



ISSN (E): 2277-7695

ISSN (P): 2349-8242

NAAS Rating: 5.23

TPI 2023; 12(6): 38-43

© 2023 TPI

www.thepharmajournal.com

Received: 18-03-2023

Accepted: 21-04-2023

Anushree RK

Ph.D. Research Scholar,
Department of Food Science and
Nutrition, Vasantnao Naik
Marathwada Krishi Vidyapeeth,
Parbhani, Maharashtra, India

Veena UK

M.Sc. (Agri.), University of
Agricultural Sciences, GKVK,
Bangalore, Karnataka, India

An overview of functional potential of rose hips

Anushree RK and Veena UK

DOI: <https://doi.org/10.22271/tpi.2023.v12.i6a.20743>

Abstract

Rose hips, also known as rose hep or rose haw, is the name for the fruit that blooms from a rose plant which belongs to the Genus-Rosa and family-Rosaceae. The hips are usually a red-orange colour, but in some species can even vary in colour from black to purple. In addition to vitamins A, B1, B2, B6, C, E, and K, essential fatty acids (Omega 3 and 6), galacto lipids, bioflavonoids, carotenoids, and tannins, rosehips (*Rosa canina*) are a good source of minerals, antioxidants, and other nutrients that are easily absorbed. The fruit contains 60 times the vitamin C found in an orange. It helps to prevent cancer, lower the cholesterol, good for the heart, treat inflammation, aid digestion, regulate blood pressure, improve skin health and improve kidney health. The production of biologically active compounds is increased when rose hips are processed using closed-loop technology. The rose hip is regarded as one of nature's finest wholefoods, a real superfood that offers a variety of health advantages.

Keywords: Rose hips, Vitamin C, anti-inflammatory, antioxidant properties, closed loop technology

1. Introduction

The rose hip is an unappetizing looking fruit and have been used for centuries in herbal remedies. Rose hips have been the ingredient for many jams, jellies, teas and beverages [23]. Rose hips have been used in treatments for many diseases like cold and flu, as well as to treat diabetes. To varying degrees, the chemical composition of the rose hip changes based on which variation it is, where it is grown, how old it is and other factors [11]. Phenolics in fruits from the Rosaceae family may have many health benefits, including antioxidant and anti-cancer properties. In his study, Ercisli (2007) [12] found that the rosacea fruit contains 96 mg GAE/g DW of phenolic compounds. Ascorbic acid, which is present in rose hips, also has anti-oxidant and anti-cancer effects. Recent studies lack information on the world production of rosehips.

Table 1: World production of rose hips [4]

Product	Rosa canina
Common name	Rose hip
Harvest area (ha)	8,412 3,514
Quantity (t)	3514
Main producing country	Chile

Table 2: Nutritional value of Rose hip/100g [9]

SL. No.	Nutrients	Quantity
1.	Water	58.6 g
2.	Energy	162 kcal
3.	Protein	1.60 g
4.	Fat	0.34 g
5.	Carbohydrates	38.22 g
6.	Sugars	2.52 g
7.	Dietary Fiber	24.1 g
8.	Calcium	169 mg
9.	Magnesium	69 mg
10.	Iron	1.06 mg
11.	Sodium	4 mg
12.	Potassium	429mg
13.	Vitamin C	426 mg
14.	Vitamin A	4345 IU
15.	Vitamin E	5.84 mg
16.	Vitamin K	25.9 µg

Corresponding Author:**Anushree RK**

Ph.D. Research Scholar,
Department of Food Science and
Nutrition, Vasantnao Naik
Marathwada Krishi Vidyapeeth,
Parbhani, Maharashtra, India

2. Utilization of Wild Rose Species in India

In India, there are around 150 rose species, both wild and cultivated. The most common varieties of rose plants in India are the *Rosa hybrida* variety [11, 1]. India's regions with typically lower temperatures have more native species of roses than those with higher temperatures [31].

