beneficial in combating bacterial and fungal infections. Since microbial resistance to chemical antimicrobials is the most common crisis in the therapeutic community, discovering a novel antimicrobial chemical with minimal side effects is one of the most important stages in microbiological research.

Goal: Therefore, the purpose of this work is to determine which phytochemical components can be recycled and added to animal diets, as well as to investigate the antibacterial and antifungal properties of extracts from the peel of plums (Prunus domestica L.) on a number of important animal microorganisms.

Techniques: The study evaluated the antibacterial properties of hot and cold aqueous and ethanol extracts of plum (Prunus domestica L.) peel extracts against a range of medically relevant pathogens isolated from poultry and cow farms. The phytochemical makeup of the ethanol and aqueous peel extracts was also looked at.

Findings and Conclusion: The results show that the peel extracts from plums (Prunus domestica L.) include compounds called alkaloids, flavonoids, tannins, and saponins. Thus, it is feasible to draw the conclusion that plum (Prunus domestica L.) peel extracts exhibit potent antibacterial activity against the tested microorganisms. However, their antifungal activity against *Candida albicans* remains unknown. Fruit peels can be used as an additive for animal feed, but further scientific and environmental research is required before this can be done.

Nighat Sultana, Haseeb-ur-Rehman et al. (2010)

Prunus domestica is an important plant that is found all over the world and is a member of the Rosaceae family. Medium-sized trees have mushy oval fruits, tiny blooms, and ovate or elliptical leaves. Its fruit, either fresh or dried, is used as food or medicinal. These are most widely referred to as prunes and plums. These fruits have therapeutic properties. These kinds of fruits can aid with digestive issues, measles, and blood circulation issues (Ahmed et al. 2010). Major nutrients like carbohydrates, amino acids, vitamin A, vitamin B complex, potassium, calcium, magnesium, and dietary fiber can all be found in large amounts in prunes. The act of drying results in an increase in total dietary fiber (Siddiq 2006).

Antibacterial activity:

The results of the diffusion method antibacterial assay for Prunus domestica demonstrated that it had an equivalent impact on gram-positive and gram-negative bacteria. According to Belhadj and Mazouki (2014), the greatest inhibitory activity against Escherichia coli growth was seen at a dose of 10 µg/mL. During a solvent-dependent antibacterial activity screening utilizing the agar well diffusion method, ethyl alcohol extract had the lowest bactericidal activity and ethyl acetate extract of Prunus domestica the highest (Yaqeen et al. 2013).

Antioxidant activity:

Food-based phenolic compounds often protect low-density lipoproteins from oxidative damage. When commercial prune and prune juice extracts were examined using reversed-phase HPLC with diode array detection, a significant amount of cholinergic acid and noncholinergic acid were discovered. These substances are in charge of inhibiting the oxidation of low-density lipoprotein (LDL) (Donovan et al. 1998). According to Morabbi Najafabad and Jamei (2014), fresh samples of Prunus domestica ethanolic and methanolic extracts show a higher antioxidant capacity than dried ones. When evaluated by oxygen radical absorbance capacity, 4-o-caffeoylquinic acid and 28 other isolated compounds, such as coumarin, flavonoids, hydroxycinnamic acid, lignans, and benzoic acid, showed strong antioxidant qualities (Kayano et al. 2004).

Shobhna Mishra and Swati Vyas et al.

Prunus domestica, the botanical name for prunes, is a dry variety of plum fruit with distinct nutritional value and a dietary bioactive profile. In conventional medicine, prunes are widely used and appreciated for the advantageous function as a laxative in the treatment of non-communicable

illnesses and bone health. Their antioxidant, anti-cancer, anti-hyperglycemic, anti-hyperlipidemic, and anti-osteoporosis qualities have all been demonstrated by research.

