



THE HEALTH AND NUTRITIONAL ATTRIBUTES OF ACTINIDIA DELICIOSA: A REVIEW

Ragini Dilip Patil¹, Pranav Mohan Thosar², Akash Sanjay Tupe³, Shivani Sudam Sonawane⁴

Department – Pharmaceutical Chemistry¹, Student², Student³, Student⁴

Matoshri college of pharmacy Nashik, MH, India

Abstract

To describe the nutritional and health benefits of kiwifruit, including improvements in nutritional status, digestive, immunological, and metabolic health. The review includes a brief history of green and gold kiwifruit varieties, from an ornamental curiosity from China in the 19th century to a crop of international economic importance in the 21st century; comparative data on their nutritional composition, particularly the high and distinctive amount of vitamin C; and an update on the most recent scientific evidence from well-designed and executed human studies on the multiple beneficial physiological effects.

The digestive benefits for healthy people as well as those with constipation and other gastrointestinal problems, such as irritable bowel syndrome symptoms, are of special interest. The water retention capacity of kiwifruit fibre, favourable changes in the human colonic microbial community and primary metabolites, as well as the naturally present proteolytic enzyme actinidin, which aids protein digestion both in the stomach and the small intestine, are the mechanisms of action behind the gastrointestinal effects, such as changes in faecal (stool) consistency, decreased transit time, and reduction of abdominal discomfort. The effects of kiwifruit on metabolic markers of cardiovascular disease and diabetes, such as glucose and insulin balance, bodyweight maintenance, and energy homeostasis, are also being studied.

INTRODUCTION

KIWI FRUIT

- Botanical name : *Actinidia deliciosa*
- Family : *Actinidiaceae*
- Origin : China
- Type of fruit : Berry
- Other names: Chinese gooseberry.
- Taste : Sweet & Sour
- Smell : Citrus
- Shape : Oval
- Colour : Fuzzy brown skin & Green inside.



Figure 1 : kiwifruit [14]

WHAT IS KIWI?

- Kiwis, commonly known as kiwifruit, are a variety of fruit endemic to Southwest China's mountains and hillsides.
- They're now grown in many other countries, including New Zealand, which is one of the leading producers of this beloved fruit. Kiwis are grown in a variety of other countries, including the United States.
- Kiwis were initially introduced to New Zealand in 1904 by Isabel Fraser, a schoolteacher who returned home with kiwi seeds after travelling through China.
- Kiwis were once known as Chinese gooseberry, but New Zealand fruit merchants gave them the name "kiwi" after the flightless kiwi birds, which are unique to the country.
- Kiwis are classed as berries in botany. The two most popular kiwi species are *Actinidia deliciosa* and *Actinidia chinensis*.
- The Hayward kiwi, a green kiwi named after a guy named Hayward Wright, who promoted kiwis in New Zealand in the 1920s, is the most common form of *A. deliciosa* kiwi.
- Hayward kiwis are around the size of a huge hen's egg and have an oval shape. Their skin is fuzzy brown, their meat is green, and their seeds are small black.
- Kiwis are also available with yellow or golden flesh (*A. chinensis*). Green kiwis have chlorophyll in their flesh, but yellow kiwis do not.
- It should be noted that kiwis and kiwiberries are not the same species. Despite the fact that they are members of the same *Actinidia* plant family, kiwiberries are small and have a delicious, grape-like skin.
- Kiwis are larger and have a thicker, fuzzy skin than other fruits.

- Most kiwi cultivars should have their skins peeled before eating. However, because the skin of golden or yellow kiwi variety is softer than the skin of green kiwis, some people prefer to eat it.
- The Saanicheton type has been known to persist in regions where the Hayward variety has failed due to cooler temperatures. Elmwood, Dexter, Abbott, Tewi, Vincent, Matua, Tomuri, Chico, Allison, Bruno, Gracie, and Monty are some of the most well-known kinds.[2]

HISTORY OF KIWI FRUIT

The kiwifruit is a fruit endemic to China's central and eastern regions. The kiwifruit was first described in China during the Song dynasty in the 12th century. The plant was rarely cultivated or bred because it was mainly taken from the wild and consumed for medical purposes. In the early twentieth century, kiwifruit cultivation moved from China to New Zealand, where the first commercial plantings took place. During World War II, the fruit became popular with British and American servicemen stationed in New Zealand, and it was later exported, first to the United Kingdom and then to California in the 1960s.

