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ORIGINAL ARTICLE

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Actinidia deliciosa (Kiwi fruit): A comprehensive review on the nutritional composition, health benefits, traditional utilization, and commercialization

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Abstract

Kiwi fruit (*Actinidia deliciosa*) belongs to the family *Actinidiaceae* and genus *Actinidia*. It is one of the most commercialized fruits on the international front and is loaded with many nutrients such as vitamins, minerals, and phytochemicals, and its parts are well recognized for their medicinal and therapeutic properties against diseases associated with the cardiovascular system, diabetes, kidney problems, cancer, digestive disorders, bone, and eye problems. Being a significant source of phytochemicals including caffeic acid, gallic acid, syringic acid, salicylic acid, ferulic acid, and protocatechuic acid; it contributes to the major flavonoid and phenolic contents of kiwi fruit. Kiwi fruit and its components are known to exhibit numerous pharmacological properties include antidiabetic, anti-tumor, anti-inflammatory, anti-ulcer, antioxidant activity, hypoglycemic, hypolipidemic effects, and many more. Besides these, kiwi fruit also finds its traditional application in the effective treatment of edema, hepatitis, kidney problems, rheumatoid arthralgia, and microbial infections. The fiber present in kiwi fruit favors its water retention capacity which further aids in decreasing the transit time and maintains gastrointestinal health of the individual. Investigations are also being done on the insulin and glucose balance, weight maintenance, and homeostatic balance to kiwi fruit consumption. The present review chiefly aims to establish a better understanding of the nutritional composition, pharmacological properties, health benefits, traditional utilization, and commercialization of kiwi, which helps us to provide scientific evidence-based recommendations to the consumers.

Novelty impact statement:

1. Kiwi is a potent source of vitamins like vitamin A, B, C, E, and K and notably appreciable levels of dietary fiber, vitamins, minerals and various phytochemicals such as carotenoids, flavonoids, anthocyanins, and lutein which contribute to the rich pharmacological profile of kiwi.
2. It exhibits strong antimicrobial, antiviral efficacy and immunomodulatory effect owing to the presence of bioactive constituents in kiwi fruit.
3. Further extensive research is still required in this field to attract the food industrialists for the value-addition and development of kiwi-based food products.

1 | INTRODUCTION

Kiwi fruit belongs to the family of *Actinidiaceae* and genus *Actinidia*. The other names of kiwi fruit are Macaque peach, Mihoutau, and Chinese gooseberry (Tyagi et al., 2015). The genus *Actinidia* has 76 species, but only two species *Actinidia chinensis* (golden kiwifruit) and *Actinidia deliciosa* (fuzzy kiwifruit) are produced on a commercial scale. Other species of the genus *Actinidia* include *Actinidia arguta* (baby kiwifruit), *Actinidia purpurea* (purple kiwifruit), *Actinidia kolomikta* (arctic kiwifruit), *Actinidia eriantha* (velvet vine), *Actinidia polygama* (silver kiwifruit), and *Actinidia melanandra* (red kiwi) (Guroo et al., 2017). It is nearly 3 inches long and has a brown hairy peel containing green flesh and white pulp in the center with many minute black edible seeds (Tyagi et al., 2015). China leads all the countries in the production of kiwi fruit followed by Italy. Italy and New Zealand are the world's two biggest exporters of kiwi (Testolin & Ferguson, 2009). It is one of the newest fruit crops to gain international commercial importance (Ferguson & Ferguson, 2002). 56.5% of the total produce (i.e., 8.5 thousand tons) of kiwi fruit in India comes from Arunachal Pradesh followed by Nagaland. The plant grows best in either full sun or light shade and generally needs slightly acidic soil that has a pH between 6.0 and 6.5. Kiwi is mostly eaten as fresh, while some are also processed into juices, purees, candies, fortified drinks, dehydrated, frozen and lyophilized products, leather, spirits, and syrups (Guroo et al., 2017). It has been revealed through extensive research studies that it contains ample amount of nutrients that provide health benefits to the one's consuming it by improving the digestive, immune, and metabolic health of an individual (Richardson et al., 2018). It is a potent source of vitamins such as vitamins A, B, C, E, and K and notably appreciable levels of dietary fiber, folate, potassium, and other minerals (Richardson et al., 2018). It consists of various phytochemicals such as carotenoids, flavonoids, anthocyanins, and lutein. It possesses various pharmacological properties such as anti-cancerous, anti-diabetic, antifertility, hepatoprotective, antiulcer, prevention of cataracts, and macular degeneration (Nishiyama et al., 2004). Owing to the several medicinal properties of kiwi fruit, it has become awfully popular during the past two decades (Tyagi et al., 2015).

