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POMEGRANATE: THE RED JEWEL OF HEALTH AND WELLNESS

Tejas Pawar*, Komal Bankar, Pournima Kshirsagar, Prof. Vikram Sarukh

India.

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***Corresponding Author: Tejas Pawar**

India.

ABSTRACT

Originally from South Asia, the pomegranate (Punica granatum L.) is now produced in tropical and subtropical regions, including Mexico, which yields about 7,000 metric tons of the fruit annually. Because of its unique flavour and useful qualities, pomegranates are increasingly being used in various nations for the marketing of various goods including drinks, jams, and jellies, as well as for their ability to fight against illnesses and harmful microbes. The two widely grown pomegranate species that go by the names "Anar" and "Punica grantum" are Punica protopunica and Punica grantum. Numerous historical texts attest to its medicinal value. Because it contains significant phytochemical elements such ellagic acid, ellagitannins, punic acid, flavonoids, anthocyanins, estrogenic flavonoids, and flavones, it has a wide range of therapeutic applications. These ingredients have been used to cure a number of illnesses, including ulcers, snakebite, liver damage, diarrhea, helminthiasis, acidosis, bleeding, and respiratory issues. In addition, pomegranates have been shown to have remarkable enzymatic and cellular activity, particularly targeting enzymes such as COX, LOX, PLA2, and CA as well as cell cycle, division, and motility. Its clinical effectiveness has recently been documented in cases of obesity, male infertility, breast and prostate cancer, Alzhemier's illness, baby brain ischaemia, and arthritis. In light of the aforementioned therapeutic uses, pomegranates are poised to "explode" in the field of scientific research in the near future.

INTRODUCTION

The pomegranate is indigenous to an area spanning from northern India to modern-day Iran. For several millennia, pomegranates have been grown in the Mediterranean, India, and

Middle East. They are also grown in Arizona and the Central Valley of California. Given that they were among the first fruit plants to be domesticated in the eastern Mediterranean, pomegranates may have been domesticated as early as the fifth millennium BC.

The fruit's carbonized exocarp has been found at late Bronze Age levels of Hala Sultan Tekke on Cyprus and Tiryns, as well as early Bronze Age levels of Tell es-Sultan (Jericho) in the West Bank. A sizable, dry pomegranate was discovered in the tomb of Djehuty, Queen Hatshepsut's butler in Egypt; pomegranates are mentioned in ancient documents from Mesopotamia as early as the mid-third millennium BC. Remains of pomegranates, soaked in water, have been discovered at the Uluburun shipwreck off the coast of Turkey, which dates back to the 14th century BC. Perfume, ivory, and gold jewelry are among the other items on board, indicating that pomegranates may have been regarded as a luxury good at this period. This conclusion is supported by other archaeological discoveries of Late Bronze Age pomegranate remains, which were mainly discovered in affluent homes.

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Taxonomy

Scientific classification of Punica granatum L.

Kingdom: *PLANTAE*

Division: *MAGNOLIOPHYTA*

Class: *MAGNOLIOPSIDA*

Subclass: *ROSIDAE*

Order: *MYRTALES*

Family: *PUNICACEAE*

Genus and Specie: *Punica granatum L.*

Since ancient times, people have used the pomegranate (Punica granatum L.), a member of the Punicaceae family that thrives in tropical and subtropical climates, as a crop. Malum

granatum, which translates as "granular apple" in Latin, is whence its name originates. The tree features an extended green trunk that is twisted and prickly, as well as smooth-surfaced leaves and orange or crimson blooms.

The pomegranate tree was first domesticated in ancient Mediterranean regions with mild winters and hot, dry summers that promote optimal plant growth.

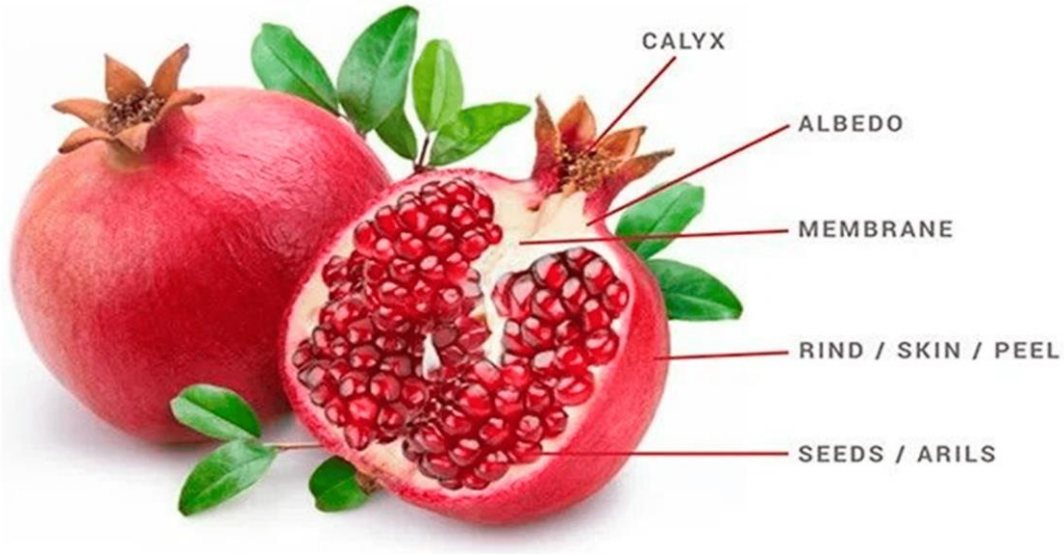

Fig. 1.1: Pomegranate (Punica granatum L.) fruit.