In India there are many uses for roses such as foods and aromatics. Three different species of roses, *Rosa multiflora*, *Rosa indica*, and *Rosa bourboniana* (Edward rose) are used for ornamental purposes. There are also other species that can be used for animal feed, medicine and food [5]. The production of rose hips to be consumed is small, with only *Rosa gigantea* being harvested by locals and sold in markets. Edible varieties include *Rosa viridiflora*, *Rosa sericea* and *Rosa sericea macrophylla* that have high levels of Vitamin C as recorded in some studies.

The research shows that the fruits of rose plants have been consumed for their flavor and nutritional value. Hips of *Rosa multiflora*, which are high in carotene and ascorbic acid, are used for foods, animal feeds and medicinal purposes. Apart from food and medicine, rose hips have been used for therapeutic purposes such as *Rosa centifolia* seeds are an astringent that reduce bleeding and diarrhoea and are also used to heal wounds and ulcers. Beauty and aroma of roses is often admired by people. The damask rose is made into Indian perfumes after being separated from its petals. After it has

been dried out, sections can be powdered to make incense sticks for worshipping a god [31]

For making Gulkand jam, rose blossoms were utilised. To give tea a certain scent, *Rosa centifolia* blooms are incorporated. *Rosa damascena* and *Rosa gallica*, two of the rose subspecies, may both be utilised to make rose water products that have medical benefits. A sore throat, heart disease and swollen tonsils can all be treated with *Rosa damascena*. Making tonics can also be done with the dried petals of *Rosa gallica*. While *Rosa centifolia* treats intestinal ulcers, *Rosa alba* flowers help reduce fever and heart palpitations. While rose pollen contains carotene, other plant parts can also be used, such as *Rosa banksiae* bark is used to make tonics, while the leaves are used to cure wounds. *Rosa multiflora* has shown antibacterial capabilities against Mycobacterium and gram-positive bacteria in its flowers, leaves and stems. It has been reported that *Rosa moschata* roots are useful for treating eye diseases [31]. Rose hips include substances like phenolic compounds and ascorbic acid. Due to these phytochemicals, conditions like redox equilibrium and health benefits are maintained. According to Czynowska *et al.* 2015 [7], these levels of ascorbic acid in rose hips range from low to high depending on a number of factors. Their research confirms that *Rosa canina* has 600 mg/L and *Rosa rugosa* has 1200 mg/L.

