

A Breif Overview on *Vitis vinifera*

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Abstract

Review Article

Vitis vinifera L. are a well-known grape species from western Asia and southern Europe that belong to the *Vitis* genus of the Vitaceae family. The grapevine's seeds and leaves are employed in herbal therapy, while the fruits are used as a food supplement. Wine production, which takes 50-75 percent of grapes, is the most significant application of grapes, followed by fresh fruits, dried fruits, and juice. Several varieties and species of *vitis vinifera* available in India, pharmacological and therapeutic research, phytochemistry of the *Vitis vinifera* (grape) and its active components are presented in this overview.

Keywords: *Vitis Vinifera*, Varieties *Vitis Vinifera*, Phytochemistry, Pharmacology.

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1. INTRODUCTION

The world is home to a diverse range of medicinal plants. Many of the weeds in our surroundings are highly effective medicinal plants that can aid in the treatment of number of serious health problems (Parihar and Sharma, 2021). Among ancient civilizations, India has long been known as a rich repository of natural medicines (Parihar and Sharma, 2021). *Vitis vinifera* is a popular grape species in the Vitaceae family that belongs to the genus *vitis*. There are seedless and non-seedless cultivars of *vitis vinifera*, as well as red, black, and white types. As the *Vitis vinifera* species outnumber all other species by 90 percent, they are easy to find¹. Western Asia and southern Europe are the origins of grapes (Aghbali *et al.*, 2013). Grapes are one of the most important agricultural products. As a result, viticulture, or grapes cultivation, is one of the most beneficial types of agriculture. There are over 10,000 different grape varieties in the globe. The root, stem, cane, leaf, seed, fruits, pomanche, and skin all contain various phytochemical substances. Phenolic compounds, aromatic acids, flavonoids, proanthocyanins, and stilbenoids are among the important chemicals discovered (Filocamo *et al.*, 2015, Radulescu *et al.*, 2020, Goufo *et al.*, 2020). Grapes contain nutritious elements such as minerals, proteins, carbohydrates, fats, fibres, vitamin C, and sugar in addition to bioactive

substances⁶⁻⁸. Grapes has been shown to have traditional uses in Pakistan, Italy, and Turkey, including medication therapy for laxatives, carminatives, colds, and flu, anaemia, wound-care, allergies, and bronchitis (Tetik *et al.*, 2013, Hayta *et al.*, 2014, Ishtiaq *et al.*, 2015, Sargin *et al.*, 2015). Many studies have shown that bioactive compounds found in grapes have antioxidant, antidiabetic, anticancer, antibacterial, antifungal, anti-inflammatory, anti-acne, anti-aging, antihypertensive, protective effect, anti-asthma, antiplatelet, anticataract, anti-obesity, anticholinergic, anti-sunburn, anti-hyperpigmentation, wound-healing properties, and antiviral: - viral infections are caused by the spread of dangerous viruses throughout the body (Chaudhary *et al.*, 2021). Taxonomical classifications of *vitis vinifera* is given in the table 1.

Table-1: Taxonomical Classifications of *Vitis vinifera*

1	Kingdom	Plantae
2	Clade	Tracheophytes
3	Clade	Angiosperms
4	Clade	Eudicots
5	Clade	Rosids
6	Order	Vitales
7	Family	Vitaceae
8	Genus	<i>Vitis</i>
9	Species	<i>Vitis vinifera</i>

2. MACROSCOPY OF VITIS VINIVERA

It is a fast-growing liana that can reach up to 12-15 meter in height (Beni *et al.* 2013, Aouey *et al.*, 2016). Its leaves are alternating, palmately lobed, deciduous, with 3-5 pointed lobes, coarsely prickly-toothed leaf margins, and heart shaped foot, and 5-20 cm long and broad, with a flaky bark. They have a glossy dark green top and a light green bottom, and normally hairless. Tendrils bind the vine to supports.