Antibacterial activity:

Disk diffusion methodology has been used by researchers to demonstrate the strong bactericidal activity of prune aqueous extract against Escherichia coli, Klebsiella pneumonia, Protease mirabilis, Pseudomonas aeruginosa, and Staphylococcus aureus (Pharmacopeia of India, 1996). In a different study, the agar well diffusion method was used to assess the antibacterial activity of dried plum against four strains of bacterial pathogens: *Bacillus subtilis, Staphylococcus epidermidis, Staphylococcus aureus,* and *Proteus mirabilis*. Results showed that *Proteus mirabilis, Staphylococcus aureus*, and *Staphylococcus epidermidis* were all effectively inhibited by dried plum. These findings demonstrated that dried plum fruit has strong antioxidant and antibacterial qualities in addition to having significant therapeutic potential that is crucial for medication development. Antibacterial activity of plum extract powders (PEP) was studied on five foodborne pathogens, including *C. jejuni, S. typhimurium, E. coli, S. aureus,* and *L. monocytogenes*. All extracts were observed to be active against these pathogens, and the activity against these bacteria also depended upon the drying procedure applied in the research. The antibacterial activity was demonstrated for both gram-negative bacteria including *P. aeruginosa* as well as gram-positive bacteria like *S. aureus*. The results thus obtained suggested that the hyperoxide could be involved in the antimicrobial activity thus observed. Hence, this can be interpreted that antibacterial activity of plum extracts powders (PEP) could be modulated further by changing the drying procedure. This further involves several variables such that a change in the polyphenolic composition.

Anti-cancer Activity

The ethanol portion of prune juice was found to inhibit the proliferation and apoptotic changes in human colon carcinoma cells. 2009 saw studies on the anti-tumor effect of supplementing immature plum extract, or IPE, on specific cancer-causing cells in vitro. The study's findings demonstrated that IPE had the capacity to suppress the growth of various types of cancer cells, including HepG2 human hepatocellular carcinoma, Kato III gastric cancer cells, HeLa human cervical carcinoma cells, U937 leukemia cells, and MCF-7 hormone-dependent breast cells. While this effect has not been observed in hormone-dependent breast cancer cells, it did decrease as the fruit ripened. Prunes contain protocatechuic acid, which inhibits the growth of malignant cells in epithelial cells and other tissues.

Dikesh Rayamajhi, Nishan Katuwal et al.

Using wine yeast Saccharomyces cerevisiae, plum wine was made from must with TSS of 110 Brix (Sample A), 200 Brix (Sample B), and 250 Brix (Sample C), and pH of 3.8, 4.0, and 4.1, respectively. The physicochemical characteristics of plum wine were monitored every day throughout fermentation. The plum wine was found to have the following parameters: pH, TSS, titratable acidity, volatile acidity, and alcohol content: 3.5, 3.6, and 3.8 at 24°C; 70, 100, and 110 Brix; 1.27, 0.85, and 0.76% as malic acid; 0.17, 0.067, and 0.050% as acetic acid; and, for samples A, B, and C, respectively, 4.5, 7, 10% v/v. Following the fermentation process, a sensory review was conducted to determine which sample was the best. The antibacterial properties of plum wine were investigated by testing its best plum wine against various microbes. The results showed

that the inhibition zone obtained was largest for E. coli (11.00 ± 3.16 mm) and gradually declined for Streptomyces spp. (6.40 ± 3.50 mm), Acetobacter spp. (6 ± 2.64 mm), K. pneumoniae (10.00 ± 1.58 mm), and Streptococcus aureus (3.40 ± 1.14 mm). Using the DPPH assay, the antioxidant activity of two samples (B and C) of plum wine was evaluated based on the best sensory outcomes. 116.35 µL/ml for B and 116.56 µL/ml for C were determined to be the IC_{50} values.

Antimicrobial activity

Antimicrobial activity of plum wine was done against five microorganisms, out of which three were gram-negative and two were gram-positive. The wine Sample C was selected for antimicrobial activity based on sensory evaluation.

Sanchi Mehta, Neha Soni, Gouri Satpathy, Rajinder K. Gupta

Studying the nutritional value, phytochemical composition, antioxidant capacity, and antibacterial properties of dried plums (Prunus domestica) helped to uncover their health benefits. The low-fat content of the nutritional composition demonstrated its potential as an energy source. The obtained values for protein and dietary fiber were 3.80% and 2.79%, respectively. It was discovered to be a modest source of various nutrients and minerals, including calcium, magnesium, and iron. The dried fruit was found to be an excellent source of total phenolic and flavonoids based on phytochemical study. The extract is a strong source of hydrogen and electrons, as evidenced by its modest antioxidant potential. Vitamin E, furfural, phytosterol, fatty acids, eugenol, and maltol—all of which have distinct medicinal applications—were found in the GC/MS screening. In an initial investigation, the extract was screened against four bacterial strains. It showed the highest zone of inhibition against Staphylococcus epidermidis followed by Staphylococcus aureus and Proteus mirabilis.