Kiwi stores an ample amount of vitamin C, which acts as an antioxidant and helps in improving the skin texture. It also helps in the synthesis of collagen protein which favors youthful and flexible skin by preventing the damage caused by harmful UV radiations from skin (Richardson et al., 2018). It is a good source of actinidin which is a proteolytic enzyme favoring the digestion of complex protein structures in stomach as well as small intestine. The bioactive materials present in kiwi fruit brings about a promising change in the human colonic microbes, changes fecal consistency, reduces abdominal discomfort, and relieves the symptoms of constipation by decreasing intestinal transit time (Richardson et al., 2018; Tyagi et al., 2015). The phytochemicals present in kiwi (xanthophylls, lutein) aids in maintaining eye health and prevents macular degeneration. Some of the other popular health benefits associated with the consumption of kiwi are that it supports cardiovascular health, promotes better sleep, aids blood clotting, absorption of vitamin D, facilitates iron absorption, reduces stone formation in kidneys, exhibits cytotoxic and antimicrobial activity (Tyagi et al., 2015). It is used for treating and preventing various kinds of cancers, e.g., stomach, lung, and liver cancer (Singh et al., 2018). This review majorly focuses on the nutritional profile, composition, antimicrobial activity, pharmacological and health benefits of kiwi fruit.

2 | COMPOSITION AND NUTRITIVE VALUE OF KIWI

The chemical composition of kiwi is of significant interest to those wishing to comprehend the nutritional value and potential health benefits of using this fruit. The composition of fruit has been considered primarily in terms of the nutritive components including protein, lipids, carbohydrates, vitamins (vitamins A, C, and E and folic acid), minerals, polyphenols, antioxidants, and dietary fiber (Drummond, 2013; Pinelli et al., 2013). The nutritional composition of two varieties of kiwi fruit, *viz*. *A*. *deliciosa* and *A*. *chinensis*, is compared in Table 1. The various bioactive polyphenols present in kiwi include caffeic acid and other chlorogenic derivatives, syringic acid, ferulic acid, gallic acid, salicylic acid, protocatechuic acid, quercetin, glycosides, coumaric acid, and procyanidins (Sun-Waterhouse et al., 2009) (Figure 1).

The various important minerals present in kiwi include calcium, iron, potassium, magnesium, manganese, copper, phosphorus, zinc, and selenium. These minerals play a vital role in the several metabolic activities taking place in the human body and also possess different bioavailability depending upon the absorption rate of every mineral (Chawla et al., 2019, 2020). The amount of calcium present in *A*. *deliciosa* is 34 and 20 mg/100 g in *A*. *chinensis*. Calcium is actively transported through the intestinal enterocytes from either of the two transport channels (Chawla et al., 2017; Sadh et al., 2017). It binds to Calbindin D_{ak} which is a transport protein and is then excreted out via basolateral membrane. This process is catalyzed by the enzyme names Ca-ATPase or by the Na-Ca exchanger (Bronner, 2003; Wolber et al., 2013). Furthermore, 1,25-dihydroxy vitamin D (the active form of vitamin D) favors the active Ca uptake in the human body and is also involved in the expression of transport protein i.e., Calbindin D_{ak} (Christakos, 2012; Wolber et al., 2013). The amount of magnesium present in *A*. *deliciosa* is 17 and 14 mg/100 g in *A*. *chinensis*. Its absorption has been known to take place passively in the small intestine. Owing to the less permeability of Mg as compared to Ca, it is absorbed to a lesser extent in the human intestine (Lule et al., 2020) Moreover, the antinutrient factors (phytic acid) and certain other medications like antibiotics further hinder the Mg absorption (Bohn et al., 2004; Wolber et al., 2013).

