

# Wild fruits of uttarakhand (india): ethnobotanical and medicinal uses

## Abstract

Fruit is a ripened ovary, it may either fleshy or nut and divided into cultivated as well as wild categories. Wild fruits are worldwide distributed and mostly found in the part of earth where anthropogenic activities are no or negligible.

The use of Himalayan plant species for food and medicine has been known for a long time. Uttarakhand is one of these places which is suitable for wild edible fruiting plants because of their difficult geography and climatic conditions and awesome taste of fruits which are attracted by their people as a rich source of their nutrition. Wild edible plants are very important for the well being of rural populations in the region, not only as sources of supplemental food, nutritionally balanced diets, medicines, fodder and fuel, but also for their income generating potential. Large numbers of wild fruits along with their edible values also used in medicine and many other wild fruits viz. *Rubus ellipticus*, *Fragaria × ananassa*, *Prunus persica*, *Myrica esculenta* etc. have high nutritive quality and used by the local peoples for the different edible products. Such wild plants might be explored for their nutritional and medicinal properties and need to conserve for biodiversity maintenance.

**Keywords:** wild fruit, medicine, ethnobotany, uttarakhand, nutrition

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## Introduction

Fruit is a ripened ovary of flower and may either fleshy or nut. Fruits are generally cultivated as well as wild, cultivated fruits are grown by farmers for economical benefits while wild fruits are occurring only in their natural environment. As population increases the areas of plantation and forest used for human welfare, number of plants decreases so wild plants lost their identity and decrease in their number. Wild fruiting plants are major in numbers in that place which are not affected by human interaction due to their difficult geography and climatic conditions which is not suitable for human survival.<sup>1</sup> Surveyed the ethnobotanical exploration, identification, concerns and future potentialities of the wild edible plants of Srinagar and Alaknanda valley of Garhwal Himalaya and recorded total 55 plant species belonging to 35 families. The ethnobotanical survey of wild edible fruits from Kolhapur district was carried out by.<sup>2,3</sup> Examined the status and distribution pattern of medicinal plants in Wildlife Institute of Dehradun, Uttarakhand and recorded 605 plants belonging to 94 families. The use of plant species of the Himalaya as food and medicine has been known for a long time and about 1748 economically important plants have been reported from Indian Himalaya.<sup>4</sup> The unique diversity of such important plants in the region is manifested by the presence of a number of native (31%), endemic (13.5%) and threatened (14%) of total red data book species of Indian Himalayan region.<sup>5</sup>

Uttarakhand is one of these places which is suitable for wild edible fruiting plants because of their difficult geography and climatic conditions and awesome taste of fruits which is attracted by their people as a rich source of their nutrition.<sup>6</sup> Western Himalayan region is rich in diversity of wild edible plant species. Consumption of wild edible fruits meets the protein, carbohydrates, fats, vitamin and mineral requirement of poor rural populace in the region. Wild edible plants are very important for the well being of rural populations in the region, not only as sources of supplemental food, nutritionally balanced diets, medicines, fodder and fuel, but also for their income generating potential.<sup>7</sup>

Uttarakhand is a part of the North-Western Himalayas and is located between 28° 43' - 31° 27' N latitudes and 77° 34' - 81° 02' E longitudes. The river Tons separates the state from Himachal Pradesh in the north-west, whereas the river Kali separates it from Nepal in the east. The greater Himalaya is the northern boundary of the state and is also the international border with China. Most of the people of this state are dependent on their natural environment and is characterized by a rich diversity of ethno-botanic plant as well as rich heritage of wild edible plants system.<sup>8</sup> recorded a total 102 species belonging to 48 families of ethno-medicinal plants from four selected districts of Uttarakhand (Almora, Champawat, Bageshwar and Pithoragarh). On the basis of this information current article focused on the nutritional and medicinal values of wild fruits which are located in Uttarakhand, which can be explored for their great nutritional and medicinal properties.

## Wild Fruits and their Ethnobotanical Uses

All botanical information regarding these plants which are included in this review article is taken from The Plant List website.

### Hisalu

**Botanical name:** *Rubus ellipticus* Sm

**Local name:** Yellow Himalayan raspberry, Hisalu, Ashilo

**Family:** Rosaceae

**Ethnobotanical uses:** It plays a major role to providing free energy packets for the people who are travelling mountains and they can be finding them everywhere.<sup>9,10</sup>

### Strawberry

**Botanical name:** *Fragaria × ananassa* (Duchesne ex Weston) Duchesne ex Rozier

**Local name:** Strawberry

**Family:** Rosaceae

Ethnobotanical uses: Used in prepared foods, flavored used in to dairy products, pigment extract used as a natural acid/base indicator due to the different color of the conjugate acid and conjugate base of the pigment. This fruit is a great source of iron.<sup>11-13</sup>

### Plum

**Botanical name:** *Prunus persica* (L.) Batsch

**Local name:** Plum

Family: Rosaceae Ethnobotanical uses: Plums are used widely in the preparation of jellies, jams and desserts. People even use dry plums as dry fruit. Medicinally it is use in wound healing.<sup>14</sup>

