



# Salad nutrients

## 1 IT'S IN THE COLOUR

---

Salad leaves are nutrient rich. The green chlorophyll in the plants' leaves absorbs sunlight. It uses the sun's energy to make carbohydrates from carbon dioxide and water. This process, known as photosynthesis, is the basis for the life processes of all plants. Plants are a primary source of food for animals and humans so photosynthesis is a source of life.

Many of the health benefits that leafy salads provide come from unique plant compounds known as phytochemicals (also called phytonutrients). These are chemical compounds that are considered to be beneficial to human health. For example Romaine/Cos and spinach contain lutein, while watercress and rocket contain glucosinolates.

Salad leaves are classified as vegetables and one cereal/dessert bowl full, or 80g of salad leaves, counts as one portion of your '5 a day'. We are encouraged to 'eat a rainbow' of fruit and vegetables for variety and to ensure we get all the nutrients we need to stay healthy. Salad leaves are ideal, ranging in colour from red through to dark green. Generally the darker or more coloured a leaf, the more phytonutrients it may contain.

## 2 LOW FAT, LOW CALORIE

---

Energy density is the amount of energy or calories in a particular weight of food (kcal per gram). Foods with a lower energy density provide fewer calories per gram than foods with a higher energy density. For the same amount of calories, a person can consume a larger portion of a food lower in energy density than a food higher in energy density.

Low-energy-dense diets help people lower their calorie intake whilst still feeling satisfied/full and help to control feelings of hunger. Adding water-rich vegetables, such as spinach to mixed dishes, such as risotto, lowers the energy density of these dishes but you still need to watch your portion size.

As a low-energy dense food, salad leaves can help with weight loss and appetite. In one study participants were given a standard lunch on different occasions, each time with either a first-course salad or with no salad (1). Participants consumed fewer calories when the meal started with the lower-energy-dense salad and they reported feeling just as full as participants who had no first-course salad but had eaten more of the main course, or had a salad that was higher in energy density.

Salad leaves are a low energy dense food, providing on average only 11kcal per portion or 14kcal per 100g and are naturally low in calories, fat and sodium. Lettuce is also high in fibre. This means you can enjoy large servings without having to worry about the calories, but just watch what you're adding as dressings and toppings can add calories, fat and salt.



### 3 VITAMIN AND MINERAL RICH

---

Nutritionally salad leaves are a healthy, low energy dense choice, and they are packed with important vitamins and minerals.

- Lettuce is a source of vitamin A, folic acid and manganese, and a good source of vitamin K.
- Rocket is a source of vitamin C and calcium, and a good source of vitamin K, folic acid and potassium.
- Red leaf lettuce is a good source of vitamin A and vitamin K.
- Spinach is a source of potassium, calcium and iron, and a good source of vitamin A, vitamin K, vitamin C and manganese.
- Watercress is a source of folic acid, chloride, calcium and iron and a good source of vitamin A (as carotenes), vitamin K, vitamin C and manganese.

Many of these are important for a healthy immune system, a healthy heart and circulation, bones and healthy skin. As different leaves offer different nutrients, eating a wide variety of mixed leaves is a good idea.

### 4 VITAMINS & YOU

---

- **Vitamin A and beta carotene** – Vitamin A is needed for growth and development and immunity, and healthy vision, hair, skin, nails, bones and teeth.
- **Vitamin C** - An antioxidant which helps to protect against free radicals, fight infection, boost iron absorption, and maintain healthy skin, blood vessels, bones and gums.
- **Vitamin B1** - Works with other B vitamins to release the energy we get from food. It is also important for healthy nerve and muscle function.
- **Vitamin B6** - Helps to maintain a healthy nervous system and produce mood-regulating serotonin. Also needed for the formation of haemoglobin in red blood cells and antibodies that help fight infection.
- **Folate** (or folic acid) - A type of B vitamin needed to form new cells. It reduces the risk of spina bifida during pregnancy and works with vitamin B12 to help keep the circulation healthy. Also important for healthy red blood cells and nerve function. Folate is the form of folic acid naturally found in foods.
- **Vitamin E** - An antioxidant and important for the protection of cell membranes as well as maintaining healthy skin, immunity, nerves, muscles and red blood cells.
- **Vitamin K** – Needed to make blood clot and so heal wounds. Also helps to build and maintain strong bones.