Twings grow through the cauline apex, the tip of stem. A branch is made up of multiple internodes separated by knots, from which the leaves, flowers, tendrils, and between-core grow, as well as where future buds are trained. The twigs become woody branches that can grow to be quite long as they harden. Its roots normally sink to a depth of 2-5 meters, but they can go as deep as 12-15 metres or even deeper. The species can be found in humid woodlands and along stream sides. Their flowers are small and greenish to white, gathered in inflorescences, and their fruits are berries grouped in clusters, with varied shapes depending on their fruits and berries grouped in clusters, with varied shapes depending on the subspecies. The single-leaf calyx have five small, deciduous teeth. The corolla is made up of five petals that are joined at the top and bottom and eventually fall

off completely. Five stamens are interlaced with glands opposite the petals. The stigma of the upper ovary is button shaped and has relatively short style. The male and female flowers appear on separate flowers appear on separate plants in the wild vine, while the cultivated varieties are monoecious, allowing self-pollination. The fruit is a berry, also known as a grape, that is ooid or globular, dark blue or pale wax bloom in wild species, in cultivated plants, it is usually much larger, up to 3 cm long and can be green, red, or purple.





3. DISTRIBUTIONS





Vitis vinifera is found in China, India, Iran, Egypt, Turkey, Brazil, Mexico, Central And Southern Europe, Western Asia Such As Anatolia, Caucasus, Middle East, China, Africa, Northern Mediterranean Coast, South Africa, North Africa, California, Michigan, New Mexico, New York, Oregon, Washington State, British Columbia, Ontario, Quebec, Chile, Argentina, Uruguay, Peru. The most wine produced in Germany, France, Italy, Canada, USA, New Zealand. Raisin production is popular in the countries such as Iran, Turkey, India, USA. Phytochemistry of *vitis vinifera* is given in the table-2. Different varieties of grapes that are grown in india are are given in the table-3. Dosage and therapeutic indications are also mentioned in the table- 4,5.

Table-2: Phytochemistry of *Vitis Vinifera*

S.NO.	PLANT PART	CHEMICAL CONSTITUENTS
1	Grapes roots extract	Stilbenoid compounds (Esatbeyoglu <i>et al.</i> , 2016), resveratrol, vitisins A, vitisins B, piceatannol, miyabenol C, trans-piecid, cis- piecid, vitisinol B, viniferether A, viniferether B, ampelopsin E, hopeaphenol, dan isohopeaphenol (Esatbeyoglu <i>et al.</i> , 2016, Goufo <i>et al.</i> , 2020).
2	Grapes leaves extract	Hydroxybenzoic acid (quinic acid, gallic acid, vanillic acid, syringic acid), hydroxycinnamic acid (caftaric acid, caffeic acid, fertaric acid), coumarin, dihydrochalcone, monomeric stilbenes, dimeric stilbenes, trimeric stilbenes, tetrameric stilbenes, flavan-3-ol, galocatechin, catechin, procyanidins, procyanidins B1, procyanidins A1, epicatechins, quercetin, quercetin-3-O-glucoside, kaempferol, myricetin, Flavone(apigenin-7-O-glucoside and luteolin-7-O-glucoside), flavanone (taxifolin, naringenin, hesperetin), anthocyanins, coumarin (aesculin, fraxin, aesculutin, umbelliferone), condensed tannin (Aouey <i>et al.</i> , 2016, Goufo <i>et al.</i> , 2020).
3	Grapes seeds extract	Procyanidin, gallic acid, epicatechin, catechin, quercetin, white grapes has flavonol glycosides, black grapes has flavonol glycoside, resveratrol, anthocyanidins, phenolic compounds, caffeic acid, coumaric acid, coutaric acid, ferulic acid, fertaric acid, routine, quercetin-3-beta-D-glucoside, quercitrin, myricetin, catechin, epicatechin, linoleic acid, primaric acid, caffeic acid, p-hydroxy-phenylacetic acid, gallic acid (Cádiz-Gurrea <i>et al.</i> , 2017, Pérez-Navarro <i>et al.</i> , 2019, Niknami <i>et al.</i> , 2020, Sochorova <i>et al.</i> , 2020, Felhi <i>et al.</i> , 2016).
4	Grapes skin extract	Flavonols, anthocyanins, flavan-3-ols, stilbenes, phenolic acid, quercetin, vanillic acid, kaempferol, syringic acid, gallic acid (Colombo <i>et al.</i> , 2019, Tkacz <i>et al.</i> , 2019, Cotoras <i>et al.</i> , 2014, Fia, <i>et al.</i> , 2018, Mateo <i>et al.</i> , 2015).
5	Grapes juice	Caffeic acid, coumaric acid, ferulic acid, caftaric acid, coutaric acid, fertaric acid, epicatechin, catechin, resveratrol, procyanidin, flavonols, quercitin, rutin, kaempferol, quercetin-3-O-glucoside, quercetin-3-O-glucuronide (Fia <i>et al.</i> , 2018)
6	Grapes stem	Gallic acid, syringic acid, caftaric acid, chioric acid, galocatechin, caffeic acid, syringic acid, ferulic acid, procyanidin B1, procyanidin A1, procyanidin C1, epicatechin, catechin, catechin gallate, anthocyanin, flavanone, flavone, flavonol (quercitin, kaempferol, quercetin-3-O-glucoside), stilbenic compounds like trans-astringin, trans-reveratrol, ampelopsin A,D, and F, vitisin A,B, and C, miyabenol (Goufo <i>et al.</i> , 2020).
7	Grapevine canes	Gallic acid, protocatechuic acid, vanillic acid, ellagic acid, caftaric acid, coutaric acid, caffeic acid, syringic acid, ferulic acid, flavan-3-ol (procyanidin B1, procyanidin A1, procyanidin C1, procyanidin B2, catechin, epicatechin), flavonols like quercetin-3-O- galactoside, quercetin-3-O-arabinose, stilbenic compound, trans-reveratrol-2-C-glucoside, trans-reveratrol, ampelopsin A and D (Goufo <i>et al.</i> , 2020).