Antibacterial activity

The Nutrient Agar (NA) plates were prepared for analysis and incubated at 37°C for 24 hours. Agar well diffusion method was used to determine antioxidant activity against three gram-positive bacteria and one gram-negative bacteria. For the agar well diffusion, wells (8 mm diameter) were punched in the plates. 100 µL of the test sample was inoculated into the wells under strict aseptic conditions which are provided in laminar air flow and all the plates were incubated. The nutrient broth was inoculated with different bacteria (S. epidermidis, B. subtilis, P. mirabilis, and S. aureus) under study and left on shaker at 37°C overnight.

Nataliia Filimonova, Bashar Jabbar Alisahlanee

Study the antimicrobial and prebiotic properties of the studied phytosubstance obtained from the fruits of Prunus domestica.

Materials and methods

The study of the antimicrobial activity of the test sample of plum fruit extract with fibers was performed in vitro by the method of multiple serial dilutions. The reference strains of the following microorganisms were used as the microbiological model: S. aureus - ATCC-25923, E. coli - ATCC-25922, P. aeruginosa - ATCC-27853, B. subtilis - ATCC-6633, C. albicans - ATCC-885653. The determination of the prebiotic properties of the studied sample was carried out by the method of cultivation of bacteria Bifidobacterium bifidum No. 1 and L. rhamnosus R0011 ND on nutrient media, which included the composition of plum fruit with fibers.

Hudda Ayub, Muhammad Nadeem et al. (2023)

Plums are a common fruit of the genus and subgenus Prunus that are eaten for food, and they have a number of health advantages as well as therapeutic uses in the treatment of various illnesses. Plum pulp is also utilized in a variety of drinks. Potential sources of polyphenolic compounds, bioactive substances such as anthocyanins, phenolics, and carotenoids, as well as numerous organic acids like malic and citric acid, include plums. Additionally, plums are a rich source of several minerals, including calcium, magnesium, potassium, phosphorus, and vitamins A, B, K, and C. Prestigious antioxidants and phenolic chemicals such as caffeic acid, chlorogenic acid, crypto-chlorogenic acid, and neo-chlorogenic acid are prevalent in plums. These antioxidants help to maintain blood glucose levels, bone health, and cardiovascular illnesses. Because plums are high in dietary fiber and low in fat, they can help avoid heart disease. Additionally, it works well in the treatment of oral and lung cancer. Eating plums improves human health and guards against numerous ailments. In the review, several aspects such as plum production, nutritional profile, availability of bioactive components, phytochemical makeup, and antioxidants, namely phenolic and flavonoid compounds, are covered. Additionally, it explains how bioactive chemicals can help with lung, heart, and circulatory conditions.

Donald Robert (2021)

When macerated, the leaves and stems of plants belonging to the Rosaceae family and genus Prunus produce naturally occurring insecticides. Macerated plant biomass is hydrodistilled to produce a concentrated solution of volatile organic chemicals that function both as natural pesticides and, as described below, as antimicrobials. Among the volatile substances released from Prunus biomass are benzoic acid, benzaldehyde, benzyl alcohol, hydrocyanic acid, 1-hexanol, 2-propanol, hexanal, trans-2-hexenal, 1-hexanol, cis-3-hexenol, and mandelonitrile. These substances can be extracted from the distillate and reconstituted into a normal concentrated solution, the main constituents of which would be hydrogen cyanide, benzaldehyde, and mandelonitrile. Techniques for using these insecticides as a broad-spectrum bactericide are included here. The extract's constituents can work independently or in concert to regulate both gram-positive and gram-negative bacteria.

Rishikumar Shukla, Kishan (2021)

Prunus domestica L., a member of the Rosaceae family, has a wide range of biological properties, including hepatoprotective, antibacterial, antioxidant, and anti-haemolytic effects. In the current study, we assessed the antioxidant activity, total phenolic content, nutritional value, and phytochemical screening for the various extracts made by serial Soxhlet extraction using various solvents according to their polarity using the DPPH and FRAP methods. The findings indicate that it's a reliable energy source. Numerous secondary metabolites, including alkaloids, sugars, glycosides, protein, terpenoids, steroids, fixed oils, fat, and phenolic compounds, were found by phytochemical screening.

