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# Ethnomedicinal and Phytochemical Perspectives of *Pyrus communis* Linn.

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Ethnomedicinal implies the usage of medicinal plants used by a group of people on account of their traditional knowledge and phytochemical means the individual chemical that plant contains. This review involves the ethnomedicinal and phytochemical perspectives of *Pyrus communis* Linn. In the “The Indian Materia Medica”, the common pear or gabbu gosha is considered as ‘Amritphale’ because of its immense potential in human health care system. Various phenolic glucoside compounds have been isolated and identified from *Pyrus communis* Linn. e.g. arbutin, quercetin, kaempferol, fredielin, sterols, isoquercitrin, ursolic acid, sorbitol, astragalin, phloridzin and various tannins responsible for different activities viz. in urinary therapeutics, as skin whitening agent, anti-inflammatory, antioxidant, antibacterial, analgesic, astringent, spasmolytic. It is also used in diabetes because of low sucrose content.

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**Keyword:** *Pyrus communis*, phenolics, antioxidant.

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### 1. Introduction

Ancient Greek poet Homer described Pears as one of the ‘gifts of God’. This prehistoric fruit has been under cultivation both in Europe and Asia for long times, also known as European Pear<sup>[1]</sup> Sand pear (Japanese and Chinese species) has been domesticated as edible fruit and cultivated in Asia for more than 3000 years<sup>[2]</sup>. Advances in pear culture and varietal improvement were brought only in the 18th century. In Asia, China and Japan are the leading pear growing countries where its cultivation remained in a semi-wild state for a long time. In the 17<sup>th</sup> century, Le Lectier described 254 different varieties and in the 19<sup>th</sup> century, the French Pomologist Leroy recorded 900 varieties<sup>[1]</sup>. It was during the 18<sup>th</sup> and 19<sup>th</sup> century when genus *Pyrus* was classified into more than

20 primary diploid species distributed over Europe and Asia<sup>[3,4]</sup> and at least six naturally occurring interspecific hybrids<sup>[5]</sup>. Among known species of pear, it is classified into three main groups on the basis of origin and commercial fruit production, such as European pear (*Pyrus communis* L.), Japanese pear (*P. pyrifolia* Burm.) and Chinese pear (*P. bretschneideri* Rehd. and *P. ussuriensis* Maxim). Later on, classification is done on the basis of the genus into two native groups, i.e. Occidental and Oriental pears<sup>[3,6]</sup>. The occidental pears include over 20 species mostly found in Europe, Northern Africa, Asia Minor, Iran and Central Asia. The oriental pears include 12 to 15 species distributed from the Tian-Shan and Hindu Kush mountains eastward to Japan<sup>[7]</sup>. Oriental pears are divided into five groups i.e., Japanese pear, Chinese white pear, Chinese sand

pear, Xinjiang pear (*P. sinkiangensis* Yu) and Ussurian pear<sup>[8]</sup>. Among occidental pears, *P. communis* (the common pear) is the major cultivated species widely distributed throughout the Europe, North & South America and Africa<sup>[9]</sup>.

### 1.1 Origin and distribution

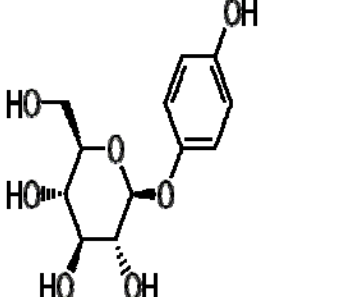
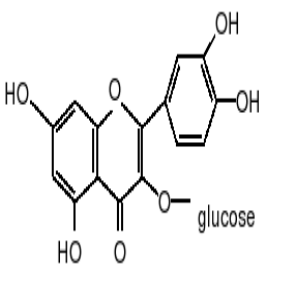
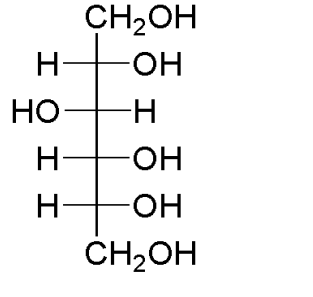
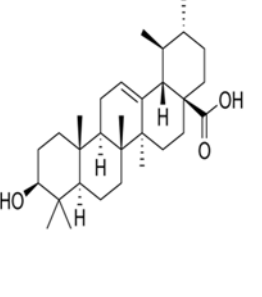
The genus *Pyrus* has probably originated in Central Asia, the mountainous regions of western and southern China, from Asia Minor to India and further diversified and moved both in eastern and western directions from primary center of origin<sup>[10]</sup>. Speciation has occurred mainly in eastern and central Asia in the Himalayas, Caucasus, Asia Minor and Eastern Europe. Distribution of wild species of *Pyrus* extends from the Balkans in Europe, through Caucasus, Turkmenistan, Altai Mountains, Siberia to China and Japan<sup>[11,12,13]</sup>. Some species of this genus although naturalized in America but America is not a native home of this genus<sup>[14]</sup>. It is documented that 80% of the world population has faith in traditional medicines, particularly plant drug for their primary health care. The therapeutic efficiency of many indigenous plants for various diseases has been described by traditional herbal medicine practitioners. Medicinal plants are source of bioactive compounds and are of great value for developing some novel therapeutic agents. Due to this tremendous potential they offered new drugs against diseases that affect the health of mankind. In India, local empirical knowledge about medicinal properties of plants is the basis for their uses as a home remedies. It is generally accepted by many Indians and elsewhere in the world that