Table-3: Different Varieties of Grapes That Are Grown In India Are:

S.NO.	VARIETY NAMES	DESCRIPTION	PICTURES WITH REFERENCES
1	Thompson seedless (Sultana)	The grapes are pale green, shape is oval, mild sweetness. This species has high sugar content. It is famous for producing raisins. Its vine has dark green foliage with escorted edgings	 https://indiagardening.com/lists/best-grape-varieties-in-india-different-types/
2	Anab-e-Shahi (Table grapes)	The grapes are elongated shape with white seeds. The fruits mature late but bear in bulk. This variety is for raw consumption. This variety is cultivated in Harayana, Punjab, Karnataka, Tamilnadu, Andhra Pradesh, Hyderabad.	 https://agrovistafarming.com/2020/12/cultivation-of-grapes-in-india-a-complete-information-guide/
3	Dilkhush	This variety is a clone of Anab-e-Shahi. It produces pale green, white seeded grapes with tangy flavour. This variety is cultivated in Karnataka in large amount. This variety is for raw consumption and table purposes.	 https://indiagardening.com/lists/best-grape-varieties-in-india-different-types/
4	Banglore blue	This variety is delicious, sweet berries. It is used for wine preparation. The grapes are juicy, purple colour, ovoid shape, multiple seeds. It cultivated in Karnataka, Banglore, Chikkaballapur, kolar.	 https://agrovistafarming.com/2020/12/cultivation-of-grapes-in-india-a-complete-information-guide/

5	Sharad seedless	They are seedless, black-purple berries. The grapes has crisp textured in an oval shape, growing abundantly in bunch. It cultivated in Maharashtra India	 <p>https://indiagardening.com/lists/best-grape-varieties-in-india-different-types/</p>
6	Perlette	They are seedless, spherical to oval shape, green yellow colour. It has flavourful pulp, juicy, that lingers a mix of tart flavour. They are cultivated in Harayana, Punjab, Delhi, Western Uttar Pradesh.	 <p>https://www.starnursery.com/product/perlette-grape</p>
7	Gulabi	They are small, spherical, seeded berries, with pink purple colour, luscious taste and juicy. It is cultivated in Maharashtra, Karnataka, Andhra Pradesh.	 <p>https://indiagardening.com/lists/best-grape-varieties-in-india-different-types/</p>
8	Arkavati	They are sweet, seedless, yellow-green. This species is the result Black Champa and Thompson seedless. This is use in wine production and raisin production.	
9	Bhokri	They are medium size, golden yellow, hued berries in bunch. They has thick skin. It is cultivated in Maharashtra, Karnataka, Telangana, Tamilnadu. It is use for the purpose of raw consumption	 <p>https://indiagardening.com/lists/best-grape-varieties-in-india-different-types/</p>