The fruit became an agricultural commodity in New Zealand throughout the 1940s and 1950s as a result of the development of commercially viable cultivars, agricultural practises, shipping, storage, and marketing.[4]

SPECIES AND CULTIVERS

The kiwi fruit comes in about 50 different varieties. The types of plants you cultivate in your landscape will be determined by your climate zone and the amount of space you have available. Some vines can reach a height of 40 feet (12 metres), necessitating a lot of trellising and room. Arctic, hardy, fuzzy, and hairless are the four species cultivated for gardening (*Actinidia chinensis*). Each one has its own set of features, such as frost tolerance and flavour. Choose your kiwi plant varieties according on your locality, as well as your preferences for flavour and size.[6]



Figure 2: Kiwi fruit farm's [14]

TYPES AND VARIETY OF KIWI FRUIT

- Kiwifruit comes in three varieties: grocery store kiwifruit (*Actinidia deliciosa*), hardy kiwifruit (*Actinidia arguta*), and super-hardy kiwifruit (*Actinidia arguta*) (*Actinidia kolomikta*).
- The kiwifruit found in grocery stores (also known as "fuzzy kiwifruit") is the largest, most edible, and widely available. Hardy kiwifruit, also known as "bowerberry," grows on 100-foot-tall trees in Japan's, China's, Korea's, and Siberia's woods and can tolerate severe weather.
- The fruit has a smoother exterior, is tastier, and grows in clusters, much like a grape. The super-hardy kiwi has smooth skin and tiny fruit, and it can withstand temperatures as low as -40°F in the winter. The "arctic beauty kiwifruit" is another name for it.
- There are around forty different kiwi varieties, ranging from California to New Zealand to Greece. Hayward, from New Zealand, has become the global standard.[7]

FUZZY KIWI FRUIT

The majority of kiwifruit sold comes from three cultivars of *A. deliciosa* (fuzzy kiwifruit): 'Hayward,' 'Blake,' and 'Saanichton. Their meat is bright green and their skin is woolly and dark brown. Around 1924, Hayward Wright in Avondale, New Zealand, produced the well-known cultivar 'Hayward.' It was first planted commercially in the 1940s, after being grown in private gardens.[4]



Figure 3: Fuzzy kiwi fruit [15]

In stores, the cultivar 'Hayward' is the most widely accessible. It's a sweet-tasting, huge egg-shaped fruit. The British Columbian variety 'Saanichton 12' is slightly more rectangular and sweeter than 'Hayward,' but the fruit's interior core can be rough. Self-pollination is possible with 'Blake,' but the fruit is smaller and more oval, and the flavour is thought to be inferior.[4]

KIWI BERRIES

Kiwi berries are edible fruits the size of a large grape with a taste and appearance similar to fuzzy kiwifruit, but with a thin, smooth green skin and no fuzz, making eating the entire fruit more enjoyable. *Actinidia arguta* (hardy kiwi), *A. kolomikta* (Arctic kiwifruit), and *A. polygama* are the three species that produce them (silver vine). They are climbing vines that grow quickly and are tough throughout the growing season. Kiwi berry, baby kiwi, dessert kiwi, grape kiwi, or cocktail kiwi are all names for the same fruit.[4]



Figure 3: kiwi berries [18]

The cultivar 'Issai' is a self-pollinating hybrid of hardy kiwi and silver vine. Because of its huge fruit, 'Issai' is a commercially grown kiwi that is less resilient than most hardy kiwis.[4]

ACTINIDIA CHINENSIS

The golden kiwifruit (*Actinidia chinensis*) has a smooth, bronze skin with a beak form at the stem attachment. The colour of the flesh ranges from a bright green to a bright, vivid yellow. When compared to *A. deliciosa*, this species has a 'sweeter and more fragrant' flavour, akin to some subtropical fruits. One of the more appealing types features a red 'iris' around the fruit's centre and yellow flesh on the outside. The yellow fruit has a higher market price and is more agreeable to eat without peeling since it is less hairy than the fuzzy kiwifruit.[4]



Figure 4 : Golden kiwifruit [17]

'Hort16A' is a golden kiwifruit cultivar sold as Gold over the world. The PSA bacterium caused considerable losses in this cultivar in New Zealand from 2010 to 2013. Gold3, a new cultivar of golden kiwifruit that has been discovered to be more disease-resistant, has been adopted by most growers. 'Gold3', also known as SunGold by Zespri, is not nearly as sweet as 'Hort16A' and lacks the slightly pointed tip.