### Kafal

**Botanical name:** *Myrica esculenta* Buch.-Ham. ex D. Don

**Local name:** Kafal or Kaphal

**Family:** Myricaceae

Ethnobotanical uses: Besides being useful in a wide range of ailments specified decoctions of fruits, the stone and also its bark are claimed to be beneficial in cardiac debility, edema and haemoptysis. A wax covering on the fruit is extracted by scalding the fruit with boiling water. Among the local inhabitants it is said to be used as an application for ulcer healing.<sup>15-18</sup>

### Bedu

**Botanical name:** *Ficus palmata* Forssk.

**Local name:** Khemri (Hindi); Pheru (Jaunsar); Bedu (Kumaun), Indian Fig (English); Bendu (Nepali); Anjir.

**Family:** Moraceae

Ethnobotanical uses: The Bedu fruit is very juicy and contain 45 percent of juice. The fruit is beneficial in the disease of lungs and the bladder. It is a source of minerals, phosphorus and a small amount of Vit. C.<sup>19</sup>

### Darim

**Botanical name:** *Punica granatum* L.

**Local name:** Darim

**Family:** Lythraceae

Ethnobotanical uses: It having a good amount of minerals, phosphorous, calcium and magnesium. Pomegranate fruit juice is known as a delicacy and is made into excellent sherbet which has diuretic and cooling effect and having glucose, fructose, tannins, oxalic acid, and reduces thirst in cases of fevers, supplies the required minerals and helps the liver to preserve vit-A. The rind of the fruit and the bark are used as a traditional remedy against diarrhea, dysentery and intestinal parasites.<sup>20</sup>

### Berbrise

**Botanical name:** *Berberis asiatica* Roxb. ex DC.

**Local name:** Chutro, Marpyashi, Daruharidra, Darbi.

**Family** -Berberidaceae

Ethnobotanical uses: In Ayurvedic medicinal system it is named as 'Daruharidra' or Wood Turmeric due to similar properties as of turmeric.<sup>21</sup> which is used in antimicrobial, wound healing,

hepatoprotective and cytotoxicity etc.<sup>22-24</sup> The plant yields fairly large quantity of alkaloids in which isoquinoline type alkaloids like berberine, palmatine, jetrorrhizine, and columbamine are the most studied phytoconstituents.<sup>25</sup>

### Makoi

**Botanical name:** *Solanum nigrum* L.

**Local name:** Black Nightshade

**Family:** Solanaceae

Ethnobotanical uses- It has expectorant, analgesic, sedative, diaphoretic properties. Its external application cures skin diseases and gives relief in burns, itching, pain etc. As per Ayurveda, this plant is hot in potency and balances tridosha. The juice of leaves is used as ear drop to get relief from pain in ears. It also contains polyphenolic compounds such as gallic acid, catechin, protocatechuic acid, caffeic acid, epicatechin, rutin, and naringenin.<sup>26-30</sup>

### Ghigharu

**Botanical name:** *Pyracantha crenulata* (Roxb. ex D.Don) M.Roem.

**Local name:** Ghigharu Family: Rosaceae

**Local name:** Chhota seb, Nepal firethorn

Ethnobotanical uses: Fruits can be made into a preservative. Medicinally it has cardio-tonic, coronary vasodilator and hypertensive properties. It has been used for cardiac failure, myocardial weakness, paroxysmal tachycardia, hypertension, arteriosclerosis and Burgor's disease. The anti-oxidants present in fruits are helpful in reducing the ill-effects of free-radicals in our body, maintain blood-pressure and reduce cholesterol. Apart from this the fruits are helpful for rejuvenation in aged people, reduce joint pains and act as appetizer. The leaves are used in the preparation of herbal tea, sun burn creams and many facial creams. The bark of the shrub is used in heavy bleeding during menstrual cycles. A combination of *Ginkgo* and *Pyracantha* leaves are a tonic to mind. The stem bark is useful in fevers especially malaria. It is rich in beta-carotene, iron, potassium, and anti-oxidants and therefore a healthy choice.<sup>31,32</sup>

### Apricot

**Botanical name:** *Prunus armeniaca* L.

**Local name:** Khubani

**Family:** Rosaceae

Ethnobotanical uses: The fruit having high in carotene and vitamin C, provides a valuable source of food eaten fresh, as jams, dried or cooked in meat dishes. The kernels can also be eaten, pressed to make almond oil or used medicinally. Recent studies suggest that the amygdalin extracted from apricot kernels can be used as an alternative treatment for cancer.<sup>33</sup>

### Dog rose

**Botanical name:** *Rosa canina* L.

**Local name:** Dog Rose

**Family:** Rosaceae

Ethnobotanical uses: The plant has high antioxidants and vit-C level, used to make syrup, tea and marmalade. Wildly it grows for the production of vit-C, The fruits have been used internally as tea for treatment of viral infections and disorders of the kidneys and urinary tract.<sup>34,35</sup>