10	Sonaka, Manik Chaman and Tas-A-Ganesh	These 3 are clone of Thompson variety. It is useful in the wine production, raisin production, table purpose. It is cultivated in Maharashtra, Karnataka, Tamilnadu and Andhra Pradesh.	 https://www.indiamart.com/proddetail/sonaka-green-grapes-15731502991.html
11	Arka Kanchan	This species is the cross between Anab-E-Shahi and Queen of vineyard's grape. They are golden green with full of flavour. It is useful in wine production and table purposes.	 https://indiagardening.com/lists/best-grape-varieties-in-india-different-types/
12	Arka Shweta	This variety is the cross between Anab-E-Shahi and Thompson. They are ovate, pale yellow colour and seedless. It has significant demand in international market. It is useful for the direct consumption and table purpose.	 https://www.iihr.res.in/grapes-arka-shweta

Table-4: Dosage of Grapes

S.NO.	INTERNAL USE	DOSAGE
1	Infusion of grapes leaves	One teaspoon per cup. Infuse 10 minutes. 3 cups, after meals
2	Fluid extract (1:1)	50 drops, 1-4 time daily
3	Tincture (1:5)	50 -100 drops, 1-3 times daily
4	Dry extract (5:1)	300 mg, 1-4 times daily
5	Fruits	Food use. It helps in curing rheumatic problems, gout, cardio-renal diseases
6	Seed oil	Several tablespoons a day, or in place of butter and other oils
	EXTERNAL USE	DOSAGE
7	Infusion leaves	Teaspoon per cup. Infuse 15 imutes. Applies as a wash, eye drops or eye wash
8	Decoction	60-80 g of grape leaves per litre water. Boil 15 minute. Apply foot baths. To relieve the discomfort of varicose veins.

Table-5: Therapeutic Indications

Leaves	Venotonic, vasoprotective, astringent, diuretic
Fruits	Vitamin, restorative
Oil seeds	Hypolipidemic

4. CONTRAINDICATION

It does not has unwanted effects in therapeutic doses but rarely can inhibit intestinal enzyme activity.

Pharmacological activities of *vitis vinifera* is given in the table-6.

Table-6: Pharmacological Activities of *Vitis Vinifera*

S.NO.	PHARMACOLOGICAL ACTIVITY AND REFERENCES	EXTRACT TYPE
1	Antioxidant activity (Sochorova <i>et al.</i> , 2020, Felhi <i>et al.</i> , 2016)	Grapes seeds ethanol extract
2	Antioxidant activity (Zeghad <i>et al.</i> , 2019)	Vitis vinifera's hydroalcoholic fruit extract
3	Antioxidant activity (Yilmaz <i>et al.</i> , 2015, Pavić <i>et al.</i> , 2019)	Grapes skin extract of red colour variety
4	Antioxidant activity (Yilmaz <i>et al.</i> , 2015, Liu <i>et al.</i> , 2018)	Grapes pulp extract white and red colour varieties
5	Anti-inflammatory activity (Moldovan <i>et al.</i> , 2020, Balea <i>et al.</i> , 2020)	Grapes leaf extract
6	Anti-inflammatory activity (Cádiz-Gurrea <i>et al.</i> , 2017)	Grapes seed extract
7	Anti-inflammatory activity (Esatbeyoglu <i>et al.</i> , 2016)	Grapes roots extract
8	Anti-inflammatory activity (Sangiovanni <i>et al.</i> , 2019)	Aqueous extract of grapes leaf
9	Anti-inflammatory activity (Di Lorenzo <i>et al.</i> , 2016)	Hydroalcoholic extract of Turkish and Portuguese raisins
10	Anti-inflammatory activity (Fraternali <i>et al.</i> , 2015)	Ethanol extract of grapes tendrils
11	Anti-inflammatory activity (Simonetti <i>et al.</i> , 2014, Simonetti <i>et al.</i> , 2017)	Grapes seeds extract
12	Antibacterial activity (Radulescu <i>et al.</i> , 2020, Manipal <i>et al.</i> , 2019)	Grapes seeds extract
13	Antibacterial activity (Radulescu <i>et al.</i> , 2020, Felhi <i>et al.</i> , 2016, Pavić <i>et al.</i> , 2019)	Grapes skin extract
14	Antibacterial activity (Filocomo <i>et al.</i> , 2015)	White grapes juice
15	Antibacterial activity (Leal <i>et al.</i> , 2020)	White Grapes stem extract
16	Antidiabetic activity (Tkacz <i>et al.</i> , 2020)	Grapes seeds, skins, flesh extract
17	Antihypertensive activity (da Costa <i>et al.</i> , 2020)	Skin grapes aqueous extract
18	Antiobesity (Santos <i>et al.</i> , 2017, da Costa <i>et al.</i> , 2017)	Grapes skin extract

