

# KALE

Kale (*Brassica oleracea* var. *acephala*) is a leafy green vegetable that originated from the Mediterranean approximately 2000 years ago. It has been selected for its distinct leaves (often frilled or otherwise textured) over time, whereas other members of the species *B. oleracea* have been selected for their buds or inflorescence like brussels sprouts (*B. oleracea* var. *gemmifera*) or broccoli (*B. oleracea* var. *italica*) and cauliflower (*B. oleracea* var. *botrytis*). Like its close relatives, kale is a cool season crop that prefers moist, well-drained soil with a pH ranging from 6.0 to 7.5. Kale grows best in full to partial sun. Its biomass, flavor, and nutritional quality suffer when subjected to drought and temperature stress.

Kale is biennial, but it is often grown as an annual. In spring, seeds should be sown 4-6 weeks before the last frost and transplanted just after the last frost; for fall planting, seeds should be sown 12-14 weeks before the first frost and transplanted 2-4 weeks later. Planting too early in the spring or too late in the fall can lead to premature flowering, or bolting, which is known to have adverse effects on flavor and leaf texture. Seeds should germinate within 4-7 days. When transplanting outdoors, plants should be spaced 12-18 inches apart to lessen disease pressure.

There are several market classes of kale, including curly green, curly red, Portuguese, Russo-Siberian, dinosaur, and ornamental that vary in leaf shape, color, and texture. Sensory attributes including flavor and aroma vary among cultivars as

## Market Classes of Kale



Curly (green)



Curly (red)



Portuguese



Russo-Siberian



Dinosaur

well. In a sensory analysis study conducted at Cornell University, cultivars ‘Darkibor’ and ‘Black Magic’ were most preferred by the majority of consumers.

Growers should be aware that when growing kale organically, plants are subject to a significantly different growing environment, especially due to restrictions on synthetic pesticide and fertilizer use. This altered growing environment can lead to significant changes in biomass, mineral nutrition, and concentration of prebiotic carbohydrates. A recent study has provided evidence for genetic variation in biomass and seasonal variation among summer and fall-planted, organically grown kale in iron, copper, and prebiotic carbohydrate concentrations. This suggests that nutrition and biomass can be optimized by selecting certain cultivars during specific growing seasons. Of 13 cultivars grown under organic conditions, ‘Westlander’ had the highest biomass, ‘Scarlet’ and ‘Curly Roja’ had the highest concentrations of mineral nutrients, and ‘Black Magic’ and ‘Red Russian’ had the highest concentrations of prebiotic carbohydrates.

Nutrient (mg/100 g)	<u>Standard Kale Nutrition</u>	
	Mean	% Daily Value
<b>Ca</b>	254	20 %
<b>K</b>	348	7 %
<b>P</b>	55	4 %
<b>Mg</b>	32.7	1 %
<b>Mn</b>	0.92	40 %
<b>Fe</b>	1.6	9 %
<b>Zn</b>	0.39	4 %
<b>Cu (µg/100 g)</b>	53	6 %

Kale is a low calorie, nutritionally rich vegetable that provides 10% or more of 17 essential nutrients, ranking 15<sup>th</sup> on a list of 41 “nutritional powerhouses”. It contains notable amounts of calcium, potassium, iron, and manganese. In addition to mineral nutrients, kale also contains prebiotic carbohydrates. Though not fully digested by the human digestive tract, prebiotic carbohydrates are digestible by beneficial bacteria in the gut, which confer health benefits like improved gut health and potential obesity-fighting effects.

Lauded for its health-promoting effects, kale is a popular food that is grown both conventionally and organically. In 2012, 6,256 acres of kale were harvested, with California, Texas, and New Jersey as the top producing states. By 2020, over 89 million pounds of kale, valued at just over \$225 million USD, were sold annually in the USA. A large portion of kale is grown organically. In South Carolina, WP Rawl is one of the largest kale producers in the state; growing and distributing over 20 kale products nationwide.

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Whether grown organically or conventionally, kale is a great ingredient raw, in smoothies, stir fries, or baked as chips.

A quick, easy, and nutritious recipe for kale chips can be found below!

# Crispy Kale Chips Recipe

## *Ingredients:*

1 bunch of kale	Sea salt
Cayenne pepper (optional for a bit of spice)	2 tbs. olive oil

## *Cooking Instructions:*

1. Preheat oven to 275 degrees.
2. Thoroughly wash the kale and spin dry.
3. Toss washed leaves in a bowl with olive oil, sea salt, and any additional spices.
4. Place on parchment paper on a baking sheet for 15-20 minutes in the oven.
5. Take out and enjoy!

