

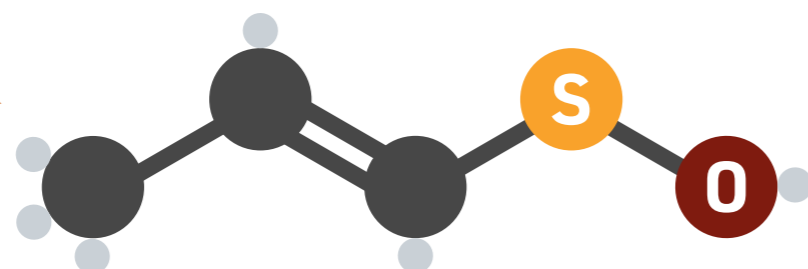
The eye-watering chemistry of onions

Why do onions make our eyes water?

As onions are sliced, they release a class of enzymes, allinases, which break down amino acid sulfoxides. A specific compound produced during this process is 1-propenesulfenic acid.

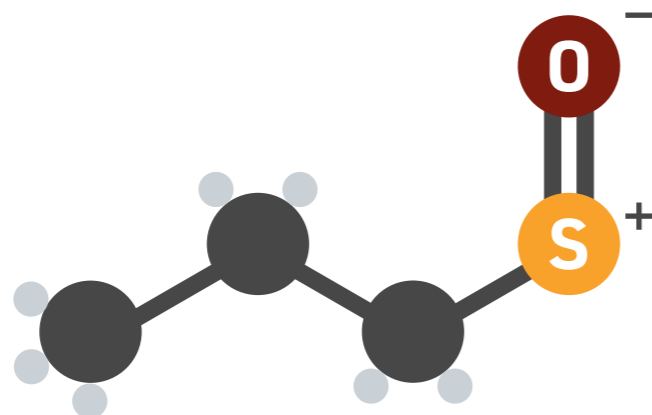
KEY: ● Carbon ● Oxygen ● Sulfur ● Hydrogen ● R Rest of molecule

1-propenesulfenic acid



1-propenesulfenic acid is rearranged by another enzyme, called lachrymatory factor synthase, to produce *syn*-propanethial-S-oxide. Production of this gas peaks 30 seconds after mechanical damage to the onion, and it stimulates sensory neurons in the eye causing a stinging sensation; the eye produces tears to flush it out.

syn-propanethial S-oxide



What compounds cause the smell of onions?

Thiosulfinates are the primary flavour and odour producing molecules in an onion. These compounds are not present in intact bulbs, but are formed via enzymatic reaction from sulfur amino acids. Allicin is one of these compounds, which in turn quickly breaks down to form other sulfur-containing compounds.

