

ARTICLE ID: 19

Bell peppers: Power packed peppers

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Sweet bell pepper (*Capsicum annuum* var *grossum* L.) is an important vegetable used for our daily consumption. These are not only delicious but also packed with essential nutrients. They are an excellent source of vitamins A and C, which play a crucial role in boosting the immune system and promoting healthy skin. Additionally, bell peppers contain dietary fibre, potassium, and antioxidants that contribute to overall well-being. These nutrients have been linked to various health benefits, such as reducing the risk of chronic diseases like heart disease and certain types of cancer. Incorporating bell peppers into your diet can be a great way to enhance your overall nutritional intake and support a healthy lifestyle. The peppers are available in different colours, such as red, yellow, and green, each offering their own unique nutritional profile. For example, red bell peppers are rich in vitamin C and beta-carotene, which can help boost your immune system and improve eye health. On the other hand, green bell peppers are a good source of vitamin K and folate, which are important for blood clotting and cell growth. By incorporating a variety of coloured bell peppers into your meals, essential nutrients can be assured.

Since the beginning of civilization, capsicum has existed. Humans have consumed it since 7500 BC. Native Americans' ancient ancestors collected wild chilies from Piquin and selected them for the many types that are currently recognised. Chilies were cultivated by Native Americans between 5200 and 3400 BC. As a result, chilies are among the earliest crops grown in the Americas (Bosland, 1996). By way of Spanish and Portuguese traders in the sixteenth century, *Capsicum annuum* (chilli) and *Capsicum frutescens* (Bird eye pepper) were widely dispersed from the New World to other continents, (Andrews, 1995). Majority of chilli species are highly pungent, non-pungent sweet bell peppers are referred to as 'Capsicums' and it is native to Mexico.

Table 1. Nutrition value (per 100 g) of raw, red bell pepper fruits

Principle components	Nutritive value	Principle components	Nutritive value
Water	91.9 g	Minerals	
Energy (At water General Factors)	31 kcal	Calcium (Ca)	6 mg
Energy (At water Specific Factors)	27 kcal	Iron Fe	0.35 mg
Nitrogen	0.14 g	Magnesium, Mg	11 mg
Protein	0.9 g	Phosphorus, P	27 mg
Total lipid (fat)	0.13 g	Potassium, K	213 mg
Ash	0.4 g	Sodium, Na	<2.5 mg
Carbohydrates	6.65 g	Zinc, Zn	0.2 mg
Fibre	1.2 g	Copper, Cu	0.04 mg
		Manganese, Mn	0.133 mg
		Selenium, Se	µg
Vitamins and other components			
Vitamin A	3131 IU		
Vitamin C, total ascorbic acid	142 mg		
Vitamin E	1.58 mg		
Thiamin	0.055 mg		
Riboflavin	0.142 mg		
Niacin	1.02 mg		
Vitamin B-6	0.303 mg		
Biotin	0.427 µg		
Folate, total	47 µg		

(Source: USDA 2023)

Carotenoids and flavonoids are important colorants in vegetables, which often impart orange and red colors (Delgado-Vargas and Paredes-Lopez 2003). Carotenoids in peppers include capsanthin and carotene (Howard 2001). The green color of peppers is due to chlorophyll and the carotenoids typical of the chloroplast (Marin and others 2004). The yellow-orange color of peppers is formed by α and β -carotene, zeaxanthin, lutein, and β -

cryptoxanthin (Howard 2001). The red color of peppers is due to the presence of carotenoid pigments of capsanthin, capsorubin, and capsanthin 5,6-epoxide. The different colors of peppers may be due to different levels of those compounds. As those compounds have antioxidant function, the different colors of bell peppers may have different antioxidant activity. Nutritionally, sweet peppers at the red stage are a good source of mixture of antioxidants including ascorbic acid, carotenoids and polyphenols (Deepa et al., 2007).

Capsiate, the non-pungent ester isoster of capsaicin, and its dihydroderivative are the major capsaicinoids of sweet peppers. Capsiates induce apoptosis cells involved in pathways of cancer development and inflammation. There by it has shown chemo preventive and anticancer potential (Macho *et al.*, 2003). The total phenolic compounds, flavonoids and dihydroxycinnamic acids contents found in sweet pepper has shown anticancer properties against prostate cancer cell (Chilczuk *et al.*, 2020). Some research studies have reported that orange coloured sweet pepper juices may offer a protective effect against photoaging by inhibiting the breakdown of dermal matrix, inflammatory response, and DNA damage as well as enhancing antioxidant defense, which leads to an overall reduction UVB-induced skin damage (Truong *et al.*, 2022). Sarcopenia is an aging-related loss of muscle mass and function, which induces numerous adverse outcomes. Higher consumption of chilies and sweet peppers was related to a lower risk of sarcopenia in older adults (Wang *et al.*, 2021).

Conclusion

Bell peppers are indeed a nutritious and versatile vegetable that can be a valuable addition to your daily diet. They are known for their vibrant colors, which indicate different nutritional benefits. Especially the red ones, are rich in vitamin C, which is essential for immune system support, skin health, and wound healing. Bell peppers, particularly the orange and red varieties, contain beta-carotene, a precursor to vitamin A. Vitamin A is crucial for eye health and maintaining healthy skin and mucous membranes. These are a source of vitamin B6, which is involved in various metabolic processes and plays a role in brain development and function. The dietary fiber, which aids in digestion, helps maintain a healthy weight, and can lower the risk of certain chronic diseases. The antioxidants, including carotenoids and flavonoids, which can help protect your cells from damage caused by free



radicals. Relatively low in calories, making them a great option for those looking to manage their weight.

Bell peppers have a consistent demand in the market, both for domestic consumption and export. They are used in a wide range of culinary dishes and are a popular ingredient in salads, stir-fries, and many other recipes. There are various bell pepper varieties available, each with its unique flavor, color, and shape. This diversity can cater to different market preferences and fetch higher prices. Bell peppers can be grown throughout the year, depending on the climate and growing methods. This allows farmers to have a continuous source of income. With proper care and cultivation techniques, bell pepper plants can yield a significant harvest, contributing to higher profits. Bell peppers can be part of a crop rotation strategy, helping to improve soil health and reduce the risk of pest and disease buildup.

However, successful bell pepper cultivation requires careful attention to factors such as soil quality, irrigation, pest management, and climate conditions. Farmers should consider their local conditions and market demand before deciding to grow bell peppers. Additionally, sustainable farming practices can help maximize profits while minimizing environmental impact.

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