



Review Article

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WHY IS PEAR SO DEAR

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ABSTRACT

Nature has blessed us with superb flora and fauna, which has made our life lovely. One of these wonders is Pear fruit. Pear is a gently sweet and juicy fruit with buttery texture. In Sanskrit, it is named as 'Amritphale' because of its immense potential in human health care. Pear is distributed in temperate regions all over the world. Pear makes an excellent dietary supplement being rich in minerals, nutrients and vitamins. Pear has unique phyto-constituents, which have numerous medicinal properties. Arbutin present in Pear acts as a skin whitening agent and is used in cosmetic preparations. Consumption of Pear on daily basis prevents the danger of uterine cancer especially in menopausal women. Pear has good wound healing property. Eating a Pear before a big drinking session can significantly reduce your blood alcohol level and hangover symptoms. Pear influences certain enzymes in our body in such a way that alcohol is metabolized quickly. Pears maintain pH level of the body. Its boron content helps the body to retain calcium, which in turn retards osteoporosis. It is also used as an energy drink and has properties like hypolipidemic, anti-oxidant, sedative, anti-inflammatory, hepato-protective, anti-bacterial, urodisinfectant, analgesic, spasmolytic, anti-diabetic and anti-pyretic. It is recommended for weaning babies as it is not too harsh on a baby's digestive system. This versatile fruit has several cuisines as well as cosmetic uses. The objective of this review article is to summarize the nutritional value, health benefits, phytochemical composition, pharmacological actions and medicinal properties of Pear.

Key Words: Pear, *Pyrus communis*, Whitening agent, Anti-oxidant, Anti-inflammatory.

INTRODUCTION

Nature has blessed us with a wonderful flora and fauna, which has made our life lovely. In our previous article, we discussed at length, medicinal properties of chickoo¹ and sweet potato². One of these wonders is Pear fruit. Pear is a gently sweet juicy fruit with glitter and buttery texture. It holds 2nd rank after apple in nutrition amongst cultivated fruits. Ancient Greek poet Homer narrated Pears as one of the 'gifts of God'. Pear belongs to dicotyledonous plant species of genus *pyrus*, (family Rosaceae). In Sanskrit, it is named as 'Amritphale' because of its immense potential in human health care³. Its varieties are widely distributed all over the world, which may be 'stiff-' (Nashpati) or 'soft' (Babbu-ghosh). Pears can be classified in to three categories based upon their origin and commercial production viz. i) European Pear (*Pyrus communis* L.), ii) Japanese Pear (*P. pyrifolia* Burm.) and iii) Chinese Pear (*P. bretschneideri* Rehd. and *P. ussuriensis* Maxim)³. Each part of Pear tree has high nutritional value and possesses multiple medicinal properties such as anti-inflammatory, sedative, anti-pyretic, anti-oxidant⁴, hypolipidemic, hypoglycaemic, anti-aging, analgesic, spasmolytic, anti-tussive, anti-diarrheal, wound healing⁵, anti-microbial⁶ and hepato-protective. Pear contains arbutin, which is an excellent skin-whitening agent used in several cosmetic preparations. Pear wood is one of the dearly materials used in the manufacture of high-quality woodwind instruments and furniture. Thus, Pear tree is available for welfare of the society.

Geographical Distribution³

Pear is distributed in temperate regions all over the world.

World scenario: Pears are cultivated in China, USA, Argentina, Italy, Turkey, Spain, India, South Africa, Belgium, Japan etc.

Indian Scenario: It is widely cultivated in different states of India such as Punjab, Himachal Pradesh, Uttar Pradesh, Uttara-Khand, Jammu- Kashmir etc.

Table 1: Taxonomical Classification of Pear

Kingdom	Plantae
Division	Magnoliophyta
Class	Magnoliopsida
Order	Rosales
Family	Rosaceae
Subfamily	Amygdaloideae
Tribe	Maleae
Sub-tribe	Malinae
Genus	<i>Pyrus</i> L.
Species	<i>communis</i> Linn.