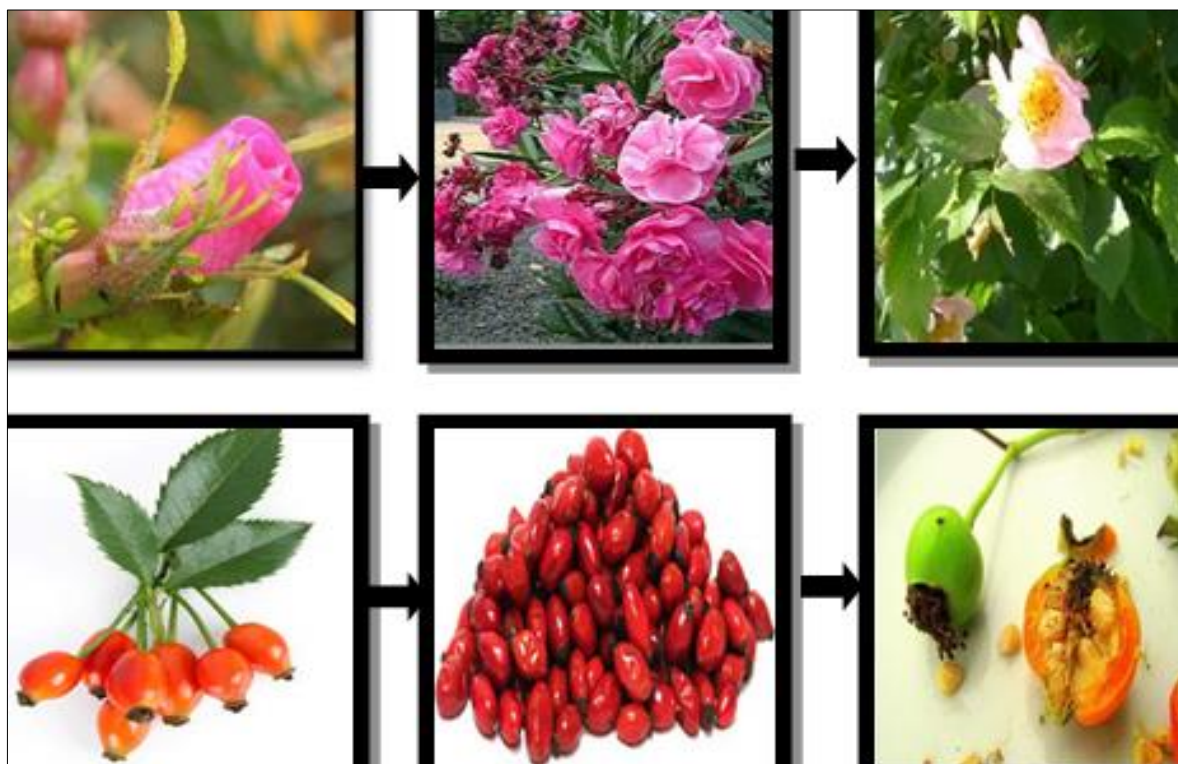


Fig 1: Rose hip cycle

3 Closed-Loop Processing Technology for Rose Hips

Chemical and technical investigations on *Rosa corymbifera* were conducted by Novruzov and Shamsizade, 2004 [26] to determine the most effective method of processing rose hips. The study found that the generation of substances that are helpful to the body is impacted by drying before processing. They created the frozen approach to get around this. Utilizing a semi-closed loop method, the new technique produces high-

yield concentrates of the vitamins C and P, carotene, pectin, vitamin E, and sterine. It is feasible without compromising any content because of the quicker turnaround time and economic advantages over conventional approaches. In a test on a semi-industrial scale, the production process efficiency for vitamin C ranged from 90 to 95% and for pectin from 65 to 70%, with comparable percentages for all other components, but with variable degrees of success.

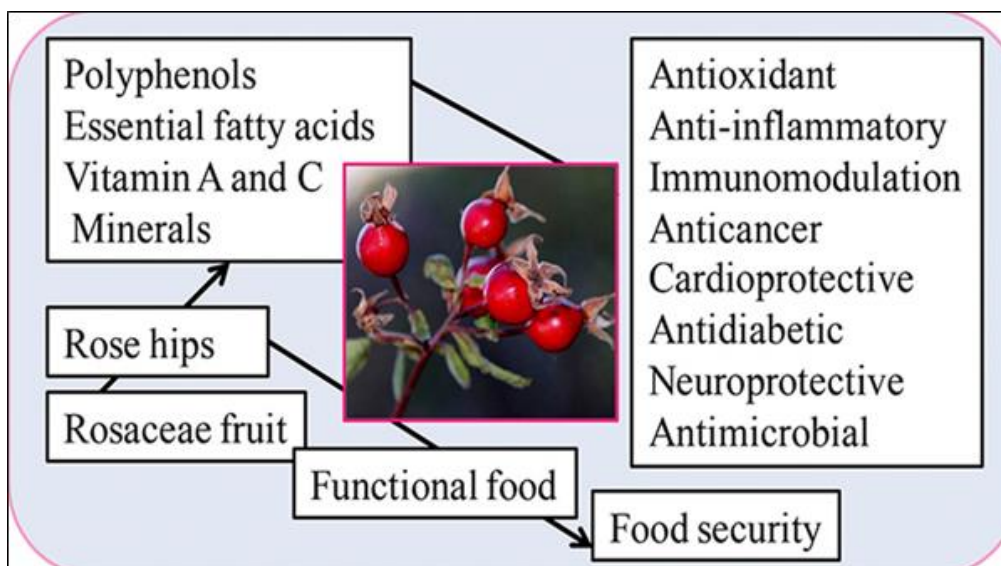


Fig 2: Nutritional Benefits of Rose hips [27]

4. Rose hips provide the following nutritional benefits

4.1. GOPO is a definitive bioactive compound in rose hip

Researchers found that the (2S)-1, 2-di-O-[(9Z, 12Z, 15Z)-octadeca-9, 12, 15-trienoyl] of RH powder of Rose hips contain -3-O-D-galactopyranosyl glycerol (GOPO), which is responsible for the anti-inflammatory properties and decreasing chemotaxis of human neutrophils [21, 29].