A. *deliciosa* and *A*. *chinensis* consist of 0.13 and 0.147 mg/100 g amount of copper, respectively, which is believed to be absorbed in the human small intestine via Cu-binding transport protein CTR1 and ATOX1. It has also been reported by researchers that copper uptake is influenced by chloride ions, but the precise pathway has

TABLE 1 Nutritional composition of *A. deliciosa* and *A. chinensis*

Nutrient	*A. deliciosa* (fuzzy kiwifruit) value per 100 g	*A. chinensis* (gold kiwifruit) value per 100 g
Water (g)	83.07	83.22
Total protein (g)	1.14	1.23
Energy (kcal/KJ)	61/255	60/251
Fat (g)	0.52	0.56
Carbohydrate (g)	14.66	14.23
Fiber (g)	3.0	2.0
Sugar (g)	8.99	10.98
Minerals (mg)		
Calcium	34	20
Iron	0.31	0.29
Magnesium	17	14
Phosphorus	34	29
Potassium	312	316
Sodium	3	3
Zinc	0.14	0.1
Copper	0.13	0.147
Manganese	0.098	0.058
Selenium	0.2	3.1
Vitamins (mg)		
Vitamin C	92.7	105.4
Vitamin B_1	0.027	0.024
Vitamin B_2	0.025	0.046
Vitamin B_3	0.341	0.28
Vitamin B_5	0.183	0.5
Vitamin B_6	0.063	0.057
Vitamin B_9	25	34
Choline	7.8	5.0
Vitamin B_{12} (μg)	0	0
Vitamin A (IU)	87	72
α-tocopherol	1.46	1.49
ϒ-tocopherol	0.03	0.01
δ-tocopherol	0.00	0.01
Vitamin K (μg)	40.3	5.5
β-carotene (μg)	52	43
Lycopene (μg)	0	0
Amino acids (g)		
Tryptophan	0.015	0.044
Threonine	0.047	0.042
Isoleucine	0.051	0.037
Glutamic acid	0.184	0.129
Glycine	0.060	0.046
Proline	0.044	0.028
Serine	0.053	0.040
Leucine	0.066	0.056
Methionine	0.024	0.016

(Continues)

TABLE 1 (Continued)

Nutrient	*A. deliciosa* (fuzzy kiwifruit) value per 100 g	*A. chinensis* (gold kiwifruit) value per 100 g
Cystine	0.031	0.025
Phenylalanine	0.044	0.030
Tyrosine	0.034	0.023
Valine	0.057	0.046
Arginine	0.081	0.109
Histidine	0.027	0.020
Alanine	0.053	0.040
Aspartic acid	0.126	0.119
Others		
GI (glycemic index)	39.3	48.5
Lutein zeaxanthin (μg)	122	114
Cholesterol (mg)	0	0

Source: Drummond (2013), Stonehouse et al. (2013), Lee et al. (2014), Guroo et al. (2017), Richardson et al. (2018).

not been fully defined yet (Zimnicka et al., 2011). Another important mineral present in kiwi is potassium, which is found to be 312 and 316 mg/100 g in *A. deliciosa* and *A. chinensis*, respectively. The intestinal absorption of potassium takes place by both active absorption and passive transport. Active uptake of potassium takes place in the enterocytes via sodium-dependent H^+/K^+ ATPase. Furthermore, its absorption is also regulated by certain hormones like aldosterone (Sorensen et al., 2010; Wolber et al., 2013).

Besides the above minerals, kiwi is also a good source of a few trace minerals that are essential for the human body such as manganese, chromium, zinc, and selenium. Certain factors including concentration, health status, excretory losses, drug-nutrient interaction, and nutrient-nutrient interaction influence the bioavailability of vitamins and minerals in the human body. Antinutrients such as phytates, oxalates, and tannins can hinder the absorption and bioavailability of various minerals present in kiwi fruit. Studies have reported that kiwi does not exhibit any sort of significant antinutritive activity although its flesh contains remarkably low levels of oxalates and tannic acid (Latocha et al., 2010; Rassam & Laing, 2005; Wolber et al., 2013).