Table 2: Indian Synonyms of Pear

Name	Language	State/Region
Perikai	Tamil	Tamilnadu
Berikkai	Kannada	Karnataka
Sabariil	Malayalam	Kerala
Berikkai	Telugu	Andhra Pradesh
Babbu-ghosha	Hindi	Punjab, Himachal Pradesh, Haryana, Uttar Pradesh
Amritphala	Sanskrit	Haryana, Maharashtra

History

Pears are some of the oldest fruits in existence. According to the Nanjing Agricultural University, China, Pears most probably originated during the tertiary period, approximately 65 to 55 million years ago. The origin of Pear is so mysterious that it is very difficult to guess precisely from where wild Pear

originated. In 50-120 A.D., Plutarch, a Greek historian and biographer observed that wild Pear was used like a ball for playing during festivals by young boys, who like to be called as Ballachrades (Ballo, I throw; achras, a wild Pear). Before Christian era, Homer made a mention of Pear in his poem, grew in Alcinous's (Greek philosopher) garden, which looked like paradise of trees, so he called it as "gift of the Gods". In Greek mythology, Pear was sacred to two goddesses Hera (goddess of women and marriage) and Aphrodite (goddess of love, desire and beauty). Before the Christian era, the Pear was cultivated in ancient Rome and was sacred to goddesses Venus (Roman counterpart to the Greek Aphrodite) and Juno (Roman version of the Greek Hera). In 1134 B.C, Pears were cultivated in China and sharing of Pear was considered as bad luck because it was believed that separation of friends or lovers would take place. The word 'li' (pear) meant separation also. Gifting of fruit on 15th of July (hungry ghost festival) was treated as appeasing of ghost and spirits. In Italy, Pear was sacred to goddess Pomona (goddess of fruit tree, orchard, fertility and long life), whose throne was made of Pears. Charlemagne, who ruled France in 9th century, cultivated Pear in his orchards and established the first notable landmark in the history of Pear. This early history of the Pear in France was repeated step by step in Belgium. Pear-breeding began in Belgium about 1730, when Nicolas Hardenpont, 1705-1774 a priest in his native town of Mons, made sowing of a large Pear seed with a view of obtaining new Pears of superior quality. In 1630, Endicott, first governor of the Massachusetts Bay Colony, planted one of the first fruit trees of Pear cultivated in America, as his children watched on. This tree is still alive and has age of 383 yrs. In 1826, the catalog of the Horticultural Society of London listed 622 pears. In Asia, cultivation of Pears began over 2500 years ago. In Japan, Pear seeds were dating from 200-300 years. Le Lecier, an attorney of the king at Orleans described 254 Pears in 1628, Merlet described 197 Pears in 1667, La Quintinye described 67 Pears in 1690, Duhamel described 119 Pears in 1768, Chartreuse fathers described 102 Pears in 1775, Tollard described 120 Pears in 1851, Noiestte described 238 Pears in 1833 and Leroy described 900 Pears in 1867. Now-a-days, we can produce Pears that look exactly like fat little 'Buddha', complete with folded arms, plump tummies, and meditative smiles.

Cultivation and Collection

The Pear tree is widely farmed in temperate regions. Pears requiring chilling conditions are cultivated in plains of North India. Cultivars requiring high chilling hours (900-1000) are cultivated at higher hills of Jammu and Kashmir, Himachal Pradesh and Uttara-Khand. Pear tree needs 2-4 years to get the fruit. Pears take 3- 5 months for ripping to full bloom. The age of a Pear tree is up to 75 years. India's Pear season ranges from late summer to early winter.

Sand

Pear tree prefers deep well drained loam soils with pH less than 8.5. Alkaline soil is unfit for cultivation. High pH soils show iron chlorosis and zinc deficiencies in Pear plants.