## Mulberries

**Botanical name:** *Morus alba* L.

**Local name-** Mulberries, White Mulberry

**Family:** Moraceae

Ethnobotanical uses: It is used from make jams or jellies add some lemon juice to perk up the flavor. The ripe fruit is edible and is widely used in pies, tarts, wines, cordials and tea. Unripe fruit and green parts of the plant have a white sap that may be toxic, stimulating, or mildly hallucinogenic. Mulberry leaves, particularly those of the white mulberry, are ecologically important as the sole food source of the silkworm (*Bombyx mori*), Anthocyanins are responsible for the attractive colors of fresh plant foods, including orange, red, purple, black, and blue. These colors are water-soluble and easily extractable, yielding natural food colorants.<sup>36-40</sup>

## Black raspberry

**Botanical name:** *Rubus occidentalis* L.

**Local name:** Black raspberry, wild black raspberry,  
black caps, black cap raspberry, thimbleberry.

**Family:** Rosaceae

Ethnobotanical uses: It has high amount of anthocyanins which is very useful for natural dyes and also beneficial for cancer treatment.<sup>41</sup> The leaves can be used fresh or dried in herbal teas. It has astringent flavor and use in herbal medicine.

## Timil

**Botanical name:** *Ficus auriculata* Lour.

**Local name** -Timul, Timil

**Family:** Moraceae

Ethnobotanical uses: Gastrointestinal problems can be treated by using 50-100 ml fresh juice of leaves with water for about 10 days.<sup>42</sup> Bark and root show hypoglycaemic and anthelmintic activity.<sup>43,44</sup> The extracts also reported to inhibit insulinase activity from liver and kidney. Fruit extracts exhibits anti-tumour activity.<sup>45</sup> Leaves exhibit hypotensive activity.<sup>46</sup>

## Juneberries

**Botanical name:** *Amelanchier spicata* (Lam.) K.Koch

**Local name:** Serviceberry, Saskatoon.

**Family:** Rosaceae

Ethnobotanical name- It can be eaten fresh or used for jam, jelly, and sauce, and also makes a fine beverage. Fruits have nutritional value because of high level of protein, fat, fiber, calcium, magnesium, manganese, barium, and aluminum.<sup>47,48</sup>

## Beal

**Botanical name:** *Aegle marmelos* (L.) Corrêa

**Local name:** Bael, Indian bael, Golden apple,  
Elephant apple, Baelputri, Sirphal, Siriphthal

**Family:** Rutaceae

Ethnobotanical uses: The fruit is eaten fresh or dried. If fresh, the juice is strained and sweetened to make a drink and use for sharbat.

The dried fruit is usually used for slice and sun-dried than hard leathery slices are immersed in water. The fruit pulp has detergent action. Quisumbing says that bael fruit is employed to eliminate scum in vinegar-making.<sup>49</sup>

## Ber

**Botanical name:** *Ziziphus jujube* Mill.

**Local name:** Ber

**Family:** Ramanaceae

Ethnobotanical uses: Delicious fruits used as an effective herbal remedy. It increases the weight, stamina and improves muscular strength. In Chinese medicine, it is prescribed as a tonic to strengthen liver function. It functions as antidote, diuretic, emollient and expectorant. Also, said to promote hair growth. The dried fruits are anodyne, anticancer, pectoral, refrigerant, sedative, stomachache, styptic and tonic. Help in purify the blood and aid digestion. They are used internally in the treatment of chronic fatigue, loss of appetite, diarrhea, anemia, irritability and hysteria. The seed is hypnotic, narcotic, sedative, stomachache and tonic. It is used internally in the treatment of palpitations, insomnia, nervous exhaustion, night sweats and excessive perspiration. The root is used in the treatment of dyspepsia. A decoction of the root has been used in the treatment of fevers. The root is made into a powder and applied to old wounds and ulcers. The leaves are applied as poultices and are helpful in liver troubles, asthma and fever. The fruit is very nutritious with potassium, phosphorus, calcium and manganese and also is rich source of Vit- C and Vit- B complex and anti-oxidant content of fresh fruits is higher than most of fruits.<sup>50-53</sup>

## Wild grapes

**Botanical name:** *Vitis vulpina* L.

**Local name:** River bank or forest grape

**Family:** Vitaceae

Ethnobotanical uses: The fruits are used in Juice, Wine and Jelly. Unripe grapes were used for treating sore throats, and raisins were given as treatments for consumption (tuberculosis), constipation and thirst. Ripe grapes were used for the treatment of cancer, cholera, smallpox, nausea, skin and eye infections as well as kidney and liver diseases.<sup>54-56</sup>

## Red berries

**Botanical name:** *Viburnum opulus* L.

**Local name:** Guelder rose, water elder, cramp bark, snowball tree

**Family-** Adoxaceae

Ethnobotanical uses: It is used as an ornamental plant. In cooking, it is used as a cranberry substitute when making preserves and jellies. It can be eaten either raw or cooked, but use caution when using the berries of this plant in foods, as it can cause diarrhea, nausea and vomiting if eaten in large quantities or when unripe. Generally, if ripe and cooked, the fruit has very low toxicity. The fruit also contains a red dye which was used by early Native Americans to make ink. A decoction of the bark was also used as a beverage for both social drinking and medicinal purposes.<sup>57,58</sup>