Although the antinutritional components in foods hinder mineral bioavailability, certain bioactive factors favor and enhance the absorption of minerals in the human body. It has been well established that iron absorption is enhanced by the presence of ascorbic acid (vitamin C). Thus, the consumption of kiwi fruit has been associated with the treatment of iron deficiency as it is a potent source of ascorbic acid (Beck et al., 2011). Research investigation has also been conducted to study the effect of consumption of kiwi fruit on iron uptake and it was found that kiwi not only positively upregulates iron intake but also increased the calcium uptake in a significant manner (Armah et al., 2008; Wolber et al., 2013). Ascorbic acid is also essential for the proper functioning of white blood cells and helps in defending the invasion of pathogenic microorganisms. It has been demonstrated that the consumption of vitamin C rich kiwi fruit improves the immune system and functioning of white blood cells. Moreover, it is also effective in reducing fatigue, depression as well as mood disturbances (Carr et al., 2012, 2013; Hunter et al., 2012; Wolber et al., 2013).

3 | PHARMACOLOGICAL PROFILE AND HEALTH BENEFITS OF KIWI FRUIT

Several research studies have been conducted by different researchers to explore the pharmacological profile and health benefits of kiwi. It has been reported to exhibit numerous biological activities such as anti-oxidant, anti-diabetic, anti-inflammatory, anti-hypertensive, anti-carcinogenic, antifungal, antiviral, anti-asthmatic, hepatoprotective, anti-platelet, anti-nociceptive, anti-HIV, anti-microbial, anti-constipation, cytotoxic, anti-tumor and anti-thrombin (Chawla et al., 2016). It possesses various health benefits owing to its rich pharmacological profile. It protects against cancer, diabetes, asthma, HIV-AIDS, and cardiovascular disorders. It plays a significant role in improving metabolic abnormalities such as dyslipidemia, low-density lipoprotein, triglycerides, hypertension, abnormal glucose metabolism, vascular inflammation, and hemostatic disorder (Stonehouse et al., 2013). The only irritant factor present in kiwi is the oxalates. These oxalates can cause oral mucosal irritation in some individuals. The consumption of this fruit should be avoided by patients of nephrolithiasis and urolithiasis due to the high oxalate content of the fruit (7.8 to 45 mg/100 g in golden kiwi fruit and 12.7 to 84.3 mg/100 g in green kiwi fruit). Oxalate in high concentrations can also reduce the bioavailability of calcium, magnesium, and iron in the body (Perera et al., 1990). The various health benefits along with their key findings have been presented in Table 2.

4 | ANTIMICROBIAL AND ANTIVIRAL EFFICACY OF KIWI FRUIT

The drug resistant microbial strains of bacteria, virus, fungi and yeast necessitates the need of conducting studies on the antimicrobial and

