

Cruciferous vegetables

Cruciferous vegetables are vegetables of the family Brassicaceae (also called Cruciferae) with many genera, species, and cultivars being raised for food production such as cauliflower, cabbage, kale, garden cress, bok choy, broccoli, Brussels sprouts and similar green leaf vegetables. The family takes its alternative name (Cruciferae, New Latin for "cross-bearing") from the shape of their flowers, whose four petals resemble a cross.

Ten of the most common cruciferous vegetables eaten by people, known colloquially in North America as **cole crops**^[1] and in Britain and Ireland as "brassicas", are in a single species (*Brassica oleracea*); they are not distinguished from one another taxonomically, only by horticultural category of cultivar groups. Numerous other genera and species in the family are also edible. Cruciferous vegetables are one of the dominant food crops worldwide. They are high in vitamin C and soluble fiber and contain multiple nutrients and phytochemicals.



Cabbage plants

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List of cruciferous vegetables

Extensive selective breeding has produced a large variety of cultivars, especially within the genus *Brassica*. One description of genetic factors involved in the breeding of *Brassica* species is the Triangle of U.

The taxonomy of common cruciferous vegetables

common name	genus	specific epithet	Cultivar group
Horseradish	<i>Armoracia</i>	<i>rusticana</i>	
Land cress	<i>Barbarea</i>	<i>verna</i>	
Ethiopian mustard	<i>Brassica</i>	<i>carinata</i>	
Kale	<i>Brassica</i>	<i>oleracea</i>	Acephala group
Collard greens	<i>Brassica</i>	<i>oleracea</i>	Acephala group
Chinese broccoli (gai-lan / jie lan)	<i>Brassica</i>	<i>oleracea</i>	Alboglabra group
Cabbage	<i>Brassica</i>	<i>oleracea</i>	Capitata group
Savoy cabbage	<i>Brassica</i>	<i>oleracea</i>	Savoy Cabbage group
Brussels sprouts	<i>Brassica</i>	<i>oleracea</i>	Gemmifera group
Kohlrabi	<i>Brassica</i>	<i>oleracea</i>	Gongylodes group
Broccoli	<i>Brassica</i>	<i>oleracea</i>	Italica group
Broccolini	<i>Brassica</i>	<i>oleracea</i>	Italica group × Alboglabra group
Broccoflower	<i>Brassica</i>	<i>oleracea</i>	Italica group × Botrytis group
Broccoli romanesco	<i>Brassica</i>	<i>oleracea</i>	Botrytis group / Italica group
Cauliflower	<i>Brassica</i>	<i>oleracea</i>	Botrytis group
Wild broccoli	<i>Brassica</i>	<i>oleracea</i>	Oleracea group
Bok choy	<i>Brassica</i>	<i>rapa</i>	<i>chinensis</i>
Komatsuna	<i>Brassica</i>	<i>rapa</i>	<i>perviridis</i> or komatsuna
Mizuna	<i>Brassica</i>	<i>rapa</i>	<i>nipposinica</i>
Rapini (broccoli rabe)	<i>Brassica</i>	<i>rapa</i>	<i>parachinensis</i>
Choy sum (Flowering cabbage)	<i>Brassica</i>	<i>rapa</i>	<i>parachinensis</i>
Chinese cabbage, napa cabbage	<i>Brassica</i>	<i>rapa</i>	<i>pekinensis</i>
Turnip root; greens	<i>Brassica</i>	<i>rapa</i>	<i>rapifera</i>
Rutabaga (swede)	<i>Brassica</i>	<i>napus</i>	<i>napobrassica</i>
Siberian kale	<i>Brassica</i>	<i>napus</i>	<i>pabularia</i>
Canola/rapeseed	<i>Brassica</i>	<i>rapa/napus</i>	<i>oleifera</i>
Wrapped heart mustard cabbage	<i>Brassica</i>	<i>juncea</i>	<i>rugosa</i>
Mustard seeds, brown; greens	<i>Brassica</i>	<i>juncea</i>	
White mustard seeds	<i>Brassica</i> (or <i>Sinapis</i>)	<i>hirta</i>	
Black mustard seeds	<i>Brassica</i>	<i>nigra</i>	
Tatsoi	<i>Brassica</i>	<i>rosularis</i>	
Wild arugula	<i>Diplotaxis</i>	<i>tenuifolia</i>	
Arugula (rocket)	<i>Eruca</i>	<i>vesicaria</i>	
Field pepperweed	<i>Lepidium</i>	<i>campestre</i>	
Maca	<i>Lepidium</i>	<i>meyenii</i>	
Garden cress	<i>Lepidium</i>	<i>sativum</i>	
Watercress	<i>Nasturtium</i>	<i>officinale</i>	
Radish	<i>Raphanus</i>	<i>sativus</i>	
Daikon	<i>Raphanus</i>	<i>sativus</i>	<i>longipinnatus</i>
Wasabi	<i>Wasabia</i>	<i>japonica</i>	

Research

Cruciferous vegetables contain glucosinolates which are under basic research for their potential properties of affecting some types of cancer.^{[2][3][4][5]} Glucosinolates are hydrolyzed to isothiocyanates (ITCs) by the action of myrosinase.^[6] ITCs, possibly a bioactive component in cruciferous vegetables, are being investigated for their chemopreventive and chemotherapeutic effects.^{[6][7]} As one example in laboratory research, ITCs such as phenethyl

isothiocyanate reduced levels of the oncoprotein MCL1.^{[8][9]} Other in vitro research indicates ITCs may affect levels of the BCR-ABL fusion protein, the oncoprotein affecting mechanisms of leukemia.^{[9][10]}

Drug and toxin metabolism

Chemicals contained in cruciferous vegetables induce the expression of the liver enzyme CYP1A2.^[11] Furthermore, some drugs such as haloperidol and theophylline are metabolized by CYP1A2. Consequently, consumption of cruciferous vegetables may decrease bioavailability and half-life of these drugs.^[12]

Alliaceous and cruciferous vegetable consumption may induce glutathione S-transferases, uridine diphosphate-glucuronosyl transferases, and quinone reductases^[13] all of which are potentially involved in detoxification of carcinogens such as aflatoxin.^[14] High consumption of cruciferous vegetables has potential risk from allergies, interference with drugs like warfarin and genotoxicity.^{[15][16]}

Taste

People who can taste phenylthiocarbamide (PTC), which is either bitter or tasteless, are less likely to eat cruciferous vegetables,^[17] due to the resemblance between isothiocyanates and PTC.

Contraindications

Although cruciferous vegetables are generally safe for human consumption, individuals with known allergies or hypersensitivities to a certain *Brassica* vegetable, or those taking anticoagulant therapy, require caution before consuming such vegetables.^[18]

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