According to Schwager *et al.* (2011) [29], the GOPO found in rose hips can decrease inflammatory responses in a range of biological systems, including mouse macrophages, chondrocytes and peripheral blood leukocytes (PBLs).

A double-blind placebo-controlled clinical study from Winther *et al.* 2005 [32] indicated that consuming 5g of RHP daily can significantly reduce WOMAC (Western Ontario and McMaster Universities Osteoarthritis Index) pain.

According to Kharazmi, 2008 [20], an *in vitro* experiment, human blood cells chemotaxis and chemiluminescence were shown to be suppressed by an aqueous rosehip extract. The extract was later identified as GOPO, a galactolipid, using a bioassay-guided fractionation process.

4.2. Linolenic acid and α -linoleic acid

A rose hip extract can relieve symptoms of arthritis. The extract modulates inflammation by influencing certain low-molecular-weight compounds. It has an impact on cytokines and pro-inflammatory enzymes that are also implicated in this process (Dao *et al.* 2004) [8]. One type of such enzyme that plays a role is called cyclooxygenase (COX). COX-1 and COX-2 are the two isoforms that make up the COX family. The isoform COX-1 produces prostaglandins and COX-2 catalyzes the conversion of arachidonic acid to prostaglandin, which has different effects on cell signaling, angiogenesis and platelet aggregation induction (Cho *et al.* 2004) [6]. Both inhibitors are suppressed by an organic solvent extract from the rose hips-linalool and alpha linolenic acid contribute to its anti-inflammatory properties [17, 18].

4.3 Carotenoids in rose hips

After using thermal lens spectrometry and high-performance liquid chromatography, the researchers detected carotenoids in *Rosa canina* fruits [16]. The carotenoids discovered included rubixanthin, lutein, carotene, lycopene and zeaxanthin. Quantitative analysis was used to measure these carotenoids. In a study, Hodisan *et al.* (1997) [16] identified that there was no significant difference in the levels of carotenoids among 10 individuals on average. Horvath *et al.* (2012) [17] found that the carotenoid extract of rosehips had anti-tumour, anti-*Helicobacter pylori* and radical scavenging capabilities when tested *in vitro* (in a petri-dish).

4.4 Lycopene

Rosehip has the highest concentration of lycopene of any fruits and berries, with 12.9-35.2 mg/10. Lycopene is best known for treating cardiovascular disorders, cataracts, asthma and other issues [18]. Several research groups looked into the possibility that lycopene consumption can lower prostate cancer risk. Researchers found promising results but there remain debates about using lycopene as a treatment for prostate cancer [2].

4.5 Vitamin C

Vitamin C, also referred to as L-ascorbic acid, is an essential water-soluble vitamin. It aids in the synthesis of collagen, norepinephrine, and L-carnitine. Alpha-tocopherol (vitamin E) has been substituted in some cases by vitamin C, a key physiological antioxidant. According to various studies, carotenoids and flavonoids increase vitamin C's stability and bioavailability in humans, making rose hips a significant source of beneficial natural sources of vitamin C that prevent oxidation [22, 33, 19, 7, 13].

According to Georgieva *et al.* (2014) [15], the rosehip tree (*Rosa canina*) produces fruits that are exceptionally rich in vitamin C and other antioxidants. The results show that the dog rose has a comparatively large concentration of Vitamin C, with the skin having the highest concentration [28].