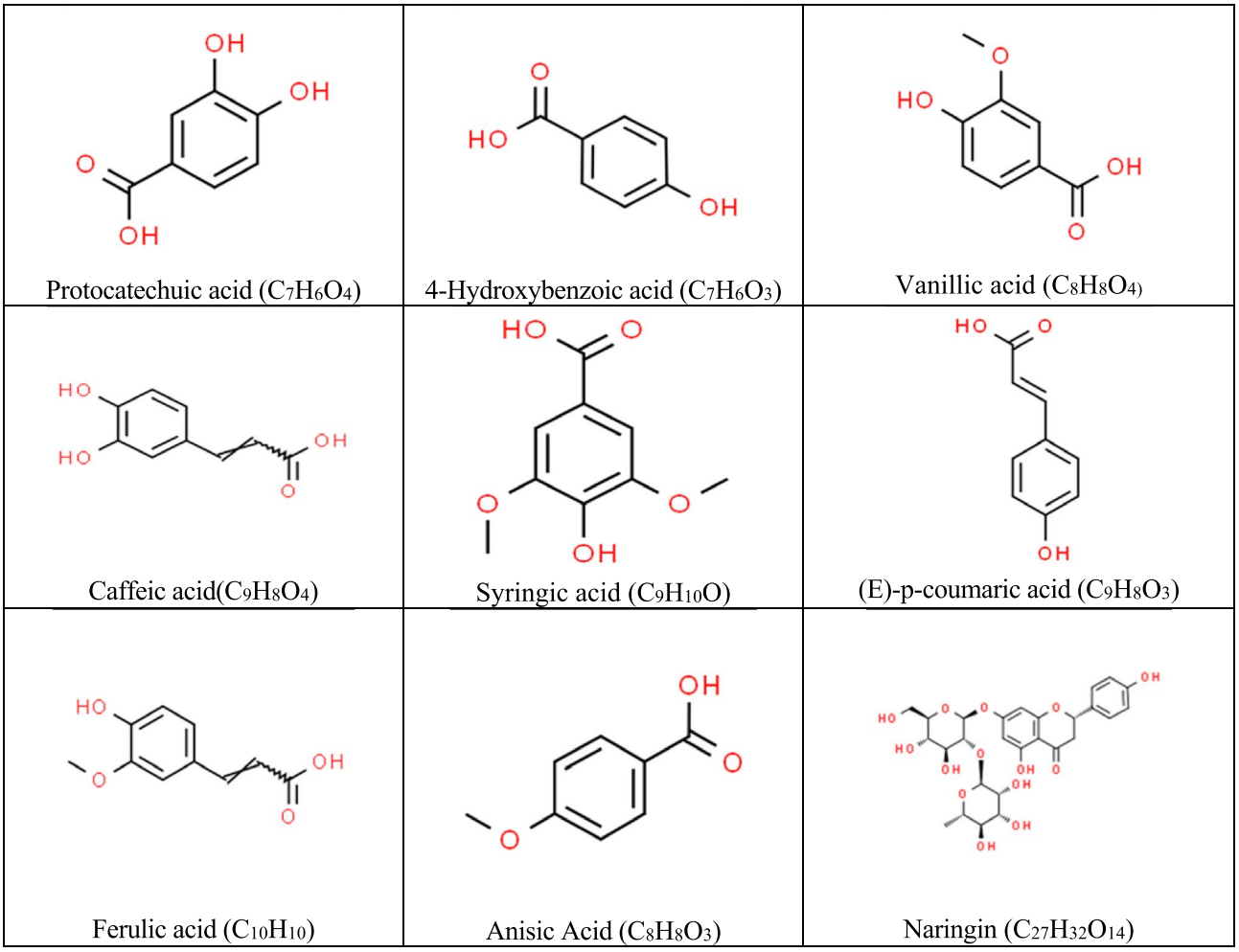

FIGURE 1 Various bioactive components of kiwi fruit. Kiwi fruit is a rich source of various bioactive constituents including Protocatechuic acid ($C_7H_6O_4$), 4-Hydroxybenzoic acid ($C_7H_6O_3$), Vanillic acid ($C_8H_8O_4$), Caffeic acid ($C_9H_8O_4$), Syringic acid ($C_9H_{10}O$), (E)-p-coumaric acid ($C_9H_8O_3$), Ferulic acid ($C_{10}H_{10}$), Anisic Acid ($C_8H_8O_3$), Naringin ($C_{27}H_{32}O_{14}$), 4-Hydroxybenzoic acid ($C_7H_6O_3$), Gallic acid ($C_7H_6O_5$), Salicylic acid ($C_7H_6O_3$), Kaempferol ($C_{15}H_{10}O_6$), Quercetin ($C_{15}H_{12}O_8$), Ascorbic acid ($C_6H_8O_6$), Chlorogenic acid ($C_{16}H_{18}O_9$), Sinapinic acid ($C_{11}H_{12}O_5$), Cinnamic acid ($C_9H_8O_2$), D-(+)-Catechin ($C_{15}H_{14}O_6$), (−)-Epicatechin ($C_{15}H_{14}O_6$) and Rutin ($C_{27}H_{30}O_{16}$). These bioactive components contribute to the pharmacological properties of kiwi

antiviral efficacy of food products. Kiwi fruit is also a rich source of phytochemicals due to the presence of which it exhibits antimicrobial and antiviral properties. Along with various therapeutic properties, the bioactive compounds of kiwi fruit could have antimicrobial properties (Bains & Chawla, 2020; Bains et al., 2020). In this regard, Salama et al. (2018) conducted a research study to investigate the antioxidant, antimicrobial and antiviral activity of the peel of *A. deliciosa*. Antioxidant activity of the aqueous, acetone, methanolic, and ethanolic extract of kiwi fruit peel was determined and it was inferred from the obtained results that kiwi is rich in various strong antioxidant compounds like lutein, vitamin C, phenolics, carotenoids, chlorophyll, flavonoids which contributes to the high antioxidant potential of this fruit.