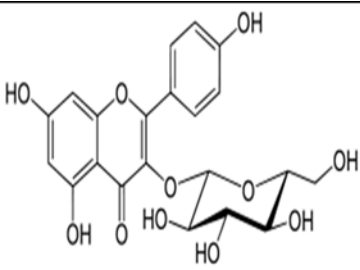
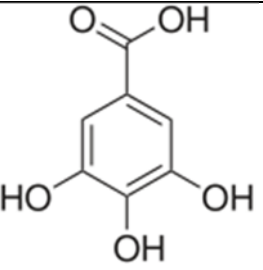
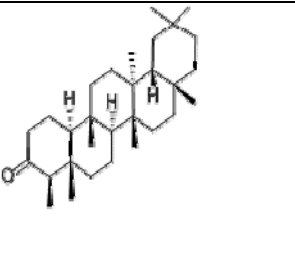
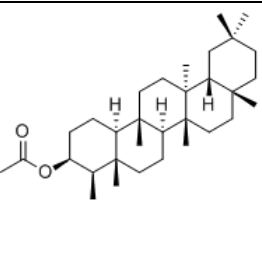
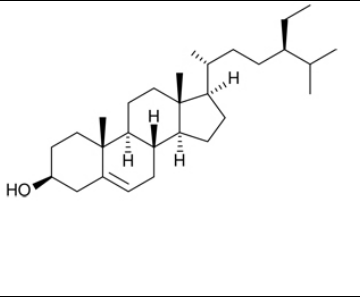
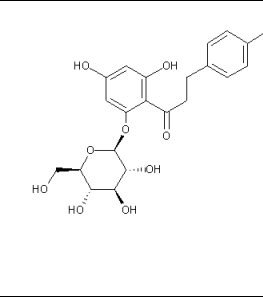
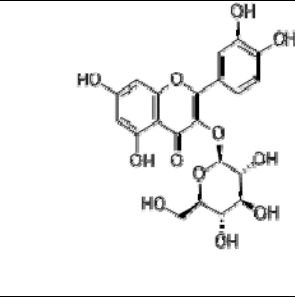
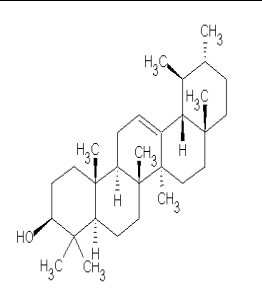
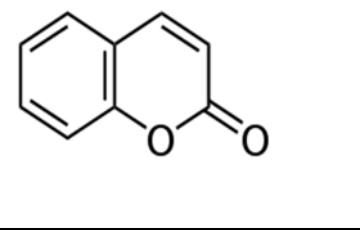
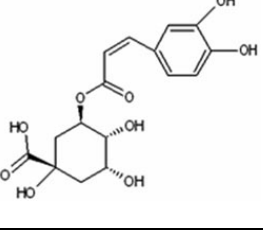
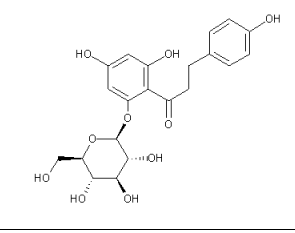
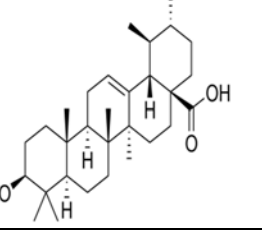
medicinal beneficial effects can be obtained by ingesting plant products. Plants have been the basis of many traditional medicines throughout the world for thousands of years continues to provide new remedies to mankind. Pharmacognosy is simple and reliable tool, by which complete information of the crude drugs can be obtained<sup>[15]</sup>.