Climate

Pears can be grown successfully at 1200 to 1800 meters above sea level. Pears can tolerate both low temperatures below 0°C and can withstand high temperatures of summer (47°C). Best temperature for flowering and fruiting is 2°C in winter and 32°C in summers.

Rainfall

100-125 cm of rainfall is sufficient for good growth of Pears.

Sun exposure

Pear fruit needs full sun exposure for growth.

Bloom time

Pear fruits bloom during summer and fall time.

Table 3: Botanical Description of Pear

Tree height	13m
Trunk colour	Grey
Leaves	Ovate, 10cm, bright green
Flower	White or rosy, 1.5 cm wide
Fruit	White pulp, Juicy, Edible pome

Pharmacological Actions

Anti-microbial activity

Fresh Pear juice and aqueous extract of leaves show anti-bacterial activity against *Staphylococcus* and *E.coli* because of the presence of phytoconstituent arbutin (bacteriostatic), which gets further, converted into hydroquinone in body^{3, 6}. This hydroquinone also possesses anti-bacterial activity, boosts biochemical processes and operates defence mechanisms against bacteria invasion. Aqueous extract of young shoots of Pear show anti-bacterial activity as it contains hydroquinone⁷. Ethyl acetate extract shows strongest anti-bacterial activity than other extracts.

Anti-oxidant activity

Pear is a rich source of vitamin C, quercetrin and copper, which protect cells from damage by free radicals. Fruits⁴ (phloridzin, chlorogenic acid and quercetin), leaves (quercetin, coumarin and chlorogenic acid), root barks (phloridzin) and flowers (chlorogenic acid) of Pear tree help in destroying reactive oxygen species thereby acting as an anti-oxidant.

Anti-cancer activity

Consumption of Pear on regular basis prevents the danger of bladder⁸, lungs⁹ and oesophageal cancer¹⁰. Pears contain urosolic acid that inhibits aromatase activity thereby preventing cancer. Isoquercitrin present in fruit maintains DNA integrity. Thus, consumption of Pear on daily basis prevents the danger of cancer, especially in menopausal women.

Cholesterol lowering activity

Pears have high content of pectin, which lowers down levels of LDL, triglycerides and VLDL thereby reducing risk of high cholesterol¹¹.

Anti-inflammatory action

Pears can be useful in treating inflammation of mucous membranes, colon, chronic gall-bladder disorders, arthritis and gout. Carotene, zeaxanthin and vitamin C are nutrients present abundantly in Pear, which lower the concentration of inflammation - causing C-reactive proteins.

Anti-diabetic activity

The fruit contains high amount of fiber, which maintains blood glucose levels in diabetics¹¹. Furthermore, levulose, low fructose and low sucrose fruit sugars are well tolerated by diabetic patients.

Skin- whitening effect

Pear contains arbutin, which decreases melanin in the skin and acts as a natural skin whitening agent³.

Wound healing effect

Pear has also been shown to be efficacious in speeding up the healing process for various types of wounds. It actually aids in several steps of the healing process. Astringent tannins constrict wounds. Vitamin C, an antioxidant, stimulates the production of collagen, the primary structural protein in skin. The presence of phytoconstituent arbutin (bacteriostatic) helps in curtailing the risk of wound infection⁵.

Bone health

Pears maintain pH level of the body. Its boron content helps the body to retain calcium, which in turn retards osteoporosis.

Constipation

Pear is a gentle laxative due to its pectin content. Drinking Pear juice regularly helps regulate bowel movements. Pectin is a type of fibre that binds to fatty substances in the digestive tract and promotes their elimination. Pear may produce gastric upset, stomach pain and diarrhoea in individuals suffering from irritable bowel disorders.

Immune- booster

The anti-oxidant nutrients of Pears are critical in building up your immune system. Pear juice shows mild anti-pyretic effect due to its cooling property³.

Pregnancy

Pear contains high amount of folate, which prevents neural tube defects in infants.