5. CONCLUSIONS

Numerous studies on grapes' numerous components have been conducted, and pharmaceutical and nutraceutical companies have developed this plant as a treatment. Plant identification, categorization, and recording necessitated a thorough and methodical inquiry, which could be a beneficial strategy for promoting traditional herbal medicine knowledge.

6. REFERENCES

1. Aouey, B., Samet, A. M., Fetoui, H., Simmonds, M. S., & Bouaziz, M. (2016). Anti-oxidant, anti-inflammatory, analgesic and antipyretic activities of grapevine leaf extract (*Vitis vinifera*) in mice and identification of its active constituents by LC-MS/MS analyses. *Biomedicine & pharmacotherapy*, 84, 1088-1098.
2. Arora, P., Ansari, S. H., Najmi, A. K., Anjum, V., & Ahmad, S. (2016). Investigation of anti-asthmatic potential of dried fruits of *Vitis vinifera* L. in animal model of bronchial asthma. *Allergy, Asthma & Clinical Immunology*, 12(1), 1-12.
3. Balea, Ş. S., Pârvu, A. E., Pârvu, M., Vlase, L., Dehelean, C. A., & Pop, T. I. (2020). Antioxidant, Anti-Inflammatory and Antiproliferative Effects of the *Vitis vinifera* L. var. Fetească Neagră and Pinot Noir Pomace Extracts. *Frontiers in Pharmacology*, 11, 990.