The pharmacological treatment of diseases began long ago with the use of herbs. Methods of folk healing throughout the world commonly used herbs as part of their tradition. Ayurveda is a medical system primarily practiced in India that has been known for nearly 5000 years. It includes diet and herbal remedies, while emphasizing the body, mind and spirit in disease prevention and treatment.

The tribal and rural populations of India largely depend on medicinal plants for their health care as well as for their livestock. This attracted the attention of several botanists that lead to an array of reports on ethno medicine. Medicinal plants are the main sources of chemical substances with potential therapeutic effects. The use of medicinal plants for the treatment of many diseases is associated with folk medicine from different parts of the world<sup>[16-20]</sup>.

The Common or European Pear, *Pyrus communis*, is a species of pear native to Central and Eastern Europe and southwest Asia. The European Pear is one of the most important fruits of temperate regions, being the species from which most orchard pear cultivars grown in Europe, North America and Australia have been developed.

|   |   |  |   |
|---|---|--|---|
|  |  |  |  |
| Arbutin   | Isoquercitrin   | Sorbitol   | Ursolic acid  |

|  |  |   |  |
|--|--|---|--|
|   |   |   |   |
| Astragalin   | Gallic acid  | Friedelin   | Epifriedelanol   |
|   |   |   |   |
| Beta-sitosterol  | Phloridzin   | Quercetin<br>3-O-β-D-<br>glucopyranoside  | α-amyrin   |
|  |  |  |  |
| Coumarins  | Chlorogenic acid   | Phloridzin  | Ursolic acid   |

Pear (*Pyrus communis* L.) are among the most economically important fruit tree crops of the temperate zones<sup>[21]</sup>.



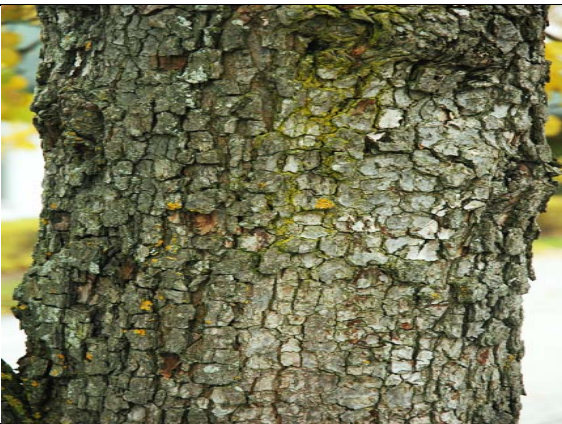


It belongs to family Rosaceae. Its habitat is distributed in the temperate regions of Europe and West Asia. Folk name is Bagu-goshaa or Naakh. Its fruits are good source of pectin, help in maintaining desirable acid balance in the body. Recommended to patients suffering from diabetes because of low sucrose content; and included in low antigen content diets to alleviate the symptoms in the management of immune-mediated disease. It contains phenolic compounds, related to diseases resistance<sup>[19]</sup>. Fresh pear juice exhibited good activity against *Escherichia coli*. An aqueous extract of the leaves was active against some strains of *E. coli*. The leaves contain arbutin, isoquercitrin, sorbitol, ursolic acid, astragalins and tannin. The bark contains friedelin, epifriedelanol and beta-sitosterol. Phloridzin is present in the root

bark<sup>[28]</sup>. The plant extract controls the development of freckles and blemishes on the skin and prevents melanin formation. It finds application in skin lightening. Pears are divided into European pears, which combine a buttery juicy texture with rich flavour and aroma, and Asian pears, which are characterized by a crisp texture and sweet but subacid flavour. European pears are considered to cultivars of *Pyrus communis*, whereas Asian cultivars are derived from *Pyrus pyrifolia*. More than 300 volatile compounds have been identified in pears, including hydrocarbons, aldehydes, alcohols, esters, ketones and sulfur compounds. Methyl to hexyl esters of decadienoate are the characteristic compounds of the European pear. Other volatile esters e.g. hexyl acetate, 2-methylpropyl acetate, butyl acetate, butyl butanoate, pentyl acetate, and ethyl hexanoate also possess strong pear-like aromas. Ethyl octanoate and ethyl (E)-2-octenoate contribute with floral sweet or fruity

odours in pears. Pears with a high concentration of 2, 4-decadienoates in the fruit flesh are more accepted by consumers than those with low content. The acetate ester concentrations increase

in La France pears during maturation, butyl acetate and hexyl acetate being the major ester components in the volatile compound profile<sup>[25]</sup>.