Cardiovascular disease

Pears prevent high blood pressure, stroke and thus, help in curing cardiovascular disorders.

Respiratory diseases

The summer heat may cause children to have shortness of breath with excessive phlegm. Drinking of Pear juice during summers helps in clearing the phlegm. It reduces vocal cord inflammation, nourishes the throat and helps prevent throat problems.

Action on urinary system

Arbutin present in Pear helps in relieving urinary infections and extract of leaves act as urodisinfectant¹².

Weight loss

Pectin is a type of fibre that binds to fatty substances in the digestive tract and promotes their elimination. Thus, Pear helps in reducing body weight¹³.

Table 4: Medicinal Uses of Pear

Sr.	Medicinal uses	Plant Parts	References
1.	Anti-microbial	Fruit, leaf, Shoot	6,7
2.	Anti-inflammatory (Wound healing)	Leaf, Flower, Bark, Root, Fruit	4
3.	Hypoglycaemic	Fruit	11
4.	Anti-oxidant	Fruit	3
5.	Anti-radical	Leaf	14
6.	Hypolipidemic	Fruit	11
7.	Anti-aging	Fruit	15
8.	Urinary therapeutics	Fruit, Leaf	12
9.	Skin whitening	Fruit	3
10.	Analgesic	Flower	3,12
11.	Spasmolytic	Flower	3,12
12.	Anti-tussive	Fruit	12
13.	Anti-pyretic	Fruit	3,12
14.	Astringent	Leaf, Bark	12
15.	Sedative	Fruit	3
16.	Anti-cancer	Fruit	8,9,10

Traditional Uses

Pear is a fruit blessed with several nutritional values, hence serves as a useful energy drink. It is being used in the treatment of various diseases from ancient time. Pear maintains folic acid levels during pregnancy and prevents development of birth defects in babies. Pear is recommended for weaning babies, which aren't too harsh on a baby's digestive system. Pear is useful in dysmenorrhea, when taken regularly¹². Low sugar content and high pectin levels make Pear suitable for diabetic patients. Pears were used as a natural remedy against nausea in ancient Greece. It maintains acid balance in body. Pear juice is an immune booster. Obese people prefer it in reducing body weight¹². Pear is a powerful cardio-protective fruit as it lowers high blood pressure. Pear also possesses promising neuro-protective properties thereby preventing the development of neurodegenerative diseases such as Parkinsonism, Huntington's disease and Alzheimer's disease. Pears are used in preventing constipation as they contain a lot of fiber, which is essential for a healthy digestive system. It is useful in fever due to its cooling property. Pear juice nourishes the throat and helps in preventing shortness of breath during hot days. Pear is preferred by persons, who are allergic to wheat or other foods. Regular consumption of Pear lowers the risk of age-related macular degeneration, which is the main cause of vision loss in older adults.

Cosmetic uses of pear

Pear for Skin

Pear contains such nutrients, which are beneficial for skin. It can be added in diet or various face-packs and hair packs. Pear is useful in treating oily skin. It helps in removing acne. It keeps skin moisturized for long. Pear is an effective natural scrub. It is good for lips. It facilitates wrinkle – free skin. Pear also improves the tone of skin.

Pear for Hair

Pear consumption on daily basis helps in nourishing hair and keeps them healthy. Pear hair- packs aid in taming curly hairs. These hair-packs help in reducing dryness of hair and restore the hair shine.

Miscellaneous Uses

Pear wood is one of the preferred materials in the manufacture of high-quality wood-wind instruments and furniture. Pear tree is used for wood carving, and as firewood to produce aromatic smoke required for smoking meat or tobacco. Pear wood is appreciated in kitchen because the spoons, scoops and stirrers made out of Pear woods do not contaminate food with colour, flavour or smell, and resists warping and splintering. Pear wood is applied for making of brush backs, umbrella handles, recorders, violin, guitar fingerboards, piano keys, engineering instruments such as set squares and T-squares and decorative

veneering. Pear wood is the favoured wood for architect's rulers because it does not warp. Pears work well in a variety of savoury and sweet dishes, and they are exceptionally versatile on account of their ability to withstand high temperatures. Beautiful jellies and jams can be prepared out of Pear juice. Pear is also used in making of dyes. Pear juice is utilized in making wine known as 'Perry'.