## Blackcurrant

**Botanical name:** *Ribes nigrum* L.

**Local name:** Blackcurrant, European black currant

**Family:** Grossulariaceae

Ethanobotanical uses: The extracted oil and juice useful as an antioxidant source and in treating rheumatoid arthritis and night and fatigue-related visual impairment, antimicrobial and anticancer properties.<sup>59</sup> The Vit- C content is considered to be the major contributor to the antioxidant capacity of black currant. *In vitro* inhibition of cancer cell proliferation was observed with antioxidant capacity.<sup>60</sup>

**Wild himalayan pear**

**Botanical name:** *Pyrus pashia* Buch.-Ham. ex D.Don

**Local name:** Wild Himalayan Pear, Mahal

**Family:** Rosaceae

Ethanobotanical uses: The juice of the ripe fruit is used in the treatment of diarrhea. The plant is well-known for its nutritional and therapeutic importance.<sup>61,62</sup>

**Indian fig**

**Botanical name:** *Ficus carica* L.

**Family:** Moraceae

**Local name:** Indian fig, Edible Fig

Ethanobotanical uses: All parts used in the native system of medicine in different disorders such as colic, indigestion, diarrhea, sore throats, coughs, bronchial problems, inflammatory, cardiovascular disorders, ulcerative diseases, and cancers.<sup>63</sup> The latex from the sap can be used to coagulate plant milks.

**Hill raspberry**

**Botanical name:** *Rubus niveus* Thunb.

**Local name:** Hill Raspberry, Kala Hinsalu

**Family:** Rosaceae

Ethanobotanical uses: The fruits are enjoyed fresh, alone or served with sugar and cream or ice cream. They are excellent for making pie, tarts, jam and jelly. The fresh fruit can be quick-frozen for future use.<sup>64,65</sup>

**Bhambti**

**Botanical name:** *Parthenocissus semicordata* (Wall.) Planch.

**Local name:** Bhambti, Phlankur, Chappar Tang, Bara Churcheri

**Family:** Vitaceae

Ethanobotanical uses: The fruits have multiple uses mostly edible.<sup>66</sup>

**Wild pear**

**Botanical name:** *Pyrus pyrifolia* (Burm.f.) Nakai

**Local name:** Wild Pear, Bada Kainth, Shiara, Zarenth

**Family:** Rosaceae

Ethanobotanical uses: The fruits are juicy and edible and a good preservative for jam.<sup>67,68</sup>

**Indian wild pear**

**Botanical Name:** *Amelanchier canadensis* (L.) Medik.

**Local Name:** Indian Wild Pear

**Family:** Rosaceae

Ethanobotanical uses: The fruit contains about 6.8% sugars, 3.7% protein, 1% ash, 0.4% pectin. Vit- C is very low, about 1.2mg per 100g.<sup>69</sup> The juice of the ripe fruit is used in the treatment of diarrhea.<sup>70</sup> Wood is used for small implements, walking sticks.<sup>71</sup>

**Amla**

**Botanical Name:** *Phyllanthus emblica* L.

**Local Name:** Amla

**Family** -Phyllanthaceae

Ethanobotanical uses- The entire plant is economically important. The dried fruit, the nut or seed, leaves, root, bark and flowers are frequently employed. The ripe fruits are generally used fresh but dried fruit are also used.<sup>72</sup> It is rich in polyphenols, minerals and is regarded as one of the richest source of vitamin C.<sup>73</sup> Therapeutic uses as an energy refiller, Aperient, Antibacterial, antifungal, antiviral,<sup>72</sup> in Gonorrhoea, Analgesic and Skin Fareness,<sup>74</sup> to stop nausea and vomiting, Antitumour activity, Hepatoprotective activity.<sup>72</sup>

**Karunda**

**Botanical Name:** *Carissa spinarum* L.

**Local name:** Karondhu, Garna, Kharnu, Karunda

**Famiy:** Apocynaceae

Ethanobotanical uses: It is used in combination with roots of some other medicinal plants to treat rheumatism by the mundas, a tribe of Chhota Nagpur. It is a strong purgative and is used as one of the ingredients in some purgative preparations. A large dose of the roots useful for the fatal owing to profuse purging.<sup>75</sup>

**Jamun**

**Botanical Name:** *Syzygium cumini* (L.) Skeels

**Local Name:** Jamun, Java Plum, Black

Plum, Jambul and Indian blackberry

**Family:** Myrtaceae

Ethanobotanical uses: Fruit syrup is very useful for curing diarrhea. It is stomachache, carminative and diuretic, apart from having cooling and digestive properties.<sup>76</sup> Vit- C is able to regenerate other antioxidants such as vit- E.<sup>77,78</sup> Fruits are used in making jam, jellies, squash, vinegar and ice cream for its beautiful and attractive purple colour.