### 1.2 Taxonomy of *Pyrus communis*

|  |  |
|--|--|
| <p>Botanical name: <i>Pyrus communis</i> Linn.<br/>                 Common name: Common Pear<br/>                 Hindi name: Babbu-goshaa<br/>                 Sanskrit name: Amritphale<br/>                 Kingdom: Plantae<br/>                 Division: Magnoliophyta<br/>                 Class: Magnoliopsida<br/>                 Order: Rosales<br/>                 Family: Rosaceae<br/>                 Genus: <i>Pyrus</i> L.<br/>                 Species: <i>Communis</i> Linn.</p> |    |
|    |   |
|   |  |
| <p style="text-align: center;"><b>Flowers</b></p>  | <p style="text-align: center;"><b>Fruits</b></p>                                     |
| <p style="text-align: center;"><b>Seeds</b></p>  | <p style="text-align: center;"><b>Bark</b></p>                                       |
| <p style="text-align: center;"><b>Leaves</b></p>   | <p style="text-align: center;"><b>Seeds</b></p>                                      |

**1.2.1 Habitat:** Distributed in the temperate regions of Europe and West Asia grown in Punjab, Himachal Pradesh and Kashmir.

ovate leaves and white or rosy flowers. The fruit is an edible pome.

**Part used:** Whole plant<sup>[21,24,28]</sup>.

**1.3 Description:** Deciduous tree of the rose family growing to 13 meters in height. It has

### 1.4 Ethnomedicinal Data

*Pyrus communis* Linn. also known as Amritphale has astringent, sedative activity and act as

febrifuge. Its leaves and bark can be used in wound healing and thus also acts as anti-inflammatory. Leaves, buds, and bark of the tree are domestic remedies among the Arabs on account of their astringent action<sup>[28]</sup>. Pear is a rich source of Vitamin C, ascorbic acid and it is an antioxidant. It acts against reactive Oxygen species<sup>[16,17]</sup>. Arbutin is commonly used in urinary therapeutics and as a human skin whitening agent. It decreases melanin in the skin. In the past, the presence of arbutin in Pear has been correlated with biochemical processes that operate as defence mechanism against bacterial invasion. Therefore acts as antibacterial too<sup>[16]</sup>. The flowers of common pear are used in folk medicine as components of analgesic and spasmolytic drugs<sup>[30]</sup>.

### 1.5 Chemical Constituents

Arbutin (hydroquinone- $\beta$ -D-glucopyranoside) is a natural phenolic glucoside found in various plant species of diverse families such as Rosaceae (*Pyrus communis* Linn.)<sup>[16]</sup>. The leaves contain arbutin, isoquercitrin, sorbitol, ursolic acid, astragalol and tannin<sup>[21]</sup>. The bark contains friedelin, epifriedelanol and beta-sitosterol<sup>[14]</sup>. Phloridzin is present in the root bark<sup>[28]</sup>. Flavonoid glycosides have been isolated and identified: quercetin 3-O- $\beta$ -D glucopyranoside, kaempferol 3-O- $\beta$ -D (6''-O- $\alpha$ -L-rhamnopyranosyl)-glucopyranoside and quercetin 3-O- $\beta$ -D-(6''-O- $\alpha$ -L-rhamnopyranosyl)-glucopyranoside. Sterols and triterpenes ( $\beta$ -sitosterol and  $\alpha$ -amyrin), phenolics and coumarins are present in *Pyrus communis* Linn. flowers. Chlorogenic acid is also isolated and identified from *Pyrus communis* Linn. flowers. The triterpenoids were isolated from the stem bark of *Pyrus communis* Linn<sup>[20]</sup>.

### 2. Conclusion

The common pear is a good source of various important chemical constituents that can help to establish different pharmacological activities. This review has shown given Ethnomedicinal and Phytochemical information about the common pear that can help researchers to explore more on account of its described valuable properties.

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