The pomegranate plant is distinguished by its growing length, which can reach 4-5 meters and is covered in prickly branches. The plant also has brittle bark with shiny, curled petal leaves. Because of its qualities, the plant is highly grown and in demand all over the world.

It is highly climate-adaptable, with globose fruit that ranges in diameter from 6 to 12 cm. Pomegranate peels range in colour from yellow to green to pink, and they can also be intensely crimson or dark purple.

Half of the weight is the edible portion, and the other half is made up of the peel. Conversely, the edible part consists of seeds (22% w/w) and juice (78% w/w). Peel, arils, and seeds make up a pomegranate fruit with longitudinal slices that displays every element examined below.

Microscopy

Pomegranate microscopy provides a wealth of information regarding the fruit's composition and structure.

- Structure of Cells: The cellular makeup of several pomegranate components, including the membranes, seed coats, and arils (juicy seed sacs), can be investigated by microscopy. This can reveal details on the order, shape, and presence of any specific features in the cells.
- Seed Morphology: Under a microscope, the size, shape, and internal structure of pomegranate seeds, or arils, can be observed. Examining the arrangement of cells within the seed coat and the existence of any specialized structures, such as vascular tissues, can be part of this process. Examining the arrangement of cells within the seed coat and the existence of any specialized structures, such as vascular tissues, can be part of this process.
- Pollen Analysis: Pomegranate blossom pollen grains can be examined using a microscope. This can aid in understanding some elements of pollination biology as well as the form of pollen grains, which can differ amongst pomegranate varieties.
- Identification of Pests and Diseases: Microscopy can help identify pests or diseases that impact pomegranate plants. Under a microscope, plant tissues can be examined to identify the distinctive symptoms of many diseases, including fungal infections and insect infestations. This process aids in accurate diagnosis and management.
- Quality Assessment: Pomegranate products, such as juice or extracts, can also be evaluated for quality using microscopy.

Evaluations of freshness, cleanliness, and contaminant presence can be made by looking at the cellular structure and integrity of processed pomegranate components.

Aril

Pomegranate arils, which make up 52% of the fruit's weight and are made up of 22% seeds and 78% juice, are the edible portion of the fruit. A tegument that is associated to the hilum and completely or partially envelops the seed is defined as a "aril"; however, years later, this term is changed to refer to pulpy structures that develop from the funiculus, or portions of the ovule, during fertilization and that cover all or part of the seed. Fruit quality is often assessed using aril colours, total soluble solids, acidity, and white tissue in order to satisfy industry standards.

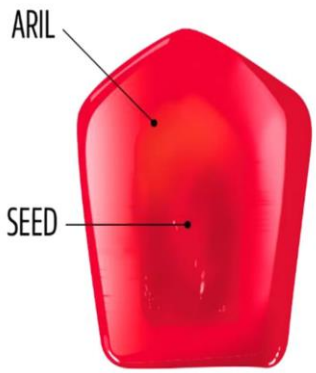

Fig. 1.2: Pomegranate Aril Composition.

Arils are clear, pink, red, or whitish in colour and are divided by membranous walls.

The arils consist of an edible layer that is luscious and succulent, originating from the seed's outer epidermal cells, which are extended mostly in a radial direction. Arils are primarily made up of water, sugars, and pectins. They are also rich in anthocyanins, which are water-soluble pigments and flavonoids found in many edible fruits and plants, particularly pomegranates and berries. Arils are also a good source of minerals, including potassium, phosphorus, calcium, iron, manganese, zinc, and copper.

These substances are glycosides composed of aglycones, the most prevalent of which are malvidin, cyanidin, pelargonidin, peonidin, and delphinidin. Other metabolites have also been reported to exist, including gallic acid and phenolic acids (primarily ellagic acid), which are members of the hydroxybenzoic acid group; additionally, the presence of p-coumaric acid, caffeic acid, and chlorogenic acid, which are members of the hydroxycinnamic acid group, has also been demonstrated.

Seed:

The pomegranate fruit's seed is found inside the aril.

The seeds are shaped like a prism and have a covering called a "testa" that acts as a shield between the seed and the environment. Sarcotesta and mesotesta make up the testa. The mesotesta is the hard portion inside the testa, whereas the sarcotesta is the soft, pulpy edible portion. The tegument is an additional layer that serves to both shield the seed's center and exchange water with the surrounding environment.

