



Earth's Perfume

What is the chemical responsible for the earthy taste of beetroot?

Stock items	Consumables
Bin bags	Cooked beetroot
Plastic plates	Lemons
Plastic knife and fork	
Disposable gloves	
Cocktail sticks	
Geosmin molecular model	

Presenting ideas

Chop up the cooked beetroot into small cubes. Invite your *edible explorer* to try a piece on a cocktail stick.

- What does it taste of?
- Do you like the taste and why?
- Does it remind you of anything else?
- Do other foods taste like it?

Squeeze some lemon onto another piece of beetroot and invite them to taste this.

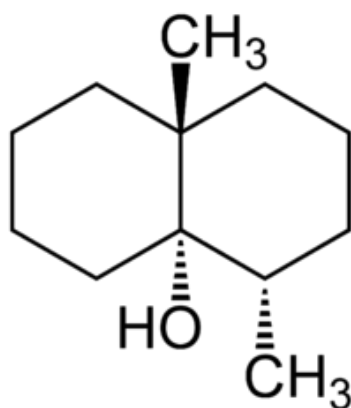
- Does it taste different and how?
- Do you prefer the taste with or without lemon?
- If people don't like the taste of beetroot, why might they prefer it with lemon?

What's the chemistry?

Some people just don't like the taste of beetroot. If you ask someone what it tastes of, chances are they'll use the word 'earthy' and is quite unlike the taste of any other food.

The chemical geosmin is responsible for this muddy, dirty flavour. Geosmin is a terpene, produced by a class of plant-eating microorganisms called *Streptomyces coelicolor* and released when they die.





Geosmin

Terpenes are a strongly-smelling class of compounds and help to protect plants from parasites and predators. Terpenes characteristically contain multiple units of isoprene (C₅H₈), either in chains or in rings.

The amount of geosmin in beetroot is genetically determined and food scientists rate varieties based on geosmin concentration. Some varieties contain two or three times more geosmin than others, so if the earthy flavour is what's stopping you from enjoying it, choose your variety carefully.

Whilst some people like the earthy taste of beetroot, geosmin isn't a molecule welcome elsewhere. People who take their drinking water from surface sources may experience a muddy taste. There have been cases where utility consumers complain about the taste of their water and it's been traced back to geosmin.

Also, blue-green algae release geosmin when they die and this can be absorbed by certain freshwater fish like trout or eel, giving them an unpleasant taste. Geosmin is rendered odourless by an acid, so these fish are often eaten with a squeeze of lemon juice. This why people who don't like the taste of beetroot may find it more palatable when eaten with lemon.

Geosmin is Latin for 'earth odour' and it is also responsible for the earthy smell after it rains. Rain disturbs spores filled with volatile geosmin and this can be a lifesaver to camels in a hot desert. They can smell geosmin released by wet ground miles away to find water.

And it's not only camels who are sensitive to it. Humans can detect one single drop in an Olympic-sized swimming pool!

Jo's Top Tips



Use plastic rather than paper plates, as the beetroot juice gets everywhere.

Remember to wear disposable gloves when you chop the beetroot up, or you'll have to explain to everyone you meet over the coming days why your hands are bright pink! Spear each piece with a cocktail stick so they can be picked up easily.

If you're struggling to know what foods pair well with beetroot, why not try them with other earthy flavours generated by aromatic pyrazines? Foods such as roasted onions, coffee or even dark chocolate might sound like an odd combination, but compliment beetroot really well.



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