**Imli**

**Botanical Name:** *Tamarindus indica* L.

**Local Name:** Madeira Mahogany, Indian Date,

Tamarind Tree, Tentul, Chinta, Anbli, Tamrul, Amli, Imli

**Family:** Leguminosae

Ethanobotanical uses: The fruit pulp is used for seasoning, as a food component to flavour confections, curries and sauces, and is a main component in juices and certain beverages. Fruit pulp is eaten fresh and often made into a juice, infusion or brine.<sup>79,80</sup>

**Quince**

**Botanical Name:** *Cydonia oblonga* Mill.



**Local Name:** Bihi

**Family:** Rosaceae

Ethnobotanical uses: It has antioxidants activity and contains phenolic compounds, vit- E, carotenoids, L-ascorbic acid and other organic acids.<sup>81,82</sup> The leaves are used in folk medicine for their sedative, antipyretic, anti-diarrheic and antitussive properties and for the treatment of various skin diseases.<sup>83,84</sup> Dried fruits are used for making jelly and marmalade.<sup>85</sup> Seeds have been used traditionally in diarrhea, dysentery, cough, sore throat and bronchitis,<sup>86</sup> intestinal colic and constipation,<sup>87</sup> and also are one of the popular complementary therapies used for allergic rhinitis and asthma.<sup>88</sup>

## Conclusion

Wild fruits are worldwide distributed but in very low quantity. Wild fruiting plants are generally in majority in that place which is not affected by human interaction due to their difficult geography and climatic conditions which is not suitable for human survival. Uttarakhand is one of these places which is suitable for wild edible fruiting plants because of their difficult geography and climatic conditions and awesome taste of fruits which is attracted by their people as a rich source of their nutrition. The unique diversity of such important plants in the region is manifested by the presence of a number of native, endemic and threatened of total red data book species of Indian Himalayan region. Uttarakhand is characterized by a rich diversity of ethnobotanic plant as well as rich heritage of wild edible plants system. These important floras are preserved by the local population of Kumaun and Garhwal region. The traditional knowledge about the use of indigenous medicinal plants has been explore, therefore, the ethnological knowledge of people and listing of plants of particular region are important tools that may help in understanding human environment interactions. Consumption of wild edible fruits meets the protein, carbohydrates, fats, vitamin and mineral requirement of poor rural populace in the region. Wild edible plants are very important for the well being of rural populations in the region, not only as sources of supplemental food, nutritionally balanced diets, medicines, fodder and fuel, but also for their income generating potential. Many wild fruits such as *Rubus ellipticus*, *Fragaria × ananassa*, *Prunus persica*, *Myrica esculenta* etc. have high nutritive quality and used by the local peoples for different edible products. Among these many other wild fruits such as *Punica granatum*, *Bebrise asiatica*, *Solanum nigrum*, *Ficus auriculata* etc. have been reported for the good medicinal properties.