By analyzing the seed closely, it is now able to determine the material's composition and suggest novel or speculative uses for what was previously thought to be waste. The proximate

analysis of the seed yielded an oil result of 12.7%, a significant percentage of fat that is practical to extract and may contain fatty acids and bioactive elements that are good for your health. In addition to its industrial and medicinal applications.

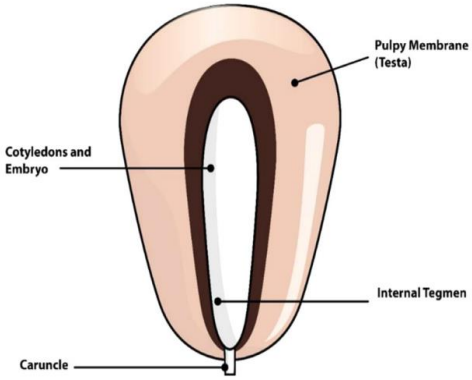

Fig. 1.3: Parts of the pomegranate seed (Punica granatum L.) in the longitudinal section, show the pulpy membrane (testa), which surrounds the colons.

Phenolic acids, flavones, and coumarins are some of the other secondary metabolites found in pomegranate seeds. Flavonoids include genistein, rutin, and gallocatechin, while coumarins include scoparone, 7-methoxycoumarin, umbelliferone, and 4-methylumbelliferone. Moreover, reported nucleosides including crotonoside, adenine, guanosine, adenosine, and phenylalanine and leucine. The presence of other beneficial substances including vitamin E, sterols, and punicic acid should also be noted. High concentrations of Π-tocopherol, δ-tocopherol, and α-tocopherol were found to be 107.38, 27.29, and 165.77 mg/100 g of dry seed, respectively.

Depending on the pomegranate variety, ripeness, harvesting period, and environmental factors, 7–27% of the seeds are made of oil.

Although pomegranate seed oil is wasted, it can be used for a variety of purposes, including food ingredients, fuels, lubricants, and paint formulation additives. Applications have recently expanded to include food, medicine, and nutrition.

Allied species of pomegranate

Punica protopunica, Punica granatum var. nana (dwarf pomegranate), and Punica granatum var. pleniflora (double-flowered pomegranate) are allied species of pomegranates. While

these species are related to the common pomegranate (Punica granatum), they may differ in size, fruit quality, or other features.

Also referred to as Socotran or Socotra pomegranates, **Punica protopunica**. exclusive to the Indian Ocean island of Socotra. smaller in size than the ordinary species of pomegranates. Generally speaking, the fruits are smaller and taste different than regular pomegranates.

Punica granatum var. nana, sometimes known as the dwarf pomegranate, is a dwarf type of pomegranate that is frequently grown for aesthetic purposes. Its compact growing habit makes it ideal for limited spaces or container gardening.yields little fruits that taste like regular pomegranates but usually have fewer seeds.

Punica granatum var. pleniflora: Distinguished by its double-flowered blooms, this pomegranate variety is valued for its attractive qualities.Grown more often for its showy flowers than for its fruit. Its main feature is the ornamental attractiveness of its blossoms, though it may also bear fruit.

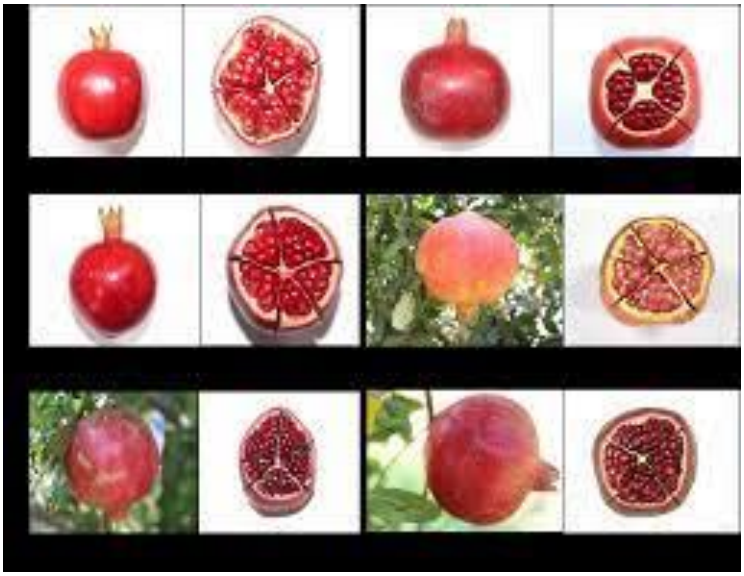

Fig. 1.4: Allied Species Of Pomegranate.

Adulteration

Dilution with Other Juices: To boost volume and cut expenses, some dishonest producers may dilute pomegranate juice with less expensive fruit juices, such as apple or grape. This reduces the amount of health-promoting substances in pomegranates and ruins their flavor and nutritional content.

Addition of Artificial Colorants: Artificial colorants may be added to diluted or low-quality pomegranate juice to improve its visual appeal. These additions may fool customers into thinking they are getting a genuine, premium product when, in fact, it may only have a small amount of pomegranate in it.