SunGold clones have been utilised to build orchards in China, resulting in Zespri's partially successful legal measures to safeguard their intellectual property in China. According to Zespri, roughly 5,000 hectares of SunGold orchards were cultivated in China in 2021, mostly in the Sichuan area.[4]

CULTIVATION

Nutrient	Amount in 1 kiwi (69 g)	Daily adult requirement
Energy (calories)	42.1	1,600–3,000
Carbohydrates (g)	10.1, including 6.2 g of sugar	130
Fiber (g)	2.1	22.4–33.6
Calcium (mg)	23.5	1,000–1,300
Magnesium (mg)	11.7	310–420
Phosphorus (mg)	23.5	700–1,250
Potassium (mg)	215	4,700
Copper (mcg)	90	890–900
Vitamin C (mg)	64	65–90
Folate (mcg)	17.2	400
Beta carotene (mcg)	35.9	No data
Lutein & zeaxanthin (mcg)	84.2	No data
Vitamin E (mg)	1.0	15
Vitamin K (mcg)	27.8	75–120

Kiwifruit can be seen growing alongside citrus, peaches, and almonds, although its leaves are more susceptible to cold than those of orange or peach trees. Temperatures below 29°F destroy young kiwifruit vines, although adult vines may endure temperatures as low as 10°F.

Plants require deep, fertile, moist, and well-drained soil to thrive. Insects pollinate the plant's flowers almost exclusively. Once the kiwifruit has achieved maturity, it is plucked by hand in a single pick.[7]

AREA & PRODUCTION

In Himachal Pradesh, Uttar Pradesh, J&K, Sikkim, Meghalaya, Arunachal Pradesh, and Kerala, kiwi is primarily produced in the mid-hills. Estimates of area and output have not yet been accessible due to the fact that it is a new product in the country.[5]

ECONOMIC IMPORTANCE

The fruit is high in nutrients and has therapeutic properties. It's high in vitamins B and C, as well as minerals including phosphorus, potassium, and calcium. Fruits are eaten fresh or in salads and desserts with other fruits. It can also be used to make squash and wine.[5]

THE NUTRITIONAL ATTRIBUTES OF KIWI FRUIT

Kiwi also contains small amounts of iron, vitamin A, and vitamins other than folate. [8]