MATERIALS & METHODS

Plant Material

P. domestica dried fruit was purchased from local market. The extract was prepared by mixing 1 kg material and 2 liter ethanol in dry screw capped bottles for 1 week then filtered and evaporated under reduced pressure in rotary evaporator.

Chemicals

The chemicals used for this study include analytical grade of ethanol, Sodium chloride.

Phytochemical screening

The ethanol extracts of *P. domestica* fruit was subjected for preliminary phytochemical analysis as reported in chemical constituents.

Drying process of *Prunus domestica* L.

Drying plums, also known as prunes, is a simple process that preserves the fruit by removing its moisture content. Here's a basic guide on how to dry plums:

- **Pick ripe plums:** For drying, pick plums that are firm and ripe. Overripe fruits can rot more quickly and may not dry correctly.
- **Wash the plums:** To get rid of any dirt or residue, give the plums a good rinse under running water.
- **Pit the plums** by cutting them in half and extracting the pits. If preferred, you can also cut the plums into quarters or smaller pieces.
- **Dry the plums:** There are several methods for drying plums:
- **Sun drying:** Place the trays of plums in direct sunlight outdoors. This method requires hot, dry weather and may take several days to complete.

Fig 2:- Drying process by sunlight

- **Oven drying:** Put the plum trays inside your oven and turn it down to the lowest setting (around 140°F or 60°C). Maintain a slightly open oven door to let moisture out. This process uses more energy but is quicker than sun drying.
- **Dehydrator:** To dry fruits, use a food dehydrator that is adjusted to the proper temperature, which is often 135°F or 57°C. For drying times, according to the manufacturer's recommendations.
- **Verify the plums' level of dryness.** When they are leathery and just a little sticky—not wet—they have finished drying. Touching them shouldn't make them feel wet.
- **Storing:** After the plums have dried, allow them to cool completely before putting them in airtight resealable bags or containers. Keep them out of direct sunlight in a cool, dry environment.

METHODS

1. **MACERATION METHOD**
2. **SOXHLET APPARATUS METHOD**

Maceration method

Maceration is an extraction technique that involves soaking the *P. domestica* fruit (200 gms) in a solvent, such as ethanol (400 ml) to extract compounds from the fruit. During maceration, the solvent penetrates the fruit tissues and dissolves the desired compounds, such as flavor compounds, pigments, or bioactive molecules. The process typically involves cutting or crushing the plum fruit to increase the surface area and then immersed it in the solvent for 1 week allowing the compounds to leach out. After maceration, the solvent containing the extracted compounds is

separated from the solid residue through filtration or pressing.

Fig 3:– Maceration method of *Prunus domestica*

Following the conclusion of fermentation, the maceration period may be prolonged, sometimes lasting up to a month. Delaying the removal of pomace has the benefit of allowing maceration to take place when there is a high concentration of ethanol present at the end of fermentation, which improves tannin solubility. Additionally, because the skin's cell walls break down during prolonged macerations, the extraction processes are aided. Higher anthocyanin levels have been seen with this approach after four months of medium-term bottle aging. If the process is not effectively regulated, the production of damp scents or excessive tannin extraction may occasionally be the major issue. Another danger is the growth of deterioration bacteria if the wines receive inadequate care, particularly if their pH values are high.

A popular method of extracting solid materials is called maceration, which entails choosing the solvent's polarity and increasing the solubility of the target molecules in the sample by heating it up or stirring it. It can be completed with inexpensive, easily operated equipment, in contrast to other traditional and innovative extraction techniques. Additionally, by varying the solvents, temperatures, and agitation levels, the maceration techniques can be tailored to extract a broad range of compounds and facilitate a more efficient and targeted mass transfer of high-value chemicals from biomass. The primary drawbacks of maceration are the lengthy extraction times and large volumes of solvent required for these processes.

