

Eating leafy greens could be better for oral health than using mouthwash

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Over half the adult population in the [UK and US](#) have gum disease. Typical treatments include [mouthwash](#) and in severe cases, [antibiotics](#). These treatments have side effects, such as dry mouth, the development

of [antimicrobial resistance](#) and increased [blood pressure](#).

But research has indicated that a molecule called [nitrate](#), which is found in [leafy green vegetables](#), has fewer [side effects](#) and offers greater benefits for [oral health](#). And it could be used as a natural alternative for treating oral disease.

Inadequate brushing and flossing leads to the build up of [dental plaque](#), a sticky layer of bacteria, on the surface of teeth and gums. Plaque causes tooth decay and [gum disease](#). Sugary and acidic foods, [dry mouth](#), and smoking can also contribute to bad breath, tooth decay, and gum infections.

The two main types of gum disease are gingivitis and periodontitis. [Gingivitis](#) causes redness, swelling and bleeding of the gums. [Periodontitis](#) is a more advanced form of gum disease, causing damage to the soft tissues and bones supporting the teeth.

Periodontal disease can therefore, lead to tooth loss and, when bacteria from the mouth enter the bloodstream, can also contribute to the development of [systemic disorders](#) such as cardiovascular disease, dementia, diabetes and rheumatoid arthritis.

Leafy greens may be the secret

Leafy greens and [root vegetables](#) are bursting with [vitamins, minerals, and antioxidants](#)—and it's no secret that a diet consisting of these vegetables is crucial for maintaining a healthy weight, boosting the immune system, and preventing [heart disease, cancer and diabetes](#). The multiple health benefits of leafy greens are partly because spinach, lettuce and beetroots are brimming with [nitrate](#), which can be reduced to [nitric oxide](#) by nitrate-reducing bacteria inside the mouth.

Nitric oxide is known to [lower blood pressure](#) and improve [exercise performance](#). However, in the mouth, it helps to prevent the overgrowth of bad bacteria and reduces [oral acidity](#), both of which can cause gum disease and tooth decay.

As part of our research on nitrate and oral health, [we studied competitive athletes](#). [Athletes are prone to gum disease](#) due to high intake of carbohydrates—which can cause inflammation of the gum tissues—stress, and dry mouth from breathing hard during training.

Our study showed that beetroot juice (containing approximately 12 [millimole](#) of nitrate) protected their teeth from acidic sports drinks and carbohydrate gels during exercise—suggesting that nitrate could be used as a prebiotic by athletes to reduce the risk of tooth decay.

Nitrate offers a lot of promise as an oral health [prebiotic](#). Good oral hygiene and a nitrate rich diet could be the key to a healthier body, a vibrant smile and disease-free gums. This is good news for those most at risk of oral health deterioration such as [pregnant women](#), and [the elderly](#).

In the UK, antiseptic mouthwashes containing [chlorhexidine](#) are commonly used to treat dental plaque and gum disease. Unfortunately, these mouthwashes are a blunderbuss approach to oral health, as they indiscriminately remove both good and bad bacteria and increase oral acidity, which can cause disease.

Worryingly, early research also indicates that chlorhexidine may contribute to [antimicrobial resistance](#). Resistance occurs when bacteria and fungi survive the effects of one or more [antimicrobial drugs](#) due to repeated exposure to these treatments. Antimicrobial resistance is a [global health concern](#), predicted to cause 10 million deaths yearly by the year 2050.

In contrast, dietary nitrate is more targeted. Nitrate eliminates disease-associated bacteria, reduces oral acidity and creates a balanced [oral microbiome](#). The oral microbiome refers to all the microorganisms in the mouth. Nitrate offers exciting potential as an [oral health prebiotic](#), which can be used to prevent disease onset or limit disease progression.

How many leafy greens for pearly whites?

So how much should we consume daily? As a rule of thumb, a generous helping of spinach, kale or beetroot at mealtimes contains about 6–10 mmol of nitrate and offers immediate health benefits.

Work we have done with our collaborators has shown that treating [plaque samples](#) from [periodontal disease](#) patients with 6.5 mmol of nitrate increased healthy bacteria levels and reduced acidity.

For example, consuming [lettuce juice](#) for two weeks reduced gum inflammation and increased healthy [bacteria](#) levels in patients with gum disease.

Growing evidence suggests that [nitrate](#) is a cornerstone of oral health. Crunching on a portion of vegetables at mealtimes can help to prevent or treat oral disease and keeps the mouth fresh and healthy.

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