4. Cádiz-Gurrea, M. D. L. L., Borrás-Linares, I., Lozano-Sánchez, J., Joven, J., Fernández-Arroyo, S., & Segura-Carretero, A. (2017). Cocoa and grape seed byproducts as a source of antioxidant and anti-inflammatory proanthocyanidins. *International journal of molecular sciences*, 18(2), 376.
5. Cádiz-Gurrea, M. D. L. L., Borrás-Linares, I., Lozano-Sánchez, J., Joven, J., Fernández-Arroyo, S., & Segura-Carretero, A. (2017). Cocoa and grape seed byproducts as a source of antioxidant and anti-inflammatory proanthocyanidins. *International journal of molecular sciences*, 18(2), 376.
6. Chaudhary, K., Parihar, S., & Sharma, D. (2021). A Critical Review on Nanoscience Advancement: In Treatment of Viral Infection. *Journal of Drug Delivery and Therapeutics*, 11(6), 225-237.
7. Colombo, F., Di Lorenzo, C., Regazzoni, L., Fumagalli, M., Sangiovanni, E., de Sousa, L. P., ... & Dell'Agli, M. (2019). Phenolic profiles and anti-inflammatory activities of sixteen table grape (*Vitis vinifera* L.) varieties. *Food & function*, 10(4), 1797-1807.
8. Cotoras, M., Vivanco, H., Melo, R., Aguirre, M., Silva, E., & Mendoza, L. (2014). In vitro and in vivo evaluation of the antioxidant and prooxidant activity of phenolic compounds obtained from grape (*Vitis vinifera*) pomace. *Molecules*, 19(12), 21154-21167.
9. da Costa, G. F., Ognibene, D. T., da Costa, C. A., Teixeira, M. T., Cordeiro, V. D. S. C., de Bem, G. F., ... & de Moura, R. S. (2020). *Vitis vinifera* L. Grape Skin Extract Prevents Development of Hypertension and Altered Lipid Profile in Spontaneously Hypertensive Rats: Role of Oxidative Stress. *Preventive nutrition and food science*, 25(1), 25.
10. da Costa, G. F., Santos, I. B., de Bem, G. F., Cordeiro, V. S. C., da Costa, C. A., de Carvalho, L. C. R. M., ... & de Moura, R. S. (2017). The beneficial effect of anthocyanidin-rich *Vitis vinifera* L. grape skin extract on metabolic changes induced by high-fat diet in mice involves antiinflammatory and antioxidant actions. *Phytotherapy Research*, 31(10), 1621-1632.
11. Di Lorenzo, C., Sangiovanni, E., Fumagalli, M., Colombo, E., Frigerio, G., Colombo, F., ... & Dell'Agli, M. (2016). Evaluation of the anti-inflammatory activity of raisins (*Vitis vinifera* L.) in human gastric epithelial cells: a comparative study. *International journal of molecular sciences*, 17(7), 1156.
12. Egea, T., Signorini, M. A., Bruschi, P., Rivera, D., Obón, C., Alcaraz, F., & Palazón, J. A. (2015). Spirits and liqueurs in European traditional medicine: Their history and ethnobotany in Tuscany and Bologna (Italy). *Journal of ethnopharmacology*, 175, 241-255.
13. Esatbeyoglu, T., Ewald, P., Yasui, Y., Yokokawa, H., Wagner, A. E., Matsugo, S., ... & Rimbach, G. (2016). Chemical characterization, free radical scavenging, and cellular antioxidant and anti-inflammatory properties of a stilbenoid-rich root extract of *Vitis vinifera*. *Oxidative medicine and cellular longevity*, 2016.
14. Esatbeyoglu, T., Ewald, P., Yasui, Y., Yokokawa, H., Wagner, A. E., Matsugo, S., ... & Rimbach, G. (2016). Chemical characterization, free radical scavenging, and cellular antioxidant and anti-inflammatory properties of a stilbenoid-rich root extract of *Vitis vinifera*. *Oxidative medicine and cellular longevity*, 2016.
15. Felhi, S., Baccouch, N., Salah, H. B., Smaoui, S., Allouche, N., Gharsallah, N., & Kadri, A. (2016). Nutritional constituents, phytochemical profiles, in vitro antioxidant and antimicrobial properties, and gas chromatography–mass spectrometry analysis of various solvent extracts from grape seeds (*Vitis vinifera* L.). *Food science and biotechnology*, 25(6), 1537-1544.
16. Felhi, S., Baccouch, N., Salah, H. B., Smaoui, S., Allouche, N., Gharsallah, N., & Kadri, A. (2016). Nutritional constituents, phytochemical profiles, in vitro antioxidant and antimicrobial properties, and gas chromatography–mass spectrometry analysis of various solvent extracts from grape seeds (*Vitis vinifera* L.). *Food science and biotechnology*, 25(6), 1537-1544.
17. Felhi, S., Baccouch, N., Salah, H. B., Smaoui, S., Allouche, N., Gharsallah, N., & Kadri, A. (2016). Nutritional constituents, phytochemical profiles, in vitro antioxidant and antimicrobial properties, and gas chromatography–mass spectrometry analysis of various solvent extracts from grape seeds (*Vitis vinifera* L.). *Food science and biotechnology*, 25(6), 1537-1544.
18. Fia, G., Gori, C., Bucalossi, G., Borghini, F., & Zanoni, B. (2018). A naturally occurring antioxidant complex from unripe grapes: The case of sangiovese (v. *Vitis vinifera*). *Antioxidants*, 7(2), 27.
19. Filocamo, A., Bisignano, C., Mandalari, G., & Navarra, M. (2015). In vitro antimicrobial activity and effect on biofilm production of a white grape juice (*Vitis vinifera*) extract. *Evidence-Based Complementary and Alternative Medicine*, 2015.
20. Filocamo, A., Bisignano, C., Mandalari, G., & Navarra, M. (2015). In vitro antimicrobial activity and effect on biofilm production of a white grape juice (*Vitis vinifera*) extract. *Evidence-Based Complementary and Alternative Medicine*, 2015.
21. Fraternali, D., Ricci, D., Verardo, G., Gorassini, A., Stocchi, V., & Sestili, P. (2015). Activity of *Vitis vinifera* tendrils extract against phytopathogenic fungi. *Natural product communications*, 10(6), 1934578X1501000661.
22. Goufo, P., Singh, R. K., & Cortez, I. (2020). A reference list of phenolic compounds (including