Use of Synthetic Sweeteners: Pomegranate juice that has been tampered with could have artificial sweeteners or additional sugars to cover up the taste of diluted or inferior fruit. Consuming too much sugar can lead to health problems including diabetes and obesity.

Mislabeling and False Advertising: Products may occasionally be sold or labeled as "100% pomegranate juice" when, in reality, they include artificial additives or a mixture of fluids. Customers who are looking for real pomegranate products for their health benefits are misled by this dishonest activity.

Presence of Chemical Residues: Pomegranate fruits may include chemical residues from improper farming methods or fertilizer and pesticide use. Long-term health problems may arise from consuming items derived from tampered fruits because they expose customers to dangerous substances.

Quality and Authenticity Testing: Strict testing techniques, such DNA analysis and chromatography, can be used to confirm the genuineness and caliber of pomegranate products in order to reduce adulteration. Stricter rules and enforcement actions may also be implemented by regulatory organizations to stop adulteration practices and safeguard the interests of consumers.

Although pomegranates, or Punica granatum, are indigenous to sections of northern India and Iran, they are now grown throughout the world in climate-suitable places, such as Mediterranean nations, California in the United States, and some regions of Asia and Africa.

A WORLDWIDE STATUS:

Iran, India, China, Turkey, and the United States account for 76% of global pomegranate output. Further countries where it is grown for table and ornamental use are Afghanistan, Bangladesh, Myanmar, Vietnam, Thailand, Cambodia, Turkmenistan, Armenia, Georgia, Morocco, Tunisia, Egypt, Israel, Syria, Lebanon, Greece, Cyprus, Italy, France, Spain, Portugal, Mexico, Argentina, and Chile. But because of the world's constant geographical expansion, there is no precise data available.

In the world at large, India is the top pomegranate producer in the world, producing 743.1 thousand tonnes in 2011–12. Iran produced 650 thousand tonnes, Turkey produced 218 thousand tonnes, the USA produced 100 thousand tons, Afghanistan and Spain produced 60 thousand tonnes apiece.

An estimate of the world's total pomegranate production is 1.5 million tonnes, and about 0.119 million tonnes of pomegranate fruit were sold to other nations, including Iran, India, the USA, Spain, and Tunisia.

In terms of area and output, India comes in first, whereas Spain and the USA have the highest productivity rates (18.5 and 18.3 t/ha, respectively). Iran was in first place with 60,000 tonnes of pomegranate exports each year, followed by India with 47,335 tonnes, or just 1.79% of its total production exported.

Table 1.1 Estimated World Pomegranate Production and Export.

Country	Planted Area (ha)	Production (t)	Export (t)
Iran	65,000	600,000	60,000
India	54,750	500,000	22,0000
China	Unknown	260,000	Unknown
USA	6,070	110,000	17,000
Turkey	7,600	90,000	Unknown
Spain	2,400	37,000	14,000
Tunisia	2,600	25,000	2,000
Israel	1,500	17,000	4,000

REGIONAL DISPERSION

1. **Mediterranean Region**: Pomegranate production is ideally suited to countries with climates like Turkey, Greece, Spain, and Italy.
2. **Middle East:** Israel, Iran, and Iraq are major pomegranate growers.
3. **United States:** The state that produces the most pomegranates is California, followed by Texas and Arizona.
4. **Central Asia:** Pomegranates are also grown in Turkmenistan and Uzbekistan.
5. **South Asia:** Pomegranate cultivation has a long history in Afghanistan and India.

COLLECTION

Depending on the kind and region, pomegranates are usually picked in the late summer or early fall. Because the fruit must be carefully plucked to prevent injury, harvesting is done by

hand. The fruits are sorted according to size, color, and quality after they are picked. After that, they are packaged for delivery to nearby marketplaces or processing centers.

CULTIVATION

1. Climate: Pomegranates do best in areas with cool winters and hot, dry summers. Although they are tolerant of many different kinds of soil, they like well-drained soil.

2. Propagation: Vegetative propagation techniques, such as cuttings or grafting onto suitable rootstocks, are typically used to cultivate pomegranates.

3. Planting: Trees are best planted in rows that are far enough apart to allow for healthy growth and harvesting in the spring.

4. Maintenance: Water pomegranate plants frequently, especially in their early years of growth. Annual pruning helps them maintain their form and cion.

5. Control of Pests and Diseases: Although pomegranate trees are comparatively resistant to pests and diseases, aphids, scale insects, and fungi-caused illnesses such fruit rot are typical problems. Integrated pest management techniques are frequently used to handle these issues.

6. Harvesting: Six to seven months after blossoming, pomegranates are usually suitable for harvesting. When the fruit is totally ripe, as indicated by a rich color and a small amount of skin cracking, it should be harvested.

Fig.1.5: Pomegranate.