In this procedure, the solid components are placed in a sealed container with the entire solvent and let to stand, stirring often, for at least three days (or up to seven days) until the soluble material dissolves. For instance, immersing coarse or powdered plant materials in a solvent-filled stoppered container and letting them stand at room temperature for a minimum of three days while stirring them often (Handa et al., 2008). By softening and breaking the plant's cell wall, the process releases soluble phytochemicals. Following standing, the combination is strained (using nets or sieves), the marc is broken up, and the combined liquids are made clearer (using decantation or filtration). Using a stoppered container aids in the evaporation-related decrease of solvents. If evaporation reduces the solvent volume, the extract could become concentrated, which might not be ideal. In this conventional method, heat is transferred by convection and conduction, and the type of material recovered from the samples is determined by the solvents.

The principles of leaching—in which the soluble components dissolve in the solvent and emerge from the physical structures of the crude drug—are the foundation for the processes of maceration, digesting, and re-maceration. The process of maceration involves eliminating a medication by shaking or stirring it several times a day at room temperature while employing a solvent. We call this a "stationary condition" since the movement is so small compared to other extraction approaches.

With the exception of keeping the material in constant motion, kinetic maceration is carried out at room temperature like simple maceration.

Re-maceration:

In this process, a portion of the solvent is added to the medication. After filtering, the residue is extracted with the leftover solvent, and the drug residue is pushed out to extract the maximum amount of solvent. When the maceration process is finished and equilibrium is reached, the extract mixture is filtered through a cloth. The marc can be filtered using a specialized instrument, such as a filter press. The liquid known as *miscella* has a high content of active ingredients. There are tiny particles and haziness in the filtered fluid. Before filtering and concentrating the extract, it is best to give the liquid enough time to settle. A schematic flow diagram for the extraction of the maceration-applied.

Soxhlet apparatus method

The Soxhlet apparatus is a standard laboratory apparatus used for the extraction of organic compounds from solid materials, including *Prunus* fruits.

Process:

The *P. domestica* fruit sample (250 gms) is ground or finely chopped and placed inside a thimble or cartridge made of filter paper. The extraction flask is filled with an appropriate solvent (ethanol 500 ml) and placed on a heating mantle or hot plate. The Soxhlet extractor containing the *Prunus* fruit sample is inserted into the top of the extraction flask, and the condenser is attached to the top of the Soxhlet extractor. The heating mantle is turned on, and the solvent in the extraction flask is heated, causing it to boil (ethanol boiling point 78°C) and vaporize. As the solvent vaporizes, it rises into the Soxhlet extractor, where it comes into contact with the *Prunus* fruit sample. The solvent dissolves the compounds from the *Prunus* fruit. Once the solvent level in the Soxhlet extractor reaches a certain height, it overflows into the siphon tube and drips back into the extraction flask. The process continues cyclically, with fresh solvent continuously being evaporated, condensed, and re-circulated through the *Prunus* fruit sample. After several cycles, the extracted compounds accumulate in the extraction flask.

When the analyte needs to be concentrated from the matrix as a whole or separated from specific interfering compounds, Soxhlet extraction is a very helpful method. Many different approaches have been developed over decades for the processing of environmental samples. One of the earliest techniques for pretreatment of solid materials is solvent extraction, often called solid-liquid extraction (more accurately termed leaching or lixiviation in physicochemical nomenclature). One of the most important methods in the field of environmental extraction is still conventional Soxhlet extraction. Conventional Soxhlet is used twice to support this claim: either as an extraction stage in a specific process or as a proven model for comparison of new extraction alternatives. When using a traditional Soxhlet, the sample is put in a thimble holder and gradually filled with condensed new solvent from a distillation flask as the process proceeds. A siphon aspirates the whole contents of the thimble-holder and unloads it back into the distillation flask, conveying the extracted analytes in the bulk liquid, when the liquid reaches an overflow level. Until full extraction is accomplished, this process is repeated. Soxhlet becomes a hybrid continuous-discontinuous approach because of this performance. The assembly can be thought of as a batch system because the solvent operates in steps, but it also

has a continuous nature because the solvent is recirculated through the sample.

Fig 4:– Soxhlet apparatus method

Collecting of extract

The extraction process is typically allowed to run 6 hours. Once the extraction is completed, the solvent containing the extracted compounds is collected from the extraction flask. The solvent can then be evaporated using a rotary evaporator or similar equipment to obtain a concentrated extract.