- stilbenes) in grapevine (*Vitis vinifera* L.) roots, woods, canes, stems, and leaves. *Antioxidants*, 9(5), 398.
23. Hayta, S., Polat, R., & Selvi, S. (2014). Traditional uses of medicinal plants in Elazığ (Turkey). *Journal of Ethnopharmacology*, 154(3), 613-623.
 24. Ishtiaq, M., Mahmood, A., & Maqbool, M. (2015). Indigenous knowledge of medicinal plants from Sudhanoti district (AJK), Pakistan. *Journal of ethnopharmacology*, 168, 201-207.
 25. Leal, C., Santos, R. A., Pinto, R., Queiroz, M., Rodrigues, M., Saavedra, M. J., ... & Gouvinhas, I. (2020). Recovery of bioactive compounds from white grape (*Vitis vinifera* L.) stems as potential antimicrobial agents for human health. *Saudi journal of biological sciences*, 27(4), 1009-1015.
 26. Liu, Q., Tang, G. Y., Zhao, C. N., Feng, X. L., Xu, X. Y., Cao, S. Y., ... & Li, H. B. (2018). Comparison of antioxidant activities of different grape varieties. *Molecules*, 23(10), 2432.
 27. Manipal, S., Fathima, L., Hussain, S. T., & Venkat, R. (2019). Efficacy of anti-bacterial and anti-fungal action on four medicinal plants extract the *A. arabica*, *T. chebula*, *A. indica* and *V. vinifera* against *Streptococcus mutans* and *Candida albicans*-an in-vitro study. *International Journal of Research in Pharmaceutical Sciences*, 10(4), 3121-3126.
 28. Moldovan, M. L., Carpa, R., Fizeşan, I., Vlase, L., Bogdan, C., Iurian, S. M., ... & Pop, A. (2020). Phytochemical profile and biological activities of tendrils and leaves extracts from a variety of *Vitis vinifera* L. *Antioxidants*, 9(5), 373.
 29. Niknami, E., Sajjadi, S. E., Talebi, A., & Minaiyan, M. (2020). Protective effect of *Vitis vinifera* (black grape) seed extract and oil on acetic acid-induced colitis in rats. *International Journal of Preventive Medicine*, 11.
 30. Parihar, S., & Sharma, D. (2021). Cynodondactylon: A Review of Pharmacological Activities. *Sch Acad J Pharm*, 11, 183-189.
 31. Parihar, S., & Sharma, D. (2021). Navagraha (nine planets) plants: the traditional uses and the therapeutic potential of nine sacred plants of india that symbolises nine planets. *International Journal of Research and Analytical Reviews (IJRAR)*, 8(4), 96-108.
 32. Pavić, V., Kujundžić, T., Kopic, M., Jukić, V., Braun, U., Schwander, F., & Drenjančević, M. (2019). Effects of Defoliation on phenolic concentrations, antioxidant and antibacterial activity of grape skin extracts of the varieties Blaufränkisch and Merlot (*Vitis vinifera* L.). *Molecules*, 24(13), 2444.
 33. Pavić, V., Kujundžić, T., Kopic, M., Jukić, V., Braun, U., Schwander, F., & Drenjančević, M. (2019). Effects of Defoliation on phenolic concentrations, antioxidant and antibacterial activity of grape skin extracts of the varieties Blaufränkisch and Merlot (*Vitis vinifera* L.). *Molecules*, 24(13), 2444.
 34. Pérez-Navarro, J., Cazals, G., Enjalbal, C., Izquierdo-Cañas, P. M., Gómez-Alonso, S., & Saucier, C. (2019). Flavanol glycoside content of grape seeds and skins of *Vitis vinifera* varieties grown in Castilla-La Mancha, Spain. *Molecules*, 24(21), 4001.
 35. Radulescu, C., Buruleanu, L. C., Nicolescu, C. M., Olteanu, R. L., Bumbac, M., Holban, G. C., & Simal-Gandara, J. (2020). Phytochemical profiles, antioxidant and antibacterial activities of grape (*Vitis vinifera* L.) seeds and skin from organic and conventional vineyards. *Plants*, 9(11), 1470.
 36. Radulescu, C., Buruleanu, L. C., Nicolescu, C. M., Olteanu, R. L., Bumbac, M., Holban, G. C., & Simal-Gandara, J. (2020). Phytochemical profiles, antioxidant and antibacterial activities of grape (*Vitis vinifera* L.) seeds and skin from organic and conventional vineyards. *Plants*, 9(11), 1470.
 37. Sangiovanni, E., Di Lorenzo, C., Piazza, S., Manzoni, Y., Brunelli, C., Fumagalli, M., ... & Dell'Agli, M. (2019). *Vitis vinifera* L. leaf extract inhibits in vitro mediators of inflammation and oxidative stress involved in inflammatory-based skin diseases. *Antioxidants*, 8(5), 134.
 38. Santos, I. B., de Bem, G. F., Cordeiro, V. S. C., da Costa, C. A., de Carvalho, L. C. R. M., da Rocha, A. P. M., ... & Resende, A. C. (2017). Supplementation with *Vitis vinifera* L. skin extract improves insulin resistance and prevents hepatic lipid accumulation and steatosis in high-fat diet-fed mice. *Nutrition Research*, 43, 69-81.
 39. Sargin, S. A., Selvi, S., & López, V. (2015). Ethnomedicinal plants of Sarigöl district (Manisa), Turkey. *Journal of ethnopharmacology*, 171, 64-84.
 40. Simonetti, G., D'Auria, F. D., Mulinacci, N., Innocenti, M., Antonacci, D., Angiolella, L., ... & Pasqua, G. (2017). Anti-Dermatophyte and Anti-Malassezia Activity of Extracts Rich in Polymeric Flavan-3-ols Obtained from *Vitis vinifera* Seeds. *Phytotherapy Research*, 31(1), 124-131.
 41. Simonetti, G., Santamaria, A. R., D'Auria, F. D., Mulinacci, N., Innocenti, M., Cecchini, F., ... & Pasqua, G. (2014). Evaluation of anti-*Candida* activity of *Vitis vinifera* L. seed extracts obtained from wine and table cultivars. *BioMed Research International*, 2014.
 42. Sochorova, L., Prusova, B., Jurikova, T., Mlcek, J., Adamkova, A., Baron, M., & Sochor, J. (2020). The study of antioxidant components in grape seeds. *Molecules*, 25(16), 3736.
 43. Sochorova, L., Prusova, B., Jurikova, T., Mlcek, J., Adamkova, A., Baron, M., Sochor, J. (2020). The Study of Antioxidant Components in Grape Seeds. *Molecules*.
<https://doi.org/10.3390/molecules25163736>.
 44. Tetik, F., Civelek, S., Cakilcioglu, U. (2013). Traditional uses of some medicinal plants in