PHYTOCONSTITUENTS

It has been reported that distinct chemical compounds derived from different plant sections exhibit variable pharmacological activity, which can be used to treat a variety of illnesses. The different phyto-constituents derived from different plant sections are shown in Table 1.2

P. grantum is known to include chemicals such as ellagic acid, ellagitannins, punic acid, flavonoids, anthocyanins, estrogenic flavonoids, and flavones, according to a number of research findings. A good source of calcium, phosphorus, and beta carotene is P. grantum rind.

Table 1.2: Phytoconstituents Of Pomegranate.

PLANT PART	CONSTITUENTS
Pomegranate Juice	Anthocyanins, glucose, ascorbic acid, ellagic acid, gallic acid, caffiec acid, catechin, Minerals, amino acids, quecertin, rutin.
Pomegranate seed oil	95% Punicic acid, ellagic acid, sterols.
Pomegranate pericarp (peel, rind)	Phenolic punicalagins, gallic acid, catechin, flavones, flavonones, anthocyanidins.
Pomegranate leaves	Tannins, falvone glycosides, luteolin, apigenin.
Pomegranate flower	Gallic acid, Urosolic acid, triterpenoids including maslinic and asiatic acid.
Pomegranate roots and bark	Ellagitannins, punicalin and punicalagin, piperidine alkaloids.

UTILIZING POMEGRANATES IN CONVENTIONAL MEDICINE:

Traditionally, ingredients have included flowers, leaves, fruit peel, pomegranate sauce, and the bark of new shoots and roots. All of the tannin-rich Punica granatum L fruit's constituents exhibit comparatively potent astringent properties. Traditional medicine has utilized a number of infusions or decoctions made from the blossoms of the plant to treat vaginal discharge, uncomplicated diarrhea, and pancreatitis. This extract is also typically gurgled with pomegranate peel to reduce inflammation of the pancreas. Punica granatum L fruit juice is suggested as a remedy for gallbladder disorders. The fruit's high tannin content is regarded as bitter nourishment. Its infusion seems to be beneficial in the treatment of illnesses like dysentery, common diarrhea, and stomach issues. Pomegranate seeds, on the other hand, have a relatively low tannin level and are typically used to treat women's vaginal discharge and wound healing. Owing to the alkaloid compounds, pomegranate ethanol extracts or fresh or dried root barks are used to eradicate intestinal parasites. Because of its antibacterial and anti-inflammatory qualities, it is also utilized in traditional medicine.

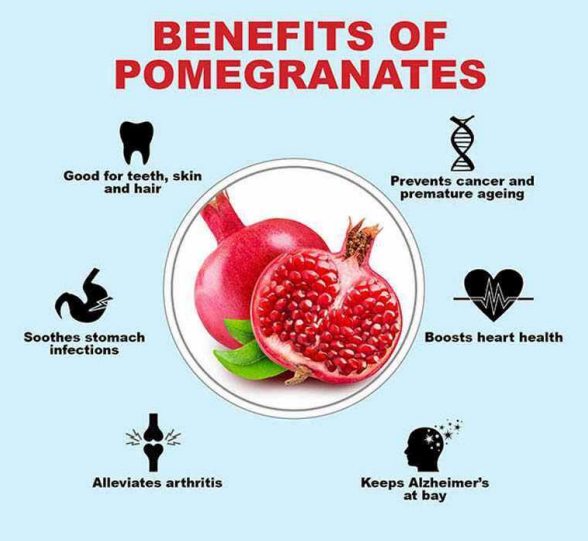

Fig. 1.6: Benefits of Pomegranate.

POMEGRANATE'S PHARMACOLOGICAL PROPERTIES

It has been discovered that the fermented juice of pomegranates have antioxidant properties. Pomegranate blossom extract can lower cholesterol and blood sugar levels. Pomegranate juice's flavonoids and tannins have the ability to stop cancer cells from growing.

Fruit peel and watery extract include flavonoids that have estrogenic action. Furthermore, studies on luteolin and naringenin have shown that their actions resemble those of the hormone that women typically secrete before becoming pregnant. The fermented extract of pomegranate fruit contains polyphenols that may have antioxidant properties, and the tannins found in the pericarp of the fruit may enhance this potential.

The breakdown of flavonoid sugar complexes during fermentation is probably what causes the fermented extract's polyphenols to have stronger activities than nonfermented extracts, as the end products will have high quantities of free polyphenols (with high biological activity).

It is established that the flavonoids in peels exist in glycoside form. While they function inversely when released and hydrolyzed, they have no estrogenic effect while present in glycoside forms. Pericarp polyphenols and fermented pomegranate juice may have an estrogenic effect because they bind to estrogen receptors, similar to estrogenic flavonoids such as kaempferol, quercetin, naringenin, luteolin, caumestrol, and weak 17-a-estradiol estrogen, which in turn inhibits the estrogenic activity of 17-b-estradiol. Both estrogen-dependent and estrogen-independent breast cancer cells can be inhibited by the watery sections of pomegranates.

