

# Banana: A Nutritive and Nutraceuticals-Rich Fruit

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Humans have been getting nutrients from bananas as a source of food/fruit for the last several hundreds years and at present, it is the staple food for 400 million people of four continents from the highest to the lowest-income groups. Its texture, convenience and easiness to eat, taste as well as nutritional values, are the testimonials for being number one dessert fruit.

## Nutritive values

Banana is an exceptionally nutritious fruit. The most important fraction of ripe banana fruit is three natural sugars namely, glucose, fructose and sucrose in addition to starch. The sugars constitute 17-20% of the total carbohydrate of the fruit in the approximate ratio of 20:15:65 with small amount of maltose.

As a starchy fruit, it supplies about 1.25 g protein from 100 g pulp and contains 9 mg tryptophan, an essential amino acid and 400 mg aspartic and glutamic acids, which are not essential amino acids. The fat content in the pulp is only around 0.5% and do not contribute much to the energy source.

A ripe banana fruit is a source of 10 vitamins and is a rich source of vitamins A (carotene) and C (ascorbic acid) and good source of vitamin B5 (pantothenic acid), vitamin B6 (pyridoxine) and vitamin B9 (folic acid). The  $\beta$ -carotene (precursor of vitamin A) level is around 350  $\mu$ g among the popular banana cultivars but the Cavendish (Grand Naine) fruit contains only 75  $\mu$ g of  $\beta$ -carotene in 100 g pulp. However, Red Banana and Nendran fruits contain more than 1000  $\mu$ g  $\beta$ -carotene, which are considered as carotenoid-rich bananas.

Mineral contents of a banana fruit is 0.8% and the predominant minerals are: potassium (450 mg), calcium (10 mg), phosphorus (25 mg) and magnesium (40 mg) in 100 g edible portion. A Grand Naine fruit is rich in calcium with 140 mg. Banana fruits are very low in sodium content.

A medium size (100 g) banana fruit provides about 7.3 (20)% vitamin A, 8% vitamin B5, 20% vitamin B6, 12.5% vitamin B9, 50% vitamin C, 13% potassium and 23% calcium of Recommended Dietary Allowance of a day (Table 1).

**Table 1: Nutritional composition (proximate level) of banana fruit  
(per 100 g edible portion)**

<b>Component</b>	<b>Quantity</b>	<b>RDA (ICMR)/Day</b>	<b>% Daily Value</b>
Total carbohydrate (g)	25	500	5
Simple sugars (g)	5	--	--
Protein (g)	1.25	57	2
Fat (g)	0.5	30	1.7
Essential fatty acids (mg)	165	--	--
β-Carotene (vit. A) (μg)	350 (75*/1000**)	4800	7.3 (20)
Thiamine (vit. B1) (mg)	0.04	1.2	3.3
Riboflavin (vit. B2) (mg)	0.07	1.5	4.6
Niacin (vit. B3) (mg)	0.6	16	3.8
Pantothenic acid (vit. B5) (mg)	0.4	5	8
Pyridoxine (vit. B6) (mg)	0.4	2	20
Folic acid (vit B9) (μg)	25	200	12.5
Ascorbic acid (vit. C) (mg)	20	40	50
β-Tocopherol (vit. E) (mg)	0.2	9	2.2
Phylloquinone (vit. K) (μg)	0.5	50	1
Potassium (mg)	450	3500	13
Calcium (mg)	10 (140*)	600	1.7 (23)
Copper (mg)	0.08	1	8
Phosphorus (mg)	25	600	4.2
Magnesium (mg)	40	325	12.3
Manganese (mg)	0.3	2.3	13

Component	Quantity	RDA (ICMR)/Day	% Daily Value
Sodium (mg)	1	2000	0.05
Iron (mg)	0.4	19	2.1
Zinc (mg)	0.15	11	1.4
Selenium (µg)	1.2	40	3

RDA - Recommended Dietary Allowance; ICMR - Indian Council of Medical Research

\*Grand Naine fruit contains only 75 µg β-carotene; \*\*Red Banana and Nendran fruits contain 1000 µg β-carotene.

\* Grand Naine fruit contains 140 mg calcium.