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## Conflicts of interest

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## References

1. Tiwari JK, Ballabha R, Tiwar P. Some Promising Wild Edible Plants of Srinagar and its Adjacent Area in Alaknanda Valley of Garhwal Himalaya, India. *J Am Sci*. 2010;6(4):167–174.
2. Valvi SR, Deshmukh SR, Rathod VS. Ethnobotanical Survey of Wild Edible Fruits in Kolhapur District. *IJABPT*. 2011;2(1):194–197.
3. Adhikari BS, Babu MM, Saklani PL, et al. Medicinal Plants Diversity and their Conservation Status in Wildlife Institute of India (WII) Campus, Dehradun. *Ethnobotanical Leaflets*. 2010;14(1):46–83.
4. Samant SS, Dhar U, Palni LMS. Medicinal Plants of Indian Himalaya: Diversity Distribution Potential Values. Gyanodaya Prakashan, Nantial, India 1998.
5. Saklani S, Chandra S, mishra AP. Evaluation of Nutritional profile, medicinal value and quantitative estimation in different parts of *Pyrus pashia*, *Ficus palmate* and *Pyraacantha crenulata*. *J Global Trends Pharmaceutical Sci*. 2011;2(3):350–354.
6. Meyers KJ, Watkins CB, Pritts MP, et al. Antioxident and anti proliferative activities of strawberries. *J Agri food Chem*. 2003;51(23):6887–6892.
7. Gangwar KK, Deepali Gangwar RS. Ehanobotanical plant diversity in kumaun Himalaya of uttarakhand, India. *Nat Sci*. 2010;8(5):66–78.
8. Joshi Y, Joshi AK, Prasad N, et al. A review on *Ficus palmata* (Wild Himalayan Fig). *J Phytopharmacol*. 2014;3(5):374–377.
9. Manandhar NE. Plants and People of Nepal. Timber Press, Portland, Oregon. 2202; pp. 599.
10. Tsewang TJ. Tibetan Medicinal Plants. Tibetan Medical Publications, India. 1995; pp. 132.
11. Duru M. Effects of dietary strawberry (*Fragaria x ananassa*) leaf powder on growth performance, body components and digestive system of broiler chicks. *Int J Agric Biol*. 2012;14:621–624.
12. Amini G, Irian S, Majd A, et al. Antioxidant effects of strawberry fruits at two phenological stages. *J Herb Drugs*. 2013;4(2):63–68.
13. Ibrahim DS, Abd El, Maksoud MA. Effect of strawberry (*Fragaria x ananassa*) leaves extract on diabetic nephropathy in rats. *Int J Exp Pathol*. 2015;96(2):87–93.
14. Hussain T, Baba I, Jain SM. Evaluation of wound healing active principles from *prunus persica*. *Int J Res Pharma Chem*. 2014;4(1):233–236.
15. Kumar A, Rana AC. Pharmagnostic and pharmacological profile of traditional medicinal plant: *Myrica nagi*. *Int Res J Pharma*. 2012;3(12):32–37.
16. Panthari P, Kharkwal H, Kharkwal H, et al. *Myrica nagi*: a review on active constituents, biological and therapeutic effects. *Int J Pharma Pharmace Sci*. 2012;4(5):38–42.
17. Gusain YS, Khanduri VP. *Myrica esculenta* wild edible fruit of Indian Himalaya: need a sustainable approach for indigenous utilization. *Eco Env Cons*. 2016;22:267–270.
18. Jeeva S, Lyndem FG, Sawian JT, et al. *Myrica esculenta* Buch.– Ham. ex D. Don. – a potential ethnomedicinal species in a subtropical forest of Meghalaya, northeast India. *Asian Pacific J Trop Biomed*. 2011;174–177.
19. Bhowmik D, Gopinath H, Kumar BP, et al. Medicinal Uses of *Punica granatum* and Its Health Benefits. *J Pharmacognosy Phytochem*. 2013;1(5):2278–4136.
20. Komal S, Bairwa R, Chauhan N, et al. *Berberis aristata* A review. *IJRAP*. 2011;2(2):383–388.
21. Singh M, Srivastava S, Rawata AKS. Antimicrobial activities of Indian *Berberis* species. *Fitoterapia*. 2011;78(7–8):574–576.
22. Dehar N, Walia R, Verma RB, et al. Hepatoprotective Activity of *Berberis aristata* Root Extract Against Chemical Induced Acute Hepatotoxicity In Rats. *Asian J Pharma Clinic Res*. 2013;6(5):53–56.
23. Kumar GS, Jayveera KN, Kumar CKA, et al. Antimicrobial effect of Indian medicinal plants against acne inducing bacteria. *Trop J Pharmacol Res*. 2007;6(2):717–723.
24. Mazumder PM, Das S, Das MK. Cytotoxic Activity of Methanolic Extracts of *Berberis aristata* DC and *Hemidesmus indicus* R.Br. in MCF7 Cell Line. *J Cur Pharma Res*. 2010;1(1):12–15.