Among the components found in pomegranate peels are gallic acid and ellagic acid; the latter is a dimeric derivative of gallic acid and is primarily found in higher plants, such as fruits and nuts.In Japan, ellagic acid has already been introduced to food as an antioxidant due to its antimutant, antiviral, antioxidant, and skin-bleaching properties.It has been measured how much antioxidant pomegranate peel extracts can provide in the form of phospholipid complex. The recovery of molybdenum (VI) to molybdenum (V) through the use of antioxidant chemicals and the synthesis of green molybdenum (V) compounds with maximal absorption at 695 nm form the basis of the approach. The antioxidant potential of pomegranate peel extracts stems from the presence of phenolic compounds, including gallic acid, ellagic acid, and tannins. Using the Ames test, the extracts' antimutagenic and anticarcinogenic qualities were evaluated in relation to azide sodium. Using azide sodium, the experiment demonstrated that pomegranate peel juice extract can prevent cancer and mutation in two different species of salmonella. The experiment's findings demonstrated that, in contrast to methanol extract, juice has the strongest antimutagenic activity and the lowest antioxidant activity.

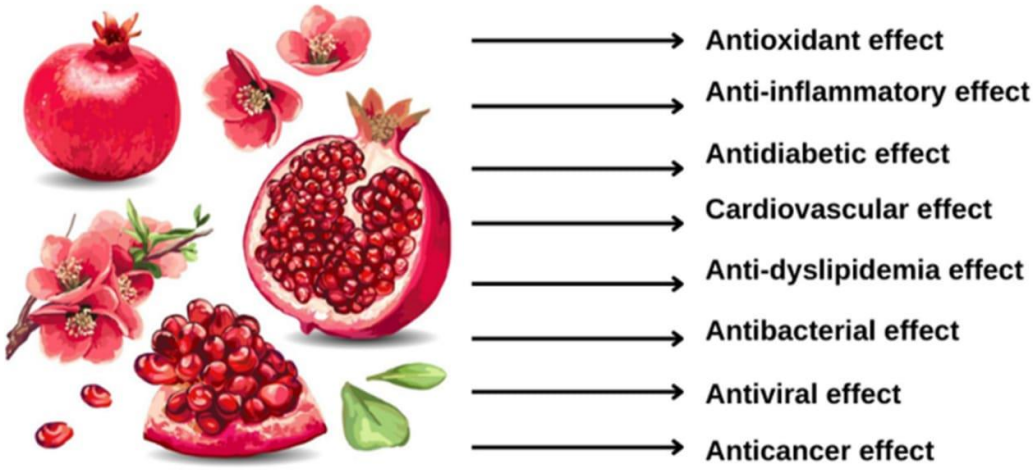

Fig. 1.7: Pharmacological Properties of pomegranate.

Packed with nutrients

Overall, pomegranates are low in calories and fat but high in fiber, vitamins, and minerals. Below is the nutrition for the arils in average pomegranate:

- **Calories**: 234
- **Protein**: 4.7 grams (g)
- **Fat**: 3.3 g
- **Carbohydrates**: 52 g

- **Fiber**: 11.3 g
- **Vitamin C**: 32% of the Daily Value (DV)
- **Folate**: 27% of the DV
- **Magnesium**: 8% of the DV
- **Phosphorus**: 8% of the DV
- **Potassium**: 13% of the DV

Keep in mind that the nutritional information for pomegranate and arils differs from that of pomegranate juice, which won't provide much fiber or vitamin C.

Rich in antioxidants

Antioxidants are substances that aid in shielding your body's cells from harm brought on by free radicals.

Excessive levels of free radicals can be detrimental and are linked to several chronic illnesses.

Antioxidants and polyphenolic chemicals, such as punicalagins, anthocyanins, and hydrolyzable tannins, are abundant in pomegranates. Consuming fruits like pomegranates, which are high in antioxidants, is a fantastic approach to promote general health and ward off illness.

May help keep inflammation at bay

Chronic inflammation can contribute Trusted Source to many conditions, including heart disease, type 2 diabetes, and cancer.

Trusted Source Eating pomegranates may help prevent the inflammation associated with these chronic conditions.

This is largely attributed to compounds called punicalagins, which have been shown to have antioxidant and anti-inflammatory properties.

While more research is needed, research shows that consuming pomegranate juice can reduce certain markers of inflammation.

May have anticancer properties

Pomegranate chemicals have been shown to have anti-cancer capabilities through research.

Pomegranate can decrease tumor growth in the early stages of liver cancer, according to study on animals.

Additionally, pomegranate extract may help prevent prostate cancer based on earlier study.

May offer heart health benefits

Pomegranates and other fruits high in polyphenolic chemicals have been shown to provide heart health benefits.

For instance, pomegranate juice consumption decreased the frequency and intensity of chest pain in individuals with heart disease as well as several indicators that point to a heart-healthy benefit.

Support urinary health

Studies on humans and in test tubes have revealed that pomegranate extract may help prevent kidney stones from forming.

In a 2014 study, it was discovered that pomegranate extract inhibited the mechanism linked to kidney stone recurrence in patients.

Furthermore, pomegranate extract has been shown in animal studies to help control blood levels of phosphates, calcium, and oxalates—all of which are frequently found in kidney stones.