Cuisine Uses

There are lots of ways in which Pear can be used in cooking. This versatile fruit can be eaten raw, used in salads, canned, pureed, poached or baked. It can also be made into jellies and jams. Perry is an alcoholic beverage made from fermented pears.

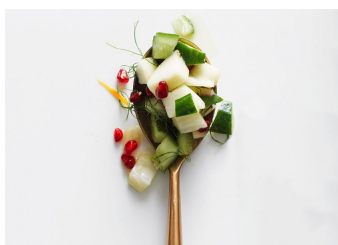
Strange Facts

Pears were given the nickname "butter fruit" in 17th century because of their soft and buttery texture. Eating Pear before a big drinking session can significantly reduce your blood alcohol level and hangover symptoms. The skin of Pear contains at least three to four times as many phenolic phytonutrients as that of flesh. Pear never ripens on the tree, but it ripens off the tree. Pears will ripen quicker if you place them by the side of bananas but its life span would be enhanced, when placed in refrigerator. The Chinese considered Pear, which they call "li", to be a

symbol of immortality. The destruction of Pear tree symbolized tragic or untimely death. In China, fen li means both "to share a Pear" and "to separate". Therefore, it is considered bad luck to share a Pear, because it may lead to separation of friends or lovers. The long-lived Pear trees symbolize long life and good fortune in China. Before tobacco was introduced in Europe, Pear leaves were smoked.

Pear before beer

Remember, the best way not to get alcohol hangover is not to drink in the first place. Australia's National Science Agency, CSIRO, has reported that eating an Asian Pear before a big drinking session can significantly reduce your blood alcohol level and hangover symptoms¹⁶. Another study reported that consuming 220ml of Pear juice (equivalent to one whole pear) can reduce blood alcohol levels to the extent of 20 % and bring down hangover symptoms such as amnesia, difficulty in concentrating, sensitivity to light and sound by decreasing the blood concentration of acetaldehyde (the toxic metabolite of alcohol). Pear influences certain enzymes in our body in such a way that alcohol is metabolized quickly. On the other hand, there is no evidence showing beneficial effects of Pear after drinking bouts.¹⁶



Pear – Salad



Pear never ripens on the tree, but it ripens off the tree

Table 5: International Synonyms of Pear

Sr.	Name	Language	Country
1.	Peer	Afrikaans	North and South Africa
2.	Tanj	Armenian	Armenia
3.	Peara	Aromanian	Southern Balkans
4.	Armud	Azeri	South Caucasus
5.	Min nan , salei, belie	Chinese	China
6.	Peren	Cornish	United Kingdom
7.	Païra	Dalmatian	Dalmatia
8.	Peer	Dutch	Belgium
9.	Pear	English	USA
10.	Piro	Esperanto	East Asia, South America
11.	Pirn	Estonian	Estonia
12.	Pera	Faroese	Denmark
13.	Poire	French	France
14.	Mxali	Georgian	Georgia
15.	Birne	German	Germany
16.	Achladi , apidi , apion	Greek	Greece
17.	Babbu-gosha	Hindi, Punjabi	India
18.	Pera	Icelandic	Iceland
19.	Pera	Italian	Italy
20.	Nashi	Japanese	Japan
21.	Paithe	Norman	Canada, Ireland
22.	Seoyangbae, bae	Korean	Korea
23.	Poara	Malagasy	Madagascar
24.	Pea	Maori	New Zealand
25.	Peer	Scots	Scotland
26.	Pear	Spanish	Argentina, Spain
27.	Anbarani , asalemi, masali	Talysh	Iran
28.	Armut , grusa	Tatar	Russia
29.	Armut	Turkish	Turkey, Cyprus