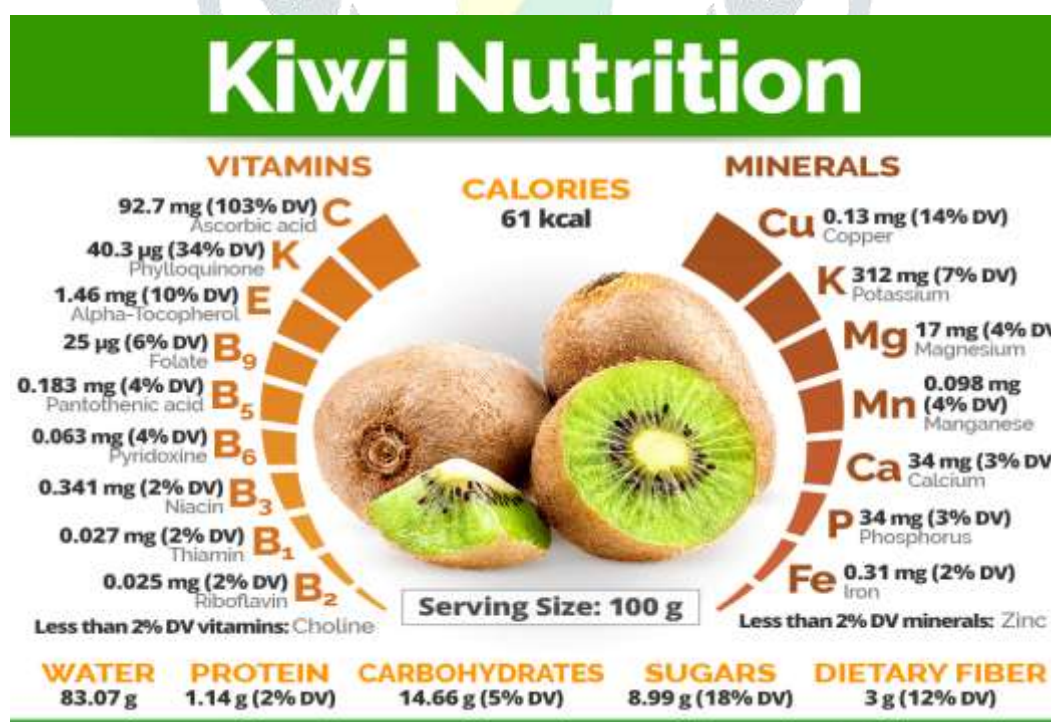


Figure 5: Nutritional value of kiwi. [16]

VITAMIN C

Vitamin C is an essential component of the human diet, and getting enough of it is vital not just for preventing scurvy but also for reducing the risk of chronic diseases like heart disease and cancer. Fresh fruit and vegetables should be consumed on a daily basis to provide a regular and enough intakes. However, the amount of vitamin C in food varies greatly, and plasma levels generally follow the amount consumed, regardless of where it comes from. Kiwifruit are one of the best sources of vitamin C in the diet, with high levels of vitamin C in all commercially relevant types and one serving providing the majority of the necessary daily requirement. Recent research has found that adding kiwifruit to a low-vitamin C diet significantly boosts plasma vitamin C levels, allowing them to reach both healthy and optimal levels. [3]

VITAMIN E

Antioxidants help to minimise the damage produced by oxidation by neutralising free radicals. Kiwifruit are high in antioxidants like vitamin C and E, as well as micronutrient polyphenols.

SunGold Kiwifruit has high vitamin E content when compared to other fruits, offering up to six times the amount of vitamin E found in apples and oranges. Vitamin E's ability to protect the skin from UV damage is one of its antioxidant capabilities. It's as simple as including leafy greens — and Kiwifruit — in your diet to boost your vitamin E levels.[3]

VITAMIN A

Vitamin A is a substance that promotes skin, eye, and reproductive health as well as improving immunity.[3]

VITAMIN K

Healthy bones are required for staying active. Vitamin K is also vital for bone health, particularly the recovery from bone injuries and the prevention of osteoporosis. Vitamin K can be found in abundance in kiwifruit. A single serving of SunGold kiwifruit provides around 8% of the necessary daily proportion of vitamin K, according to the Food and Drug Administration.

A diet high in this antioxidant, as well as potassium, is critical for health, particularly when you need to keep active. [3]

POTASSIUM

The potassium content of kiwifruit is virtually identical to that of a banana. Potassium is an essential nutrient for anyone who wants to stay energized and active. It aids in the maintenance of muscular and nervous system function. It also helps to keep blood pressure in check, which is particularly crucial for the elderly.

Fruit, green vegetables, cereals, and whole meal bread, for example, are high in potassium and low in salt. While most people associate potassium-rich fruits with bananas, Kiwifruit is an excellent, all-natural source of potassium.[3]

FOLATE

Kiwifruit includes folate, a B vitamin that is required for cell division. Doctors encourage women to take more folate during pregnancy because it may protect the foetus from developmental issues including neural tube defects.

A single kiwi contains roughly 17.2 micrograms (mcg) of folate, which is just over 4% of an adult's daily requirement Trusted Source. [9]

Everyone requires folate, whether they are children or adults. It's a B-vitamin that aids in the conversion of carbohydrates to energy, the production of DNA and RNA, and the formation of red and white blood cells in the bone marrow. This is necessary for the development of red blood cells, which allow humans to use oxygen, iron, and other minerals efficiently. And you'll need a lot of it during your life.

Your body can't make or store folate, and it can't store huge amounts of it either. As a result, folate is truly a "use it and replenish it" nutrient. Fortunately, folate is available in a wide variety of foods. The nutrient is found mostly in green vegetables, and kiwifruit is one of the few fruits that have it. However, folate is added to most breakfast cereals and bread items derived from fortified flour. However, for those avoiding wheat (e.g., those on a low-carb or keto diet, or those avoiding gluten), kiwifruit — especially fresh — is an excellent substitute.