May have antimicrobial properties

Compounds in pomegranates may aid in the battle against dangerous microbes.

For example, they might safeguard oral health by inhibiting the growth of microorganisms linked to tooth decay and bad breath.

May improve exercise endurance

Pomegranate polyphenols have the potential to improve exercise endurance.

Pomegranate extract lengthened the time to exhaustion and enhanced performance in experienced cyclists, according to a short research.

Supplementing with pomegranates may enhance muscle repair and endurance, according to additional study.

Further research is necessary as pomegranate juice has not been demonstrated to be beneficial for muscle rehabilitation following exercise.

Good for your brain

Antioxidants called ellagitannins, which are found in pomegranates, aid in lowering inflammation in the body.

According to certain research, ellagitannins may lessen oxidative damage and boost brain cell survival, which may help shield the brain against conditions like Parkinson's and Alzheimer's.

Ellagitannins are thought to generate urolithin A, a substance that has been researched for its potential to lessen brain inflammation and postpone the beginning of cognitive disorders. Urolithin A is produced in the gut.

Supports digestive health

Pomegranate consumption has the potential to improve gut microbiota health, which is important for numerous aspects of health.

Pomegranate has been shown in test-tube studies to boost the numbers of good gut flora, indicating potential prebiotic benefits.

Prebiotics promote a healthy gut microbiome by acting as fuel for the good bacteria in your stomach.

Pomegranate arils also contain a lot of fiber, which is good for the digestive system and can help prevent some digestive disorders.

ADVERSE EFFECT OF POMEGRANATE:

For millennia, pomegranates were used as a traditional Ayurvedic treatment. Particularly prized were their antimicrobial qualities. Many people use not just the fruits but also the plant's blossoms, peels, arils, and bark. Nevertheless, it's crucial to be aware of pomegranate adverse effects as well.

Pomegranates are generally thought to be safe, however some people may have negative side effects from them. These include problems during pregnancy, allergies, low blood pressure, and drug interactions.

Short-Term Effects

Nausea, vomiting, abdominal pain, diarrhea, itching, swelling, irritation in the throat, stomach pain, and hives.

Long-Term Effects

Pomegranate juice supplementation may reduce fetal abdominal and head circumference during pregnancy and cause fluctuations in blood pressure levels.

May Cause Allergies

Out of all the negative consequences of pomegranates, this is the most severe. Pomegranate allergies are uncommon, but they can be fatal. Please be cautious if you suspect an allergy.

These allergies cause mouth sores, stomach pains, throat irritation, itching, swelling, and hives. In extreme situations, breathing difficulties and shortness of breath, tongue and throat enlargement, and anaphylactic shock may occur.

Fig. 1.8

May Interact with Certain Drugs

Pomegranate might have unfavorable side effects and interact negatively with some drugs.

- Drugs such as amitriptyline (Elavil), desipramine (Norpramin), fluoxetine (Prozac), ondansetron (Zofran), tramadol (Ultram), rosuvastatin (Crestor), etc. are altered and metabolized by the liver.

- pharmaceuticals that treat high blood pressure, such as antihypertensive medications (Diovan, Cozaar, Cardizem, Lasix, etc.) and ACE inhibitors (Capoten, Vasotec, Prinivil, Altace, Zestril, etc.). Juice has the potential to drastically lower blood pressure, especially in people on antihypertensive medications.

Fig.1.9

Another paper states that pomegranates can block the activity of an enzyme crucial to medication metabolism.

May Lower Blood Pressure Way Too Much

Pomegranates have been shown in studies to reduce blood pressure. For most, this is good news. However, pomegranates should be avoided by those with low blood pressure in order to prevent blood pressure fluctuations.

This is one of the reasons pomegranates could be problematic during surgery. Therefore, cut back on pomegranate consumption at least two weeks before to a planned surgery.

Fig.1.10

May Cause Fetal Growth Restriction (FGR) During Pregnancy

While pomegranate juice may be safe, other pomegranate products (such as pomegranate extract) have not been thoroughly studied for safety. Therefore, if you're pregnant, keep with the juice. Pomegranate juice supplementation decreased fetal head and belly size, according to animal research.

Fig.1.11

May Cause Digestive Disorders

Regarding this, not enough information is available. Pomegranate overconsumption can result in a variety of conditions, including diarrhea, vomiting, nausea, and abdominal pain in certain individuals.

Ancestral data suggests that consuming this fruit in excess might likewise irritate the gastrointestinal tract.

Fig.1.12

MARKETED FORMULATION

Table 1.3: Marketed formulation of pomegranate.