25. Dehar N, Walia R, Ratol S. Potentiation of Thiopentone Sodium Induced Hypnosis by Berberis Aristata In Rodents. *Asian J Pharmacol Clinic Res.* 2012;5(1):131–133.
26. Saleem TSM, Chetty CM, Ramkanth S, et al. Solanum nigrum Linn– A Review. *Phcog Rev.* 2009;3(6):342–345.
27. Jain R, Sharma A, Gupta S, et al. Solanum nigrum: Current Perspectives on Therapeutic Properties. *Al Med Rev.* 2011;16(1):78–85.
28. Atanu FO, Ebiloma UG, Ajayi EI. A review of the pharmacological aspects of Solanum nigrum Linn. *Biotechnol Mol Biol Rev.* 2011;6(1):1–7.
29. Yousaf Z, Wang Y, Baydoun E. Phytochemistry and Pharmacological Studies on Solanum torvum Swartz. *J Appl Pharma Sci.* 2013;3(4):152–160.
30. Nyeem MAB, Rashid AKMMU, Nowrose M, et al. Solanum nigrum (Maku):A review of pharmacological activities and clinical effects. *Int J Appl Res.* 2017;3(1):12–17.
31. Bisht VK, Kandari LS, Negi JS, et al. Traditional use of medicinal plants in district Chamoli, Uttarakhand, India. *Journal of Medicinal Plants Research.* 2013;7(15):918–929.
32. Saklani S, Chandra S. In Vitro Antimicrobial Activity, Nutritional Value, Antinutritional Value and Phytochemical Screening of Pyracantha crenulata Fruit. *Int J Pharm Sci Rev Res.* 2014;26(1):1–5.
33. Sharma S, Satpathy G, Gupta RK. Nutritional, phytochemical, antioxidant and antimicrobial activity of Prunus armenicus. *J Pharmacog Phytochem.* 2014;3(3):23–28.
34. Ghrabi Z. A Guide to Medicinal Plants in North Africa: *Rosa canina* L. International Union for Conservation of Nature and Natural Resources: Malaga, Spain. 2005:229–231.
35. Vântu S. In vitro multiplication of *Rosa canina* L. Analele științifice ale Universității Al. I. Cuza Iași Tomul LVII, fasc. 1, s. II a. Biologie vegetala. 2011:1–4.
36. Singh R, Bagachi A, Semwal A, et al. Bharadwaj Traditional uses, phytochemistry and pharmacology of Morus alba Linn.: A review. *J Med Plants Res.* 2013;7(9):461–469.
37. Soni S, Sahu KK, Dewagan S, et al. Medicinal value of [Morus alba] mulberry plant. *Int Res J.* 2014;2(5):449–450.
38. Almeida JRGS, Souza GR, Araújo ECC, et al. Medicinal Plants and Natural Compounds from the Genus Morus (Moraceae) with Hypoglycemic Activity: A Review 2012.
39. Kaur R. Ethnobotanical studies of some of the traditionally important medicinal plants of Punjab (India). *Int J Cur Res Acad Rev.* 2015;3(5):262–271.
40. Bajpai S, Rao AVB, Muthukumaran M, et al. History and active pharmacokinetic principles of mulberry: a review. *IOSR J Pharma.* 2012;2(4):13–16.
41. Kresty LA, Frankel WL, Hammond CD, et al. Transitioning from preclinical to clinical chemopreventive assessments of lyophilized black raspberries: interim results show berries modulate markers of oxidative stress in Barrett’s esophagus patients. *Nutr Cancer.* 2006;54(1):148–156.
42. Rout SD, Panda T, Mishra N. Ethnomedicinal plants used to cure different diseases by tribal’s of Mayurbhanj district of North Orissa. *Ethno–Med.* 2009;3(1):27–32.
43. Mazumder PM, Farswan M, Parcha V. Hypoglycaemic effect of Ficus arnottiana Miq. Bark extracts on streptozocin induced diabetes in rats. *Nat Prod Rad.* 2009;8(5):478–482.
44. Ghosh R, Sharathchandra K, Rita S, et al. Hypoglycaemic activity of Ficus hispida (bark) in normal and diabetic albino rats. *Indian J Pharmacol.* 2004;36(4):222–225.
45. Aswar M, Aswar U, Watkar B, et al. Anthelmintic activity of Ficus bengalensis. *Int J Green Pharm.* 2008;2(3):170–172.
46. Buniyamin A, Ayinde EI, Fabain O, et al. Pharmacognosy and hypotensive evaluation of Ficus exasperata Vahl (Moraceae) leaf. *Acta Pol Pharm.* 2007;64(116):543–546.
47. Laughlin KM, Askew RG, Smith RC. Juneberry for Commercial and Home Use on the Northern Great Plains 1996.
48. Gough RE. Juneberries for Montana Gardens 2010.
49. Morton JF. *Bael Fruit*. In: Morton JF & Miami FL, editors. Fruits of warm climates. pp. 1987:187–190.
50. Li JW, Fan LP, Ding SD, et al. Nutritional composition of five cultivars of Chinese jujube. *Food Chem.* 2007;103:454–460.
51. Zhang H, Jiang L, Ye S, et al. Systematic evaluation of antioxidant capacities of the ethalonic extract of different tissues of jujube (Ziziphus jujube Mill) from China. *Food Chem Toxicol.* 2010;48(6):1461–1465.
52. Plastina P, Bonofiglio D, Vizza D, et al. Identification of bioactive constituents of Ziziphus jujube fruit extracts exerting antiproliferative and apoptotic effects in human breast cancer cells. *J Ethnopharmacol.* 2010;140(2):325–332.
53. Yu L, Jiang BP, Luo D, et al. Bioactive components in the fruits of Ziziphus jujube Mill. against the inflammatory irritant action of Eubhorbia Plants. *Phytomed.* 2012;19(3–4):239–244.
54. Agarwal C, Singh RP, Agarwal R. Grape seed extract induces apoptotic death of human prostate carcinoma DU145 cells via caspases activation accompanied by dissipation of mitochondrial membrane potential and cytochrome c release. *Carcinogenesis.* 2002;23(11):1869–1876.
55. Bagchi D, Sen CK, Ray SD, et al. Molecular mechanisms of cardioprotection by a novel grape seed proanthocyanidin extract. *Mutat Res.* 2003;523–524:87–97.
56. Bender DA, Bender AE. A Dictionary of Food and Nutrition. (4th edn), New York: Oxford University Press, USA 2005.
57. Nesom G. Highbush cranberry Viburnum opulus L. var. americanum Ait. Plant Symbol = VIOPA2. Plant Guide.2003:1–4.
58. Altun ML, Çitoğlu GS, Yılmaz BS, et al. Antinociceptive and anti-inflammatory activities of Viburnum opulus. *Pharma Biol.* 2009;47(7):653–658.
59. Nielsen IL, Haren GR, Magnussen EL, et al. Quantification of anthocyanins in commercial black currant juices by simple high–performance liquid chromatography. Investigation of their pH stability and antioxidative potency. *J Agri Food Chem.* 2003;51(20):5861–5866.
60. Olsson ME, Gustavsson KE, Andersson S, et al. Inhibition of cancer cell proliferation in vitro by fruit and berry extracts and correlations with antioxidant levels. *J Agri Food Chem.* 2004;52(24):7264–7271.
61. Arya V, Gupta R, Gupta VK. Pharmacognostic and phytochemical investigations on Pyrus pashia Buch.–Ham. ex D. Don stem bark. *J Chem Pharm Res.* 2011;3(3):447–456.
62. Tsering J, Gogoi BJ, Tag H. Ethnobotany and phytochemical analysis of Pyrus pashia leaves. *IJPSR.* 2012;3(8):2721–2725.
63. Gilani AH, Mehmood MH, Janbaz KH, et al. Ethnopharmacological studies on antispasmodic and ant platelet activities of Ficus carica. *J Ethnopharmacol.* 2008;119(1):1–5.
64. Chauhan PP, Nigam A, Santvan VK. Ethnobotanical study of wild fruits in Pabbar Valley, District Shimla, Himachal Pradesh. *JMPS.* 2016;4(2):216–220.
65. Ahmad M, Masood S, Sultana S, et al. Antioxidant and nutraceutical value of wild medicinal Rubus berries. *Pak J Pharm Sci.* 2015;28(1):241–247.