5. Functional properties of rose hips

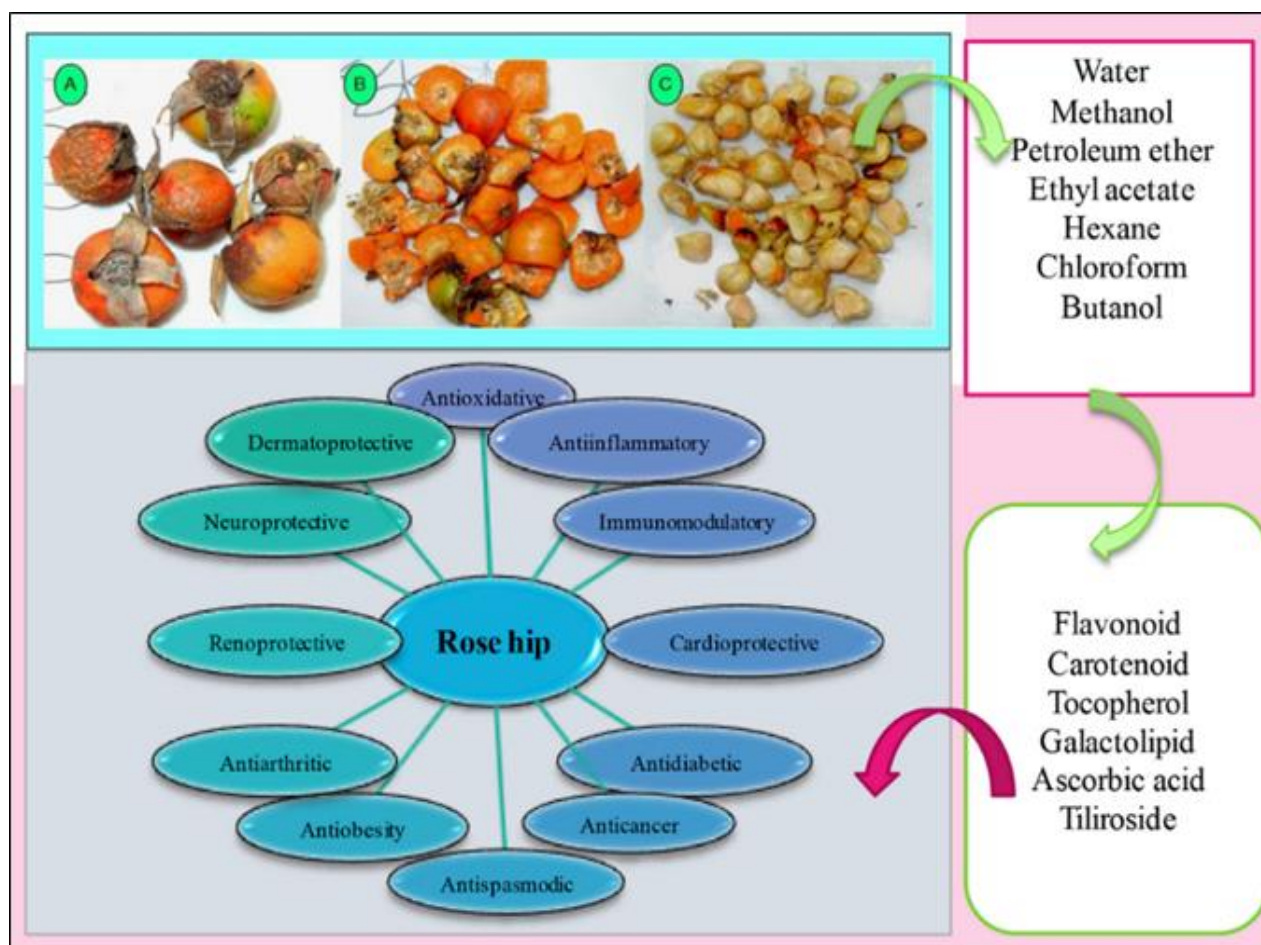


Fig 3: Functional properties of rose hips [27]