The antimicrobial study conducted on kiwi fruit peel suggested that the ethanol (80%) and acetone (80%) extract of the peel show a wide zone of inhibition against the gram-positive bacterial strains (19.82 mm for *Bacillus subtilis* in acetone extract and 17.65 mm for *Staphylococcus aureus* in ethanolic extract), gram-negative bacterial strains (19.52 mm for *Escherichia coli* and 19.50 mm for *Pseudomonas aeruginosa*), fungus (17.85 mm for *Aspergillus flavus*) and yeast (17.66 mm for *Saccharomyces cerevisiae* and 16.52 mm for *Candida albicans*) at a concentration of 400–600 ppm. Moreover, the acetone extract was found to be more effective against these bacterial as well as fungal strains as compared to the ethanolic extract of fruit peel. Thus, it was finally concluded from the studies that peels of kiwi can be utilized as an important ingredient having high nutritional value for the production of functional food commodities. Also, the isolation of the constituents possessing good biological value is highly recommended (Salama et al., 2018). In the same line, a research study carried out by Alim et al. (2019) revealed that gram-positive bacteria were found to be more vulnerable to polyphenolic compounds of kiwi as compared to gram-negative bacterial strains. This can be attributed to the presence of lipopolysaccharide molecules in the outer hydrophilic (water-loving) membrane which acts