Type	Brand Name	Company Name	Ingredients	Dose / Product	Prize
Pomegranate Juice 	POM Wonderful	Wonderful Company LLC	100% pomegranate juice	Available in various sizes (e.g., 8 oz, 16 oz, 32 oz)	₹ 414.33 to 662.91
Pomegranate Juice 	Lakewood Organic	Lakewood Organic Juices	Organic pomegranate juice	Typically available in 32 oz bottles	₹ 662.96 to 994.44
Pomegranate Juice 	RW Knudsen	The J.M. Smucker Company (parent company of RW Knudsen)	Pomegranate juice or blends with other fruits	Available in 32 oz bottles	₹ 414.35 to 662.96
Pomegranate Supplements 	Nature's Way	Nature's Way Products, LLC	Pomegranate extract (standardized for polyphenol content)	Capsules containing 250 mg to 500 mg of pomegranate extract	₹ 828.7 to 1657.4
Pomegranate Supplements	NOW Foods	NOW Health Group, Inc.	Pomegranate extract capsules or powders	Varies by product, typically 250 mg to 1000 mg per serving	₹ 828.7 to 2486.1
Pomegranate Skincare Products 	KORRES	KORRES Natural Products	Pomegranate extract, antioxidants, moisturizing agents	Cleansers, moisturizers, masks	Prices vary depending on product type and size.
Pomegranate Skincare Products 	Burt's Bees	Burt's Bees, Inc. (a subsidiary of Clorox)	Pomegranate extract, natural oils, beeswax	Facial creams, lip balms	Prices vary depending on product d size.
Pomegranate-Flavored Foods and Beverages	Bai	Bai Brands, LLC (a subsidiary of Dr Pepper Snapple Group)	Pomegranate flavoring, antioxidants	Antioxidant-infused beverages	Prices vary depending on packaging size.

					
Pomegranate-Flavored Foods and Beverages	Kind	Kind LLC	Pomegranate, nuts, seeds, sweeteners	Snack bars	Prices vary depending on packaging size and quantity.
Pomegranate-Flavored Foods and Beverages	Chobani	Chobani, LLC	Greek yogurt, pomegranate flavoring, fruit	Greek yogurt cups	Prices vary depending on packaging size and quantity
Pomegranate Tea 	TAZO	Unilever	Black tea, pomegranate flavoring	Tea bags or loose-leaf tea	Prices vary depending on packaging size and quantity.
Pomegranate Extract Capsules 	NOW Foods	NOW Health Group, Inc.	Pomegranate extract capsules or powders	Varies by product, typically 250 mg to 1000 mg per serving	Rs. 828.7 to 2486.1
Pomegranate Face Masks 	Origins	Origins Natural Resources, Inc. (a subsidiary of Estée Lauder Companies)	Pomegranate extract, antioxidants, moisturizers	Face masks	Prices vary depending on product type and size.
Pomegranate Salad Dressing 	Newman's Own	Newman's Own, Inc.	Pomegranate juice, vinegar, herbs	Salad dressings	Prices vary depending on bottle size.
Pomegranate Scented Candles 	Yankee Candle	The Yankee Candle Company, Inc.	Scented wax, pomegranate fragrance	Scented candles	Prices vary depending on candle size and type.
Pomegranate Lip Balm 	EOS	Evolution of Smooth, LLC	Pomegranate extract, natural oils, shea butter	Lip balms	Prices vary depending on packaging size.

HOME REMEDIES

1. Give youngsters who are coughing a half-cup of pomegranate juice together with a pinch of pippali powder and ginger powder.
2. Try combining 1/3 cup of pomegranate juice, 1 tsp organic sugar, and ½ tsp shredded fresh ginger once or twice a day to treat nausea and vomiting.
3. If you notice blood or mucus in your stools, try drinking ½ cup of pomegranate juice twice or three times a day along with a pinch of clove powder and two pinches of ginger powder.
4. Put two drops of pomegranate juice in each nostril to stop a nosebleed.
5. Drink one cup of pomegranate juice, half a cup of grape juice, one tsp organic sugar, and a teaspoon of ginger powder to combat dehydration.
6. For anemia drink a cup of pomegranate juice daily in the morning. Or add 2 tsp of dried pomegranate seed powder to a glass of warm milk and drink it once or twice a day.

CONCLUSION

The pomegranate tree is one of the most valuable medicinal plants for pharmaceutical, industrial, and commercial applications. It is also edible and can be used to make a variety of products, such as juices, drinks, food items like jam and salad dressings, and cosmetics like shampoo and bath soap. P. granatum is used and treated differently in different parts of the world. P. granatum is a long-used tree species with medicinal, therapeutic, and pharmacological qualities that originated in the Mediterranean region. P. granatum has been used to treat intestinal issues, dandruff, colds, ulcers, and cardiovascular illnesses. A growing body of research indicates that P. granatum and its active ingredients hold promise for the management, prevention, and treatment of bacterial, fungal, and viral infections as well as obesity, diabetes, liver fibrosis, inflammation, and cancer. It has been demonstrated that pomegranates contain phytochemicals with potential pharmacological and toxicological effects. However, many of these compounds have pharmacological and toxicological effects that are still unclear in terms of their precise mechanisms and effects. These days, a lot of research is being done all over the world on the use of herbal products or medicinal plants due to their effectiveness and safety in the prevention and/or treatment of various chronic diseases. Over the past ten years, India has emerged as the world's largest pomegranate grower and exporter.

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