5.1 Anti-inflammatory and Immunomodulatory Activity

Rose hips are beneficial for knee pain and inflammation [30]. The following symptoms are lessened by the anti-inflammatory and immunomodulatory properties of rose hips: The most prevalent kind of arthritis is osteoarthritis (OA). The friction of the bones causes discomfort, stiffness, and reduced joint movement. Recent research has revealed that prostaglandins, chemokines and cytokines are crucial for the onset and development of OA [3]. There is evidence that the galactolipid (2S)-1, 2-di-O-[(9Z, 012Z, 15Z)-octadeca-9, 12, 15-trienoyl] an anti-inflammatory compound with chemotaxis-inhibitory properties, 3-O-d-galactopyranosyl glycerol was discovered by bioassay guided fractionation from dried and milling fruits of *Rosa canina* [21].

5.2. Antioxidant Properties

In vitro antioxidant properties of RH and its components have been reported in so many studies among them the Gao *et al.* 2000 found that the ascorbic, phenolic, and lipophilic components all exhibited high antioxidant activity when investigated with a crude extract made with 50% ethanol. The phenolic fraction contributed the most to antioxidant activity, but the lipophilic component played the most effective role [10, 14]. The findings of Fascella *et al.* 2019 [13] showed that there

is a lot of variation among the rose species, with *Rosa canina* and *Rosa sempervirens* hips having the highest total polyphenol contents and antioxidant activities (6784.5 and 6241.2 mg GAE/100 g DW, respectively), while *Rosa canina* and *Rosa micrantha* hips had the highest total anthocyanin contents (2.94 and 3.86 mg CGE/100 g DW, respectively) [33].

5.3 Anti-obese activities

Nagatomo *et al.* (2013) [24] demonstrated the anti-obesity and anti-diabetic characteristics of a rose hips by having shown that its berries increase fatty acid oxidation in the liver and skeletal muscle. According to Ninomiya *et al.* (2007) [25] rose hip extract reduced obesity in rat models by enhancing lipid metabolic activity. In addition, the rose hip extract increased the expression of the PPAR α gene, which is important for reducing inflammation and oxidative stress in fatty acids. Trans-tiliroside is a compound found in *Rosa canina* reduces body weight in mice and inhibits fat buildup [24]. The earlier research of Ninomiya *et al.* 2007 [25] suggested that trans-tiliroside is involved in lipid metabolism and adipogenesis. He also observed that pre-obese volunteers had a healthier body fat distribution and more favourable levels of abdominal visceral fat after daily intake of rose hip extract, without any negative side effects.

Old Tree Rose Powder For Face, 100g
★★★★☆ ~ 37
₹179 ₹280 Save ₹101 (36%)
Save 5% more with Subscribe & Save

VitaGreen 100% Natural Joint Health Rosehip Capsules(60 capsules,500mg) - Pack of 1
★★★★☆ ~ 1
₹484 ₹499 Save ₹15 (3%)

Soulflower Herbal Vitamin C Under Eye Cream With Rosehip, White, 15 g
★★★★☆ ~ 41
₹320 ₹350 Save ₹30 (9%)

Now Foods, C-1000, with Rose Hips & Bioflavonoids, 250 Tablets
★★★★☆ ~ 10
₹2,498 ₹5,999 Save ₹3,501 (58%)
Get it by Monday, November 11

HEALTHY NATURE GROWN NOT MADE
ROSEHIP HIBISCUS HERBAL TEA
LOOSE TEA FILTERS
The Tea Trove Organic Rosehip Hibiscus Tea with Loose Tea Filter for Blood Pressure Control (50 Gm,31 Cups)
★★★★☆ ~ 13
₹396 (₹12.77/Cup) ₹417 Save ₹21

amazon

Products available in Amazon.com and Flipkart.com

vitacost
Vitamin C 500 mg
250 CAPSULES
VITAMIN SUPPLEMENT
Vitacost Vitamin C with Rose Hips - 500 mg - 250 Capsules
More Buying Choices
₹5,103.45 (1 new offer)

Fig 4: Rose Hips Products available in market

5. Conclusion

Rose hips are a great source of vitamins, minerals, and other beneficial compounds. According to studies, rose hips provide more vitamin C than the majority of berries that may be eaten. These research on rose hips' potential to treat complicated metabolic, autoimmune, and degenerative disorders, however, resulted in no findings. Rose hips are expensive, yet consumers are ready to spend a lot for nutritional supplements. Randomized controlled trials in human and animal intervention studies must be conducted to eliminate any potential health concerns associated with rose hip use.