Fig 5:– Extract sample of maceration method

Fig 6:– Extract sample of Soxhlet method

Fig 7:– Dried extract samples of maceration & Soxhlet method

Evaluating of Anti-Microbial Activity in *Prunus domestica L.* by Cup Plate Method

Aim & Objectives: The aim of present study was to evaluate the antimicrobial property of *Prunus domestica L.* by cup plate method using two bacteria:

1. Gram-positive organism — *Staphylococcus aureus*
2. Gram-negative organism — *Escherichia coli*

Materials and Methods

Materials:

Nutrient agar, sterile Petri dishes, sterile micropipette, sterile cotton swab, sterile cork borer

Cup Plate Method

The agar diffusion method, which is another name for the cup-plate method, is used to test a substance's antimicrobial activity. One of the recognized IP methods is the cup plate method, in which test samples are allowed to diffuse from the cup through an agar layer in a Petri dish or plate to the point where the growth of additional microorganisms is completely contained to a zone or circle surrounding the cavity holding the antibiotic solution. The antimicrobial activity is expressed as zone diameter in millimeters, which is measured by a scale.

Organisms:

The study employed:

- Gram-positive bacteria: *Streptococcus aureus*, *Streptococcus pyogenes*, and *Streptococcus pneumoniae*
- Gram-negative bacterium: *Escherichia coli*

Sterilization of Equipment

The sterilization process for cup-plate method typically involves several steps to ensure the complete elimination of microorganisms and to prevent contamination.

1.Cleaning: The glassware used in the cup-plate method should be thoroughly cleaned before sterilization to remove any visible debris or contaminants. This can be done using soap, water, and a brush or sponge. Rinse the glassware with distilled water to remove any soap residue.

2. Autoclaving: Autoclaving is the most common method of sterilization and involves exposing the glassware to high-pressure steam at a temperature of around 121°C (250°F) for a specified period, usually around 15–20 minutes. This process effectively kills bacteria, fungi, and other microorganisms.

3. Drying: After autoclaving, it's important to allow the glassware to dry completely before use. This can be achieved by air-drying or by placing the glassware in an oven at a low temperature to remove any remaining moisture.

4. Sterilization of Media: In addition to sterilizing the glassware, the media used in the cup-plate method should also be sterilized to prevent contamination. This can be done by autoclaving the media in flasks or bottles before pouring it into the Petri dishes.

5. Sterile Technique: Throughout the entire process, it's crucial to maintain a sterile environment and use sterile techniques to prevent contamination. This includes working in a clean area, using sterile gloves and equipment, and avoiding any unnecessary contact with non-sterile surfaces.

Preparation of Test / Stock Solution

Suspension of *Prunus domestica* 1A was prepared by maceration process with the following:

Sample-1A

- Dried *Prunus domestica*: 200 gms
- Ethanol: 400 ml
- Thus, the final concentration of the test solution obtained.

Suspension of *Prunus domestica* 1B was prepared by Soxhlet apparatus process with the following:

Sample-1B

- Dried *Prunus domestica*: 250 gms
- Ethanol: 500 ml
- Thus, the final concentration of the test solution obtained.

These general stages are usually followed in order to prepare a test or stock solution for use in the cup-plate method or any other laboratory procedure:

Taking into account the solubility of the material being tested as well as the experimental requirements, determine the desired concentration of the test solution. This concentration will be determined by elements including the substance's potency and the anticipated antibacterial action.

Using a balance or volumetric apparatus, precisely weigh or measure the prescribed quantity of the test material. Utilize materials of laboratory quality and adhere to safety procedures to prevent exposure or contamination.

Measure out the test ingredient and dissolve it in an appropriate solvent or diluent. The qualities of the drug and its intended use will determine which solvent is best. Dimethyl sulfoxide (DMSO), ethanol, and water are examples of common solvents.

Sterilization of the solution may be required to prevent contamination, depending on the needs of the experiment and the nature of the test substance. Filtration using a sterile membrane filter or autoclaving are two techniques of sterilization assuming the solubilization solvent can resist high temperatures.

It might be necessary to dilute the stock solution to the appropriate concentration if its concentration is too high for the experiment. The solvent used to dissolve the test substance or another appropriate diluent can be used to make dilutions.