Table 6: Phytoconstituents of Pear¹⁷⁻²⁰

Sr.	Phytoconstituents	Plant Part
1.	Glycosides Arbutin, Quercetin, Isorhamnetin Kaempferol, 3,5- dicateoylquinic acid, Astragalin and Pyroside	Leaf, Fruit Leaf
2.	Vitamins Vitamin A, Retinol, Vitamin C, Vitamin E, Vitamin K, Vitamin B12 (folate), Vitamin B3 (niacin), Choline, Betaine and Vitamin B5 (pantothenic acid)	Fruit
3.	Minerals Sodium, Potassium, Magnesium, Calcium, Phosphorous, Copper, Iron, Zinc, Manganese, Selenium and Fluoride	Seed, Fruit
4.	Flavonoids Quercetin 3-O-β-D glucopyranoside, Kaempferol 3-O-β-D (6"-O-α-L-rhamnopyranosyl)-glucopyranoside and Querce 3-O-β-D-(6"-O-α-L-rhamnopyranosyl)-glucopyranoside Phloridzin	Fruit, Flower Root bark
5.	Alkaloids	Fruit
6.	Sterol β- sitosterol, Saccharostenon	Flower
7.	Phenolic acid- Chlorogenic acid, Gallic acid	Leaf, Flower, fruit
8.	Anthocyanins	Fruit
9.	Tannins	Leaf, Fruit
10.	Coumarin	Leaf
11.	Carbohydrate	Seed, Fruit
12.	Polyphenol oxidase	Fruit
13.	Triterpenes α-amyryn Ursolic acid Friedelin, Epifeiedelanol	Flower, Stem bark Leaf Bark
14.	Lipid	Seed, Fruit
15.	Fatty acid Stearic acid, Palmitic acid and Arachidic acid	Flower

Table 7: Amino Acid Content of Pear for Edible Portion²¹

Amino acids	Value per 100 grams
Threonine	2.12g
Isolucine	3.18g
Leucine	4.98g
Lysine	3.28g
Methionine	0.72g
Cystine	0.56g
Phenylalanine	3.13g
Tyrosine	0.34g
Valine	3.02g
Arginine	3.09g
Histidine	2.87g
Alanine	2.71g
Aspartic acid	5.79g
Glutamic acid	6.58g
Glycine	2.81g
Serine	1.77g

CONCLUSION

Nature has blessed us with superb flora and fauna, which has made our life lovely. One of these wonders is Pear fruit. In this review article, we have made humble attempt to summarize the nutritional value, health benefits, phytochemical composition, pharmacological actions and medicinal properties of Pear. Pear is a juicy fruit with gently sweet taste. It serves as an economical package of health care. Pear is a treasure of nutrients, minerals and vitamins, which make it a sound dietary supplement. Eating a pear before a big drinking session can significantly reduce your blood alcohol level. Pear juice is an excellent remedy for reducing hangover symptoms as Pear decreases the blood concentration of acetaldehyde, the toxic metabolite of alcohol. Pear has numerous medicinal properties such as hypolipidemic, anti-oxidant, sedative, anti-inflammatory, anti-cancer, wound

healing, anti-bacterial, urodisinfectant, analgesic, spasmolytic, hepato-protective, anti-diabetic and anti-pyretic property. Pear is not only beneficial in maintaining wrinkle free skin, shine of the skin, but also useful in acne. Pear maintains folic acid level during pregnancy and prevents development of birth defects in babies. As pear has low acid content, it is recommended for weaning babies, because they aren't too harsh on a baby's digestive system. Pear provides energy to the body and boosts up immune system. We can say pear is a versatile fruit, which has multi-faceted uses such as medicinal uses, cosmetic uses as well as cuisine uses. Pear being inexpensive is within the reach of poor people and brings about huge health benefits.

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