### 5 MINERALS

---

- **Calcium** - An essential nutrient needed to help muscles contract, blood to clot and nerves to carry messages. It also helps build bones and teeth and keep them strong. A poor calcium intake is a risk factor for osteoporosis, a crippling disease that affects one in three women and one in 12 men over the age of 50 in Britain.



- **Iodine** – Its primary role is to produce thyroid hormones, which regulate the metabolic rate and vital bodily functions such as body temperature, growth and development in children, blood cell manufacture and nerve and muscle function.
- **Iron** - Its main function is in haemoglobin, the part of red blood cells that carries oxygen from the lungs to all the cells of the body. Iron is also important for immunity. If the body runs short of iron, iron-deficiency anaemia develops with symptoms including tiredness, pallor, irritability and reduced resistance to infection. Women, in particular need to ensure enough iron in their diet.
- **Manganese** – Assists a wide range of bodily functions, including the development of healthy bones, the way the body processes carbohydrates, and protective antioxidant activity in the body.
- **Phosphorus** – Works with calcium and magnesium to build and maintain strong bones and teeth. It also plays a key role in releasing energy from food to fuel our body.
- **Potassium** - An essential mineral, which helps regulate our blood pressure and nerve muscle functions.
- **Zinc** - It helps keep the skin healthy, aids wound healing, regulates the sense of taste and is important for immune system strength. It is particularly important during pregnancy and for infant development. A deficiency in adulthood has been linked to increased risk of infection, skin and hair problems and a low sperm count.
- **Magnesium** - Works with calcium to maintain healthy bones, it helps release energy from food and to absorb nutrients, as well as regulating mood, nerve and muscle function. Adequate levels are important to maintain a healthy heart.

## 6 PHYTOCHEMICALS & THEIR BENEFITS

---

Phytochemicals are natural plant compounds that are beneficial to health, but not essential in the way vitamins and minerals are.

Research has highlighted how different nutrients and phytochemicals ('phyto' meaning plant), including different carotenoids, work best as a team. For example, vitamins C and vitamin E, which also have an antioxidant role, help enhance the benefits of phytochemicals too. This is one very important reason why eating a variety of different fruit and vegetables is so beneficial to our health. It may also help to explain why regularly eating nutrient-packed green leafy vegetables, has been strongly linked with maintaining good health.

There is now a great deal of interest in phytochemicals as research is discovering that the health benefits associated with fruit and vegetables are due to both the conventional nutrients and these phytochemicals working together to promote health.

- **Beta carotene** – A type of carotenoid and a strong antioxidant. As well as being converted to vitamin A (see above), it may help to protect the body from potentially harmful free radicals.
- **Lutein and Zeaxanthin** - Types of carotenoids that act as antioxidants, meaning they can mop up potentially damaging free radicals. They are found in high concentrations in the lens and retina (especially the macular) of the eye and studies suggest they may play a role in keeping these parts of the eye healthy.



- Ongoing research is investigating flavonoids protective role against certain types of cancers, stroke and heart disease. Types of flavonoids include:
  - **Quercetin** – A type of flavonol and a powerful antioxidant meaning it may help to protect the body against damaging free radicals. Studies also suggest it has anti-inflammatory effects.
  - **Anthocyanins** - Types of flavonoids that have strong antioxidant activity.
  - **Kaempferol** - A type of flavonol that has strong antioxidant activity.
- Other non-flavonoid phytochemicals include:
- **Glucosinolate Family** - What makes watercress unique is its high levels of a type of glucosinolate called phenylethyl isothiocyanate, or PEITC. PEITC gives the plant its unique peppery flavour and in scientific studies has been shown to increase the body's potential to resist certain carcinogenic (cancer causing) agents.
  - **Hydroxycinnamates** - A group of phenolic compounds that appear to have potent antioxidant properties in the laboratory and may block the formation of cancer causing agents. Further human studies are required before any conclusions can be made about their direct health effects once inside the body. One particular group of hydroxycinnamates includes 4-Coumaric Acid.

1. Rolls BJ, Roe LS, Meengs JS. Salad and satiety: energy density and portion size of a first course salad affect energy intake at lunch. Journal of the American Dietetic Association 2004;104:1570-1576.