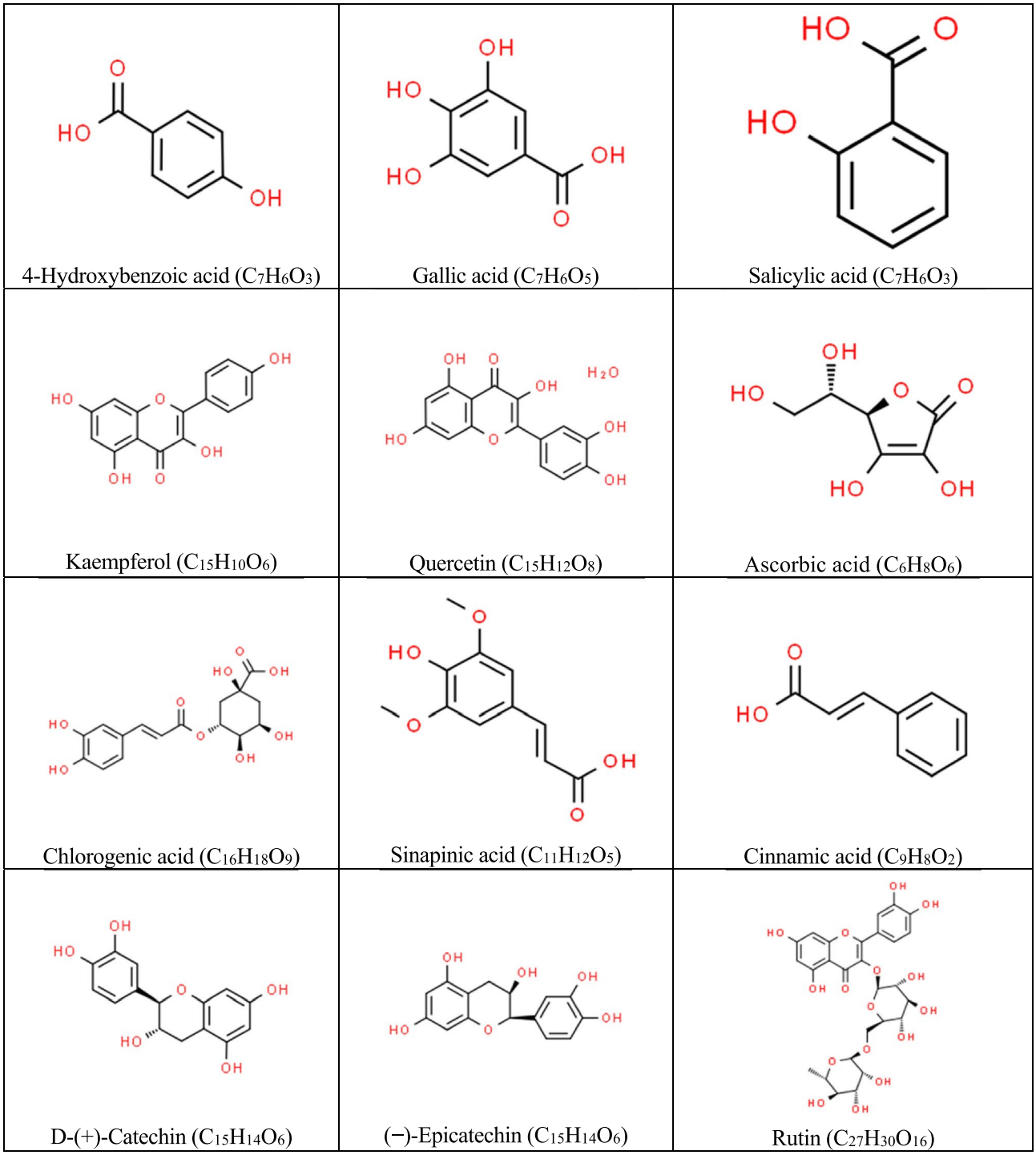

FIGURE 1 Continued

as a hindrance to the compounds that are known to be hydrophobic (water-repelling) in nature.

Kiwi fruit is known to play a supportive role in providing immunity by modulating the immune system of the individuals (Skinner et al., 2011). Several researchers including Shu et al. (2008) and Hunter et al. (2008) suggested through their research investigations carried out on mice that supplementation with kiwi fruit extract improves the lymphocyte transformation, favors phagocytosis, enhances the production of serum antibodies or immunoglobulins (such as IgA, IgG, and IgM) as well as enhances the biomarkers of innate and acquired immunity. These factors contribute to the immunomodulatory effects of kiwi, helps in combating the symptoms of cold, flu and therefore, prove the antiviral efficacy of kiwi fruit.

TABLE 2 Health benefits of kiwi

Health benefits	Key findings	References
Prevent cancer	• The biochemical composition of kiwifruit like carotenoids, vitamins, antioxidants, and fibers are effective in the prevention of various types of cancers • It works as a cytotoxic agent against malignant cancerous cells instead of affecting the healthy body cells • Being a good source of fibre, it helps in decreasing the risk of colon cancer	Motohashi et al. (2002)
Maintains skin health	• It is a potent source of vitamin C which being an antioxidant, helps in preventing damage caused by UV radiations, pollution, smoke and thus improves overall skin quality • It is rich in vitamin K that is essential for healthy and glowing skin	Tyagi et al. (2015)
Maintains good digestive health	• The fruit has been known to maintain good digestive health as it possesses laxative properties which helps in treating constipation • It contains actinidin (proteolytic enzyme) which influences the gastric and intestinal digestion of proteins in a positive manner	Stonehouse et al. (2013)
Protects against oxidative DNA damage	• The wide range of antioxidants (vitamins, zeaxanthin, lutein, polyphenols etc.) present in kiwi contributes to its high antioxidant potential • It plays a vital role in preventing postprandial oxidative damage owing to its high antioxidant capacity • Research studies have revealed that the consumption of kiwi juice has been linked with a decrease in the oxidative damage in DNA	Collins et al. (2001), Prior (2007), Stonehouse et al. (2013)
Diabetes	• It is a suitable choice for the patients suffering from type 2 diabetes mellitus as the whole fruit is known to have a low glycemic impact	Mishra et al. (2017), Wilson et al. (2018)
Improves immunity	• It might improve innate and adaptive immune function of human blood cells • Research studies have revealed that supplementation of kiwi fruit extract in mice resulted in an increase in the rate of process of phagocytosis and immunoglobulins levels (IgA, IgG and IgM)	Ma et al. (2006), Skinner et al. (2011), Hunter et al. (2011)
Help to treat iron deficiency	• Kiwi helps in overcoming iron deficiency • It contains high amount of pigments like carotenoids, ascorbic acid and citric acid which helps in improving the iron status of an individual	Beck et al. (2011), Diaz et al. (2017)
Improves cardiovascular health	• Being a potent source of polyphenols and antioxidants, kiwi is proved to be effective in the maintenance of heart health • It helps to regulate blood pressure (B.P.) and platelet aggregation in smokers. It has been known to cause reduction in the systolic and diastolic B.P. by 10 and 9 mm Hg respectively	Karlsen et al. (2013), Tyagi et al. (2015)
Bone health	• It exhibits protective effects with daidzein on bone metabolism overiectimized rats • It helps to prevent overiectomy induced decline in BMD (bone mineral density)	Katsumata et al. (2015)
Pregnant women	• Kiwi is a good source of folic acid and thus advantageous for pregnant women as it aids in foetal development	Tyagi et al. (2015)