## Nutraceutical values

A nutraceutical is a functional component of food that has health benefits and provides protection against diseases. Banana fruit has two potent nutraceuticals *viz.*, flavonoids and fructans.

Flavonoids are antioxidant phytonutrients. A 100 g edible portion of fruit contains 60 mg flavonoids; however, peel is a rich source of antioxidant flavonoids with 310 mg (Table 2). The main flavonoids present in the banana fruits are: gallic catechin, catechin and epicatechin. Of these, gallic catechin has greatest antioxidant activity and the edible pulp contains around 10 mg gallic catechin and the peel, being the richest source of flavonoids, contains 55 mg.

Flavonoids protect against Coronary Heart Disease by reduction of low density lipoprotein, scavenging of free radicals, sequestering of metal ions and reducing thrombotic tendencies. Since peel is a richer source of natural antioxidants, it can be termed as a 'functional food' and should be utilized without discarding.

Fructans (fructo-oligosaccharides) are soluble but indigestible non-starch polysaccharide that functions as dietary fiber. Banana fruit contains about 2.7 g dietary fiber and 0.3 g fructans in 100 g edible portion of the fruit. Fructans prevent internal intestinal lining from attracting bacteria that contribute to the inflammation in bowel and aids in normal bowel movement. The fiber decreases the accumulation of triglycerides and increases calcium and magnesium absorption in the intestine. It also prevents colon carcinogenesis and other inflammatory bowel diseases.

**Table 2: Nutraceuticals contents (proximate level) of banana fruit**

Nutraceuticals	Quantity	
	Pulp	Peel
Total flavonoids (mg)	60	310
Gallocatechin (mg)	10	55
Catechin (mg)	8	40
Epicatechin (mg)	8	45
Dietary fiber (g)	2.7 (0.3)	---

Value in parenthesis is fructo-oligosaccharides (fructans) content.

### **Medicinal and therapeutic values**

- Ripe banana is one of the most rapidly digestible foods and bioavailability of nutrients from banana fruit is very high.
- Banana gives instant, sustained and substantial boost of energy and just two bananas provide enough energy for a vigorous 90 minute exercise.
- Banana has natural antacid property that neutralizes over-acidity and it reduces heartburn and irritation of the stomach.
- Eaten as raw fruit without distress in over-chronicler cases.
- The high carbohydrate and low fat makes it suitable food of infants, obese and geriatric patients and people suffering from intestinal disorders.
- Number one choice of athletes to maintain adequate levels of blood sugar for muscle action.
- Snacking on bananas helps to overcome morning sickness.
- High fiber content of bananas helps in normal bowel action.
- Tryptophan in banana is converted into serotonin and norepinephrin, which are neurotransmitters and have positive mood-enhancing effect.
- Bananas are useful for the treatment of peptic ulcers, infant diarrhea and colitis.
- Banana has angiotensin-converting enzyme inhibitors and arrest release of angiotensin-2 responsible for constriction of blood vessels and rise in blood pressure.

- B - vitamins of bananas help to calm the nervous system.
- Vitamin B6 helps to regulate blood glucose levels and emotional condition.
- Vitamin B6, potassium and magnesium of the bananas help the people to give up smoking and recover from the effects of nicotine withdrawal.
- Potassium-rich and sodium-poor bananas keep the hypertension and stroke under check.
- Potassium normalizes the heartbeat, sends oxygen to the brain and regulates the water balance of the body.
- Potassium reduction in the body due to stress condition can be replenished with potassium-rich bananas.
- Potassium-packed banana has excellent 'brain power', assists in learning and make strong mental alertness.
- Banana protein inhibits AIDS virus.
- Rubbing of banana peel is a home remedy for reducing the irritation and swelling of mosquito bites and warts.
- Banana is a 'cooling' fruit that can lower both the physical and emotional temperature of the expectant mothers.

Banana is a nature's gift to the mankind. It has four times protein, twice carbohydrate, three times phosphorus, five times vitamin A and iron, many times potassium and twice other vitamins and minerals compared to other fruits in general and apple in particular. Considering the above nutritive, nutraceutical and therapeutic values, banana is the '**BEST VALUE FRUIT**'.

Published by

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