- Malatya (Turkey). *J. Ethnopharmacol.* 146, 331-346, <https://doi.org/10.1016/j.jep.2012.12.054>.
45. Tkacz, K., Wojdyło, A., Nowicka, P., Turkiewicz, I., Golis, T. (2019). Characterization in vitro potency of biological active fractions of seeds, skins and flesh from selected *Vitis vinifera* L. cultivars and interspecific hybrids. *J. Funct. Foods.* 56, 353-363, <https://doi.org/10.1016/j.jff.2019.03.029>.
46. Tkacz, K., Wojdyło, A., Nowicka, P., Turkiewicz, I., Golis, T. (2019). Characterization in vitro potency of biological active fractions of seeds, skins and flesh from selected *Vitis vinifera* L. cultivars and interspecific hybrids. *J. Funct. Foods.* 56, 353-363, <https://doi.org/10.1016/j.jff.2019.03.029>.
47. Yilmaz, Y., Göksel, Z., Erdoğan, S.S., Öztürk, A., Atak, A., Özer, C. (2015). Antioxidant Activity and Phenolic Content of Seed, Skin and Pulp Parts of 22 Grape (*Vitis vinifera* L.) Cultivars (4 Common and 18 Registered or Candidate for Registration). *J. Food Process. Preserv.* 39, 1682-1691, <https://doi.org/10.1111/jfpp.12399>.
48. Zeghad, N., Ahmed, E., Belkhiri, A., Vander Heyden, Y., Demeyer, K. (2019). Antioxidant activity of *Vitis vinifera*, *Punica granatum*, *Citrus aurantium* and *Opuntia ficus indica* fruits cultivated in Algeria. *Heliyon.* 5, e01575, <https://doi.org/10.1016/j.heliyon.2019.e01575>.