66. Sarkar A, Das AP. Contribution of forest flora in rural livelihood: a study of Jayanti, Buxa Tiger Reserve, West Bengal, India. *Pleione*. 2012;6(1):132–140.
67. Kumari A, Dhaliwal YS. Formulation of kainth (*Pyrus serotina*) based functional food products and changes during storage. *Int Res J Nat Appl Sci*. 2016;3(11):59–70.
68. Arzani K, Khoshghalb H, Malakouti MJ, et al. Total Oxalate Soluble Pectin Concentration in Asian Pear (*Pyrus serotina* Rehd) Fruit in Relation to Ripening, Storage and Internal Browning Disorder. *J Agri Sci Technol*. 2011;13(4):611–626.
69. Parmar C, Kaushal MK. *Pyrus pashia*. In: Buch, Ham, editors. Wild Fruits. Kalyani Publishers, New Delhi, India. 1982:78–80.
70. Manandhar NP. Plants and People of Nepal. Timber Press. Oregon. 2002;7(12):pp. 599.
71. Polunin O, Stainton A. Flowers of the Himalayas. Oxford University Press, India 1984.
72. Bhide MM, Nitave SA. Roles of *Emblica officinalis* (amla) in medicine. *World J Pharma pharmaceut Sci*. 2014;3(6):604–615.
73. Krishnaveni M, Mirunalin S. Amla – The Role of Ayurvedic Therapeutic Herb in Cancer. *Asian J Pharma Clinical Res*. 2011;4(3):1317
74. Kumar MS, Rao JV. Development and validation of analytical technique for non steroidal anti inflammatory drugs (nsaids) by high performance liquid chromatography (HPLC). *Int J Pharma chemical Sci*. 2012;1(1):9–12.
75. Parmar C, Kaushal MK. Wild Fruits of the Sub-Himalayan Region. Kalyani Publishers. New Delhi, India 1982.
76. Thaper AR. Jamun, ICAR, Farm Bull 42 1958.
77. Carr AC, Frei BA. Toward a new recommended dietary allowance for vitamin C based on antioxidant and health effects in humans. *Am J Clin Nutr*. 1999;69(6):1086–1107.
78. Simon JA, Hudes ES. Serum ascorbic acid and gallbladder disease prevalence among US adults: the Third National Health and Nutrition Examination Survey (NHANES III). *Arch Intern Med*. 2000;160(7):931–936.
79. El-Siddig K, Gunasena HPM, Prasa BA, et al. Tamarind – *Tamarindus indica* L. Fruits for the future 1. Southampton Centre for Underutilized Crops, Southampton, UK. 2006:188.
80. du Toit R, Volsteedt Y, Apostolides Z. Comparison of the antioxidant content of fruits, vegetables and teas measured as vitamin C equivalents. *Toxicol*. 2001;166(1–2):63–69.
81. Silva BM, Andrade PB, Goncalves AC, et al. Influence of jam processing upon the contents of phenolics, organic acids and free amino acids in quince fruit (*Cydonia oblonga* Miller). *Eur Food Res Technol*. 2004;218(4):385–389.
82. De Tommasi N, De Simone F, Pizza C, et al. New tetracyclic sesterterpenes from *Cydonia vulgaris*. *J Nat Prod*. 1996;59(3):267–270.
83. Oliveira AP, Pereira JA, Andrade PB, et al. Phenolic profile of *Cydonia oblonga* Miller leaves. *J Agri Food Chem*. 2007;55(19):7926–7930.
84. Usmanghani K, Saeed A, Alam MT. Indusynic Medicine, University of Karachi press, Karachi. 1997:368.
85. Nadkarni KM. Indian Materia Medica. (3rd edn), Popular Prakashan, Bombay, India. 1976:1038.
86. Duke JA, Bogenschutz-Godwin MJ, Ducealliar J, et al. Handbook of Medicinal Herbs, (2nd edn). CRC Press, Boca Raton. 2002:605.
87. Prajapati ND, Purohit SS, Sharma AK, Kumar TA Handbook of Medicinal Plants. Agrobios India, pp. 184 2006.
88. Bruin D, Baars E. Citrus/*Cydonia* comp. Use in general practice. A survey among anthroposophic physicians, Louis Bolk Instituut, Driebergen, The Netherlands 2001.