The name or identification of the chemical, its concentration, the preparation date, and any other relevant information should all be clearly labeled on the test solution. Accurate identification and traceability are facilitated by proper labeling.

To preserve the prepared test solution's stability and integrity, store it properly. Observe any storage guidelines that the manufacturer or the substance's qualities specify. Common storage requirements include keeping food cold, shielding it from light, and avoiding extremely high or low temperatures.

To ensure that the prepared test solution is reliable and appropriate for use in studies, do quality control checks using methods such as microbial sterility testing or pH monitoring.

Preparation of Agar Plates

Two conical flasks of each 35 ml of distilled water were taken. To it, 0.98 g of nutrient agar and 0.5 g of plain agar were added and heated using a heating mantle for 10 minutes, then autoclaved for 50 minutes.

Microorganism Inoculation

Apply a standardized inoculum of the test microorganism to the agar plate's surface using a sterile brush or loop. This guarantees that the fungi or bacteria are distributed evenly over the agar surface. The Petri dishes, which measured around 32 cm diameter and 2 cm thickness, were selected after sterilizing. Base layer was obtained by pouring around 35 ml of agar solution to obtain a thickness of 4 mm. It was then kept for solidification. The overnight grown subculture was taken in definite volumes of peptone water and incubated at 37°C for at least 2–4 hours prior

to plating. After incubation, with the help of cotton swab, the organisms were streaked on Petri dish containing base layer medium.

Fig 8:– Preparation of agar plates

Experimental Procedure

The sterile borer was used to prepare 4 cups of 8 mm diameter, in the medium of each Petri dish. The Petri dishes which measured around 32 cm diameter and 2 cm thickness were selected after sterilizing. Base layer was obtained by pouring around 35 ml of Agar solution to obtain a thickness of 4 mm. The nutrient medium was prepared and sterilized by autoclave at 120°C, 15 lb pressure for 15 mins and Petri dishes were sterilized by hot air oven at 160°C for 2 hours. After sterilization, cool the medium up to 40°C. Then 24 hours of fresh cultures *E. coli* and *S. aureus* were added to each of conical flask and poured to Petri dishes, leave for solidification. At the center, one more cup was made for standard drug; its zone of inhibition was measured to compare with the zone of inhibition of the test drug. At the right side of the Petri dish, 1 cup was marked as A, where *Prunus domestica* sample A (prepared using method maceration) was introduced with the help of a micropipette. Left side of the Petri dish had one cup marked B in which suspension prepared out of *Prunus domestica* sample B (prepared using method Soxhlet apparatus) was introduced with a micropipette. The cups were prepared with sterile borer and added 50 µl amount of suspension of *Prunus domestica* sample 1A extract of *E. coli* in Petri dish. The cups were prepared with sterile borer and added 50 µl amount of suspension of *Prunus domestica* sample 1B extract of *S. aureus* in Petri dish. The plates were incubated for 48 hours at 32°C. After incubation period, the zone of inhibition was measured.

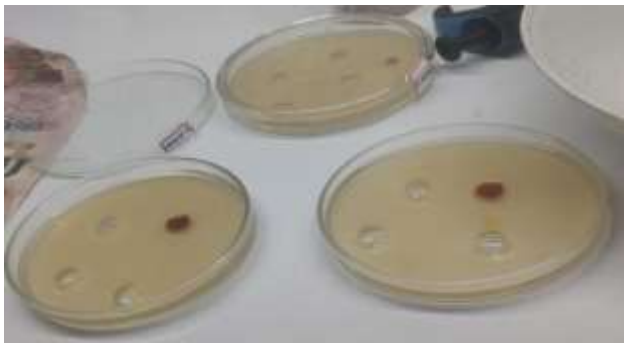

Fig 9: Adding samples of 1A, 1B in Petri dishes

RESULTS

After experimental process, the plates were incubated for 48 hours at 32°C. After incubation period, the zone of inhibition was measured. The zone of inhibition was measured by a scale and the measurements are noted.