References

- Ahmad N and Anwar F. Rose hip (*Rosa canina* L.) oils. In: Essential oils in food preservation, flavor and safety. Academic Press, 2016, 667-675.
- Ahn J, Gammon MD, Santella RM, Gaudet MM, Britton JA, Teitelbaum SL, *et al.* Associations between breast cancer risk and the catalase genotype, fruit and vegetable consumption and supplement use. *American journal of epidemiology.* 2005;162(10):943-952.
- Berenbaum F. Osteoarthritis as an inflammatory disease (Osteoarthritis is not osteoarthrosis!). *Osteoarthritis and cartilage.* 2013;21(1):16-21.
- Censkowsky U, Helberg U, Nowack A, Steidle M. Overview of world production and marketing of organic wild collected products. International Trade Centre UNCTAD/WTO and International Federation of Organic Agriculture Movements (IFOAM), Geneva, Switzerland.
- Chadha YR. (ed.). The Wealth of India. In: A Dictionary of Indian Raw materials and Industrial Products, CSIR Publications & Information Directory, New Delhi; c1972. p. 9.
- Cho H, Yun CW, Park WK, Kong JY, Kim KS, Park Y, *et al.* Modulation of the activity of pro-inflammatory enzymes, COX-2 and iNOS, by chrysin derivatives. *Pharmacological Research.* 2004;49(1):37-43.
- Czyzowska A, Klewicka E, Pogorzelski E. and Nowak A. Polyphenols, vitamin C and antioxidant activity in wines from *Rosa canina* L. and *Rosa rugosa* Thunb. *Journal of Food Composition and Analysis.* 2015;39:62-68.
- Dao TT, Chi YS, Kim J, Kim HP, Kim S, Park H. Synthesis and inhibitory activity against COX-2 catalyzed prostaglandin production of chrysin derivatives. *Bioorganic & medicinal chemistry letters.* 2004;14(5):1165-1167.
- David H, Linda L, Pamela P. USDA National Nutrient Database for Standard Reference, Release 24. Beltsville: Nutrient Data Laboratory, USDA National Nutrient Database for Standard Reference, 2016.
- Egea I, Sánchez-Bel P, Romojaro F, Pretel MT. Six edible wild fruits as potential antioxidant additives or nutritional supplements. *Plant foods for human nutrition.*