TABLE 3 Traditional uses of different parts of kiwi fruit

Plant part	Traditional utilization	Reference
Root	• The root of kiwi plant possesses anti-hepatotoxic, anti-pyorrheal and gingival inflammation • Root is utilized for treating hepatitis, edema, gastric and breast carcinoma	Shastri et al. (2012), Chawla et al. (2016)
Stem	• Stem and root have sedative effect and are used as diuretic and febrifuge • It is utilized for treating stones of urinary tract, liver and esophageal cancer as well as rheumatoid arthralgia	Ferguson and Bollard (1990), Shastri et al. (2012)
Seed	• The seeds of kiwi exhibit blood thinning property due to the presence of vitamin E and omega-3 fatty acids	Chawla et al. (2016)
Peel	• The peel extract exhibit anti-microbial, anti-viral properties • Due to the presence of high phenolic content, the peel extract has been known to possess anti-oxidant and anti-cancer properties	Motohashi et al. (2001), Zawawy (2015), Chawla et al. (2016), Alim et al. (2019)

TABLE 4 Commercialization of kiwi fruit

Kiwi-based product	Brand or company
AloFrut Kiwi Aloevera Juice	AloFrut
Monin kiwi syrup	Monin
Bella nuts dehydrated kiwi	Bellanuts
Kiwi jam	Orchard Lane
Ck Paris kiwi fruit scrub	CK Paris
Green apple and kiwi face wash	Anherb
Kiwifruit chocolates	Aotea
Kiwi crush	Mapro, Mala's
Kiwi fruit lip balm	Khadi natural
Kiwi soap	Vaadi herbal
Kiwi freshness gel face facial	Lakme
Purple kiwi seeds milk taste	Wintefei

5 | TRADITIONAL UTILIZATION OF KIWI FRUIT

The extract of kiwi fruit has been reported to relieve the symptoms of numerous disorders such as skin diseases, high blood lipid levels, and improvement of gastrointestinal diseases in traditional Chinese medicine. The presence of biologically active phytochemicals has stimulated investigations into its anti-inflammatory and antioxidant properties that might help in preventing lifestyle disorders and various degenerative diseases (Singletary, 2012). The traditional utilization of different parts of the kiwi plant is given in Table 3.

6 | COMMERCIALIZATION OF KIWI FRUIT

Kiwi fruit has achieved a steady position in the market of fresh fruits due to various aspects like convenience, good taste, health, and visual properties. There has been a rapid growth in the development of functional foods, nutraceuticals, beverages, and desserts. Kiwi fruit products include drinks, confectionery, yogurts, soaps, shampoos, and other cosmetic products (Stanley et al., 2006). Some of the kiwi-based products available in the market are given in Table 4.

7 | CONCLUSION

Kiwi fruit is not available throughout the year; therefore, attempts can be made in the development of kiwi-based processed foods. It's processing as well as preservation can be used as a weapon in the enhancement of employment opportunities for the rural population. Various studies have revealed the excellent pharmacological profile of kiwi fruit. Further research is still required in this field to attract the food industrialists for the value-addition and development of kiwi-based food products. It might help in the development of incredible pharmacological products and nutritional supplements for the welfare of mankind.

CONFLICT OF INTEREST

The authors have declared no conflicts of interest for this article.

AUTHOR CONTRIBUTIONS

Satpal: Conceptualization; Data curation; Investigation; Methodology; Resources; Writing-original draft; Writing-review & editing. **Vishesh Bhadariya:** Conceptualization; Data curation; Formal analysis; Supervision; Writing-review & editing. **Kartik Sharma:** Data curation; Supervision; Writing-review & editing.

DATA AVAILABILITY STATEMENT

Data openly available in a public repository that issues datasets with DOIs.

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