In order to maintain a healthy body, you need lots of folate at all stages of life. However, in three important life periods, sufficiently high levels are required: childbirth, pregnancy.[9]

DIETARY FIBER

- Kiwis are a nutrient-dense food that is low in calories and high in nutrients.
- The nutritional composition of kiwis provides a variety of health benefits.
- Vitamin C, antioxidants, fibre, and minerals are abundant in kiwis.
- The nutritional profile of kiwifruit is incredible.
- Kiwifruit is gluten-free, cholesterol-free, fat-free, sodium-free, and cholesterol-free.
- Fiber is a natural assist for digestion. It makes us feel fuller for extended periods of time after we eat. It also keeps things "going along." The majority of us undoubtedly believe we aren't getting enough fibre. Fortunately, kiwifruit is an excellent source of dietary fibre.
- Fiber-rich foods will not only help you feel fuller for longer, but they will also aid in the management of metabolic markers such as blood sugar, cholesterol, and blood pressure. Even better, kiwifruit has both insoluble and soluble fibre, which is unusual for a fruit.[3]

KIWI AS AN ANTIOXIDANT

Kiwi is a unique fruit in terms of both appearance and nutritional value. Desserts and fruit bowls have always benefited from the brilliant green slices flecked with tiny black seeds. It has a pleasing appearance and a pleasant flavour that makes it a popular fruit pick. It is thought to be Chinese in origin and has long been prized for its therapeutic benefits. Ironically, it became regarded as the national fruit of New Zealand and was reintroduced to the globe as 'kiwi' rather than its previous names - yang tao and Chinese gooseberry – over time. It is thought to have arrived in New Zealand via missionaries, and it became so popular there that it began to be professionally grown and marketed as 'kiwi' (bearing close resemblance to their national bird). Europeans and Americans alike took advantage of its popularity, incorporating it into their cereals, sweets, and other foods. There are numerous kiwi benefits, and include them in your daily diet has been shown to help your health in a variety of ways.

Kiwi is an exotic fruit that is frequently used as a topping for pavlovas, fruit bowls, salads, and smoothies. It is rarely cooked; in desserts, in particular, it is used fresh since an enzyme found in it tends to break down milk proteins quickly, interfering with the dish's final texture. It is often used in the preparation of roasts and curries as a tenderising agent for meats. However, it is stated that the greatest method to get the most nutritional benefit from it is to eat it raw, on its own.

A 100-gram serving of kiwifruit contains 61 calories, 14.66 grammes of carbs, 1.14 grammes of protein, 0.52 gramme of fat, and 3 grammes of fibre, according to the United States Department of Agriculture (USDA). Kiwifruit is also noted for its unique look and flavour. Kiwi is juicy and refreshing with a sweet and tart flavour, with a fuzzy brown skin and shimmering, bright green flesh. [10]

HEALTH BENEFITS OF KIWI FRUIT

The nutritional content of kiwi and other fruits provides a variety of health benefits. Vitamin C, antioxidants, and fibre are all abundant in kiwis.

Vitamin C, choline, lutein, and zeaxanthin are antioxidants that aid in the removal of free radicals from the body. Free radicals are highly reactive chemicals produced by the body during metabolism and other processes.

When too many free radicals accumulate, they can induce oxidative stress, which can lead to cell death. Heart disease or cancer may result as a result of this harm. By eliminating free radicals, antioxidants can help protect the body. [11]

May promote healthy skin and hair: Vitamin C, a key antioxidant that can naturally boost collagen formation, is abundant in kiwi fruit. Kiwis are abundant in vitamin C, which can help keep your skin firm and youthful-looking, as well as encourage strong hair strands.

May support immunity: Most people think of oranges as having a lot of vitamin C, however a serving of kiwi fruit (two small kiwis) has even more vitamin C than a medium orange. Because the body cannot produce vitamin C, getting enough of it through diet is critical for protecting the body from harmful germs.