- 2010;65(2):121-129.
11. Ercisli S. Chemical composition of fruits in some rose (*Rosa* spp.) species. *Food Chemistry*. 2007;104(4):1379-1384.
 12. Ercisli S. Rose (*Rosa* spp.) germplasm resources of Turkey. *Genetic Resources and Crop Evolution*. 2005;52(6):787-795.
 13. Fascella G, D'Angiolillo F, Mammano MM, Amenta M, Romeo FV, Rapisarda P, *et al.* Bioactive compounds and antioxidant activity of four rose hip species from spontaneous Sicilian flora. *Food Chemistry*. 2019;289:56-64.
 14. Gao X, Björk L, Trajkovski V, Uggla M. Evaluation of antioxidant activities of rosehip ethanol extracts in different test systems. *Journal of the Science of Food and Agriculture*. 2000;80(14):2021-2027.
 15. Georgieva S, Angelov G, Boyadzhieva S. Concentration of vitamin C and antioxidant activity of rosehip extracts. *Journal of Chemical Technology Metallurgy*. 2014;49(5):451-4.
 16. Hodisan T, Socaciu C, Ropan I, Neamtu G. Carotenoid composition of *Rosa canina* fruits determined by thin-layer chromatography and high-performance liquid chromatography. *Journal of pharmaceutical and biomedical analysis*. 1997;16(3):521-528.
 17. Horváth G, Molnár P, Radó-Turcsi E, Deli J, Kawase M, Satoh K, *et al.* Carotenoid composition and in vitro pharmacological activity of rose hips. *Acta Biochimica Polonica*, 2012, 59(1).
 18. Ilic D, Forbes KM, Hased C. Lycopene for the prevention of prostate cancer. *Cochrane database of systematic reviews*, 2011, 11.
 19. Ilyasoğlu H. Characterization of rosehip (*Rosa canina* L.) seed and seed oil. *International Journal of Food Properties*. 2014;17(7):1591-1598.
 20. Kharazmi A. Laboratory and preclinical studies on the anti-inflammatory and anti-oxidant properties of rosehip powder-Identification and characterization of the active component GOPO®. *Osteoarthritis and Cartilage*. 2008;16:S5-S7.
 21. Larsen E, Kharazmi A, Christensen LP, Christensen SB. An anti-inflammatory galactolipid from Rose hip (*Rosa canina*) that inhibits chemotaxis of human peripheral blood neutrophils *in vitro*. *Journal of Natural Products*. 2003;66(7):994-995.
 22. Li Y, Schellhorn HE. New developments and novel therapeutic perspectives for vitamin C. *The Journal of nutrition*. 2007;137(10):2171-2184.
 23. Nađpal JD, Lesjak MM, Šibul FS, Anačkov GT, Četojević-Simin DD, *et al.* Comparative study of biological activities and phytochemical composition of two rose hips and their preserves: *Rosa canina* L. and *Rosa arvensis* Huds. *Food chemistry*. 2016;192:907-914.
 24. Nagatomo A, Nishida N, Matsuura Y, Shibata N. Rosehip extract inhibits lipid accumulation in white adipose tissue by suppressing the expression of peroxisome proliferator-activated receptor gamma. *Preventive nutrition and food science*. 2013;18(2):85.
 25. Ninomiya K, Matsuda H, Kubo M, Morikawa T, Nishida N, Yoshikawa M. Potent anti-obese principle from *Rosa canina*: structural requirements and mode of action of trans-tiliroside. *Bioorganic & medicinal chemistry letters*. 2007;17(11):3059-3064.
 26. Novruzov EN, Shamsizade LA. Closed-loop processing technology for rose hips. In: *International Rose Hip Conference*. 2004;690:269-276.
 27. Patel S. Rose hip as an underutilized functional food: Evidence-based review. *Trends in Food Science & Technology*. 2017;63:29-38.
 28. Rathore DS. A note on ascorbic acid content of rose hips. *Progressive Horticulture*. 1984;16:159-160.
 29. Schwager J, Hoeller U, Wolfram S, Richard N. Rose hip and its constituent galactolipids confer cartilage protection by modulating cytokine and chemokine expression. *BMC complementary and alternative medicine*. 2011;11(1):1-14.
 30. Schwager J, Richard N, Schoop R, Wolfram SA. Novel rose hip preparation with enhanced anti-inflammatory and chondroprotective effects. *Mediators of inflammation*; c2014.
 31. Tejaswini, Prakash MS. Utilization of wild rose hips species in India. *Indian Institute of Horticulture Research, Bengaluru, India. Journal of Acta Horticulture*. 2015;6(1):91-96.
 32. Winther K, Apel K, Thamsborg G. A powder made from seeds and shells of a rose-hip subspecies (*Rosa canina*) reduces symptoms of knee and hip osteoarthritis: a randomized, double-blind, placebo-controlled clinical trial. *Scandinavian journal of rheumatology*. 2005;34(4):302-308.
 33. Winther K, Hansen ASV, Campbell-Tofte, J. Bioactive ingredients of rose hips (*Rosa canina* L) with special reference to antioxidative and anti-inflammatory properties: *in vitro* studies. *Botanics: Targets and Therapy*. 2016;6:11-23.