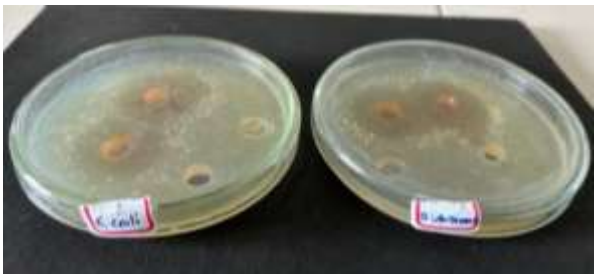

Fig 10

Fig 10 & 11: Zone of Inhibition – *E. coli* & *S. aureus*

Zone of Inhibition of *Escherichia coli*

The zone of inhibition of *Escherichia coli* is within the normal standard range of **12.0 ± 0.5 mm**.

The zone of inhibition of *Escherichia coli* was measured by a scale and the measurements are noted:

Table 3: Zone of Inhibition of *Escherichia coli*

Methods	Zone (mm)
Sample 1A by Maceration	0.7 mm
Sample 1B by Soxhlet	1.6 mm

By comparing the two samples using two methods, the microbial profile for *P. domestica* was found to be within acceptable limits. The zone of inhibition for *E. coli* of Sample 1A is **0.7 mm**, and Sample 1B is **1.6 mm**.

Fig 12: Zone of Inhibition of *Escherichia coli*

Zone of Inhibition of *Staphylococcus aureus*

The zone of inhibition of *Staphylococcus aureus* is within the normal standard range of **15 ± 1 mm**. The zone of inhibition of *Staphylococcus aureus* was measured by a scale and the measurements are noted:

Table 4: Zone of Inhibition of *Staphylococcus aureus*

Methods	Zone (mm)
Sample 1A by Maceration	0.5 mm
Sample 1B by Soxhlet	1.2 mm

By comparing the two samples using two methods, the microbial profile for *P. domestica* was found to be within acceptable limits. The zone of inhibition for *S. aureus* of Sample 1A is **0.5 mm**, and Sample 1B is **1.2 mm**.

Fig 13: Zone of Inhibition of *Staphylococcus aureus*

DISCUSSION

Prunus domestica L. is evidently rich in pharmacological activity, such as cholinesterase inhibitory, antioxidant, antibacterial, antihaemolytic, cytotoxic (anticancer), hepatoprotective, antihyperlipidemic, anti-inflammatory, antidiabetic, larvicidal, and repellant properties. The phytochemicals that have been isolated from the various *Prunus domestica* plant parts have also been clarified by this review. Because of its therapeutic properties, which are advantageous to human wellbeing, it is also effective in treating a wide range of disorders.

5.1 Antimicrobial Activity

Antimicrobial activity can be evaluated in relation to several microorganisms/bacteria, such as *Escherichia coli* and *Staphylococcus aureus*. The deformation, inhibition, or cessation of microorganism development is the source of antimicrobial action. The antibacterial properties of prunes exhibit intriguing variations based on the microorganism's susceptibility. Used the agar well diffusion method and the agar tube dilution method, respectively, to detect the oil component of *P. domestica* shoots to have moderate

antibacterial and antifungal activity against the *Salmonella* group and *Microsporum canis*. It was noted that the plum fruit's ethanol and ethyl acetate extract exhibited strong antibacterial action. Also used the agar well diffusion method and disc diffusion to test the plum wine's antibacterial properties. The agar well diffusion approach produced enough activity, whereas the disc diffusion method showed no activity at all. When the dried plum's antibacterial activity was examined, it was discovered that *Proteus mirabilis* (Gram -ve), *Staphylococcus aureus* (Gram +ve), and *Staphylococcus epidermis* (Gram +ve) were all inhibited. *Staphylococcus epidermis* had the largest diameter of the inhibition zone, indicating the highest activity, while *Proteus mirabilis* had the lowest inhibition zone, indicating the lowest antibacterial activity. When the antibacterial activity of the DMSO extract of the plum and prune was compared, it was discovered that both Gram +ve and -ve bacteria were equally affected, with the prune showing the greatest effect.

CONCLUSION

It is concluded that *Prunus domestica* L. was found to have significant antimicrobial activity, and it plays a crucial role in the preparation of antimicrobial drugs. With the help of our study using *P. domestica*, plant extraction methods—i.e., maceration and Soxhlet apparatus method—using both bacteria (*E. coli* & *Staphylococcus aureus*) showed measurable zones of inhibition.

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