May promote good digestion:Kiwis are high in fibre, which is necessary for preventing constipation and maintaining bodily regularity. Green kiwifruit, in particular, includes actinidin, a natural digestive enzyme that can break down protein and improve stomach and intestinal function.

May support healthy weight loss: This low-calorie, high-nutrient snack is high in satisfying fibre to help you stay full. Kiwis are also over 90% water, which can assist the body stay hydrated.

May slow aging and help prevent chronic diseases:The high vitamin C in kiwi fruit acts as an antioxidant, assisting in the battle against free radicals in the body, which not only promotes healthy ageing but also helps to prevent or delay the onset of chronic diseases such as cancer and heart disease.

May benefit moms and babies:Kiwi fruit's high vitamin C content functions as an antioxidant, assisting in the body's fight against free radicals, which not only promotes healthy ageing but also helps to prevent or delay the onset of chronic diseases like cancer and heart disease.

SLEEP: Serotonin is responsible for kiwi's sleep-inducing properties. Serotonin is a brain neurotransmitter that aids in sleep cycle regulation. Furthermore, anti-inflammatory antioxidants included in kiwis, such as vitamin C and carotenoids, are responsible for aiding sleep.[12]

THINGS TO WATCH OUT FOR:

Kiwis are a delicious fruit, but many individuals are allergic to them. The severity of the symptoms might range from minor to severe. Itching or pain of the tongue, lips, or mouth after eating kiwi are common mild symptoms. [13]

- A visible rash on the skin.
- If you have any of the following severe symptoms, call 911 immediately.
- Breathing problems or other asthma symptoms
- Throat, lip, or mouth swelling
- Pain in the abdomen
- Dizziness
- Vomiting

REFERANCE

1. THE NUTRITIONAL & HEALTH ATTRIBUTES OF KIWIFRUIT: A REVIEW, BY David P.Richardson, Juliet Ansel & Lynley N.Drummond , European journal of Nutrition Published: 22 February 2018.

2. 4 HEALTH BENEFITS OF KIWI , Written by Jillian Kubala, MS, RD — Medically reviewed by Sade Meeks, MS, RD, Nutrition — Updated on January 31, 2022
3. Kiwi Vitamins : THE KEY TO THIS SUPERFOODS'S SUPERPOWERS.Link : <https://www.zespri.com>
4. Kiwifruit : From Wikipedia ,the free encyclopedia , Main article: Kiwifruit industry in New Zealand
5. KIWI Link : <http://nhb.gov.in/model-project-reports/Horticulture%20Crops/Kiwi/Kiwi1.htm>
6. KIWI PLANT TYPES -Differant varities of kiwifruit By: Bonnie L. Grant, Certified Urban Agriculturist.
7. KIWIFRUIT , Blue book services, Link : <https://www.producebluebook.com/know-your-commodity/kiwifruit/#>
8. What are the health benefits of kiwifruit ? Medically reviewed by Miho Hatanaka, RDN, L.D. — Written by Megan Ware, RDN, L.D. on December 5, 2019 Link : <https://www.medicalnewstoday.com/>
9. Kiwifruit is becoming very popular in the world. Link : <https://www.farmingportal.co.za/>
10. Benefits Of Kiwi Fruit: From A Powerhouse Of Antioxidants To Inducing Sleep, By Plavaneeta Borah, NDTV ,Updated: October 29, 2021 17:24 IST
11. 8 Powerful Health Benefits of Kiwi You Should Know ,This superfood can promote weight loss, healthy skin, and good digestion.BY STEFANI SASSOS, MS, RDN, CSO, CDN, NASM-CPT, GOOD HOUSEKEEPING INSTITUTE Aug 18, 2020
12. Here are 5 fantastic reasons that prove kiwi is the super fruit you need, Link :<https://www.healthshots.com/>
13. Health benefits of kiwi, By WebMD Editorial Contributors , Reviewed by Brunilda Nazario, MD on September 16, 2020
14. Image : <https://www.istockphoto.com/>
15. Image:File:Hardy-Kiwi-Comparison-3.jpg Link : <https://commons.wikimedia.org/wiki/File:Hardy-Kiwi-Comparison-3.jpg>
16. Image : <https://www.pinterest.com/pin/493355334180008495/>
17. Image : <https://favpng.com/>
18. Image : <https://www.tasteofhome.com/>