

Extracting the Red from Tomatoes

What makes tomatoes red?

Tomatoes' red colour comes from a chemical called **lycopene**. Lycopene is an important nutrient found in tomatoes and other vegetables. It has antioxidant properties and studies suggest that having a lycopene rich diet may reduce the risk of cancer and protects against heart disease.*

Ingredients

- tomato paste
- engine starter fluid - this contains diethyl ether, in which lycopene dissolves (found in garages or petrol stations)
- distilled or deionised water (normally found in garages, petrol stations, hardware shops)

Equipment

- DIY visible light spectrometer (e.g.: Public Lab Desktop Spectrometer v3) or can be built from an Open Hardware design (soon to be available on <http://vital-food.org>)
- strong glass or LDPE containers
- spoon / chopsticks
- some way of measuring out 25-50 ml of liquid
- this could be a measuring jug, measuring cylinder (or a scale at a push, if you're prepared to do the required weight to volume calculation)
- glass or LDPE funnel
- filter papers
- measuring scale
- glass cuvettes or small glass vials (preferably square) - you can get away with just one but having 2 is easier

What to do to extract lycopene

- Measure 5g tomato paste / fresh tomato
- Measure out 25ml of starter fluid - do this by spraying the fluid against the side of the container. Careful! the container will get very cold. If it isn't toughened glass there is a risk the container could crack.
- Mix the tomato paste into the starter fluid and stir.
- Stir intermittently over the next 15 minutes
- Filter the (now red) liquid
- Take the filtrate (the liquid part)
- Analyse using DIY Spectrometer (See separate sheet)
- Compare results from tomato paste and fresh tomato

Risk Assessment

Diethyl ether

irritant, flammable

- Wear gloves
- Wear eye protection
- Cover clothing

Engine starter fluid

severely cooling

- Use only toughened glass
- Protect fingers from cold
- Do not touch cold surfaces

Diethyl ether is a strong solvent. It dissolves most plastics, but glass and **LDPE** are safe to use.

LDPE containers - normally things like shampoo or washing up bottles - have this symbol.



If you reuse a container, wash and dry it carefully to avoid contamination.

* see J. Agric. Food Chem., 2013, 61 (40), p 9534

