

Polysulfanes as latent sources of hydrogen sulfide during wine storage



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Background

- Volatile sulfur compounds (VSCs) impart 'reductive' aromas in wine.
- Not all the routes to hydrogen sulfide (H₂S) are defined.
- Certain remediation treatments may produce 'masked' sources of H₂S, such as polysulfanes.
- Winemakers can mitigate the risk of producing wines with 'reductive' aromas if the factors involved in both the formation of H₂S precursors, and the release of H₂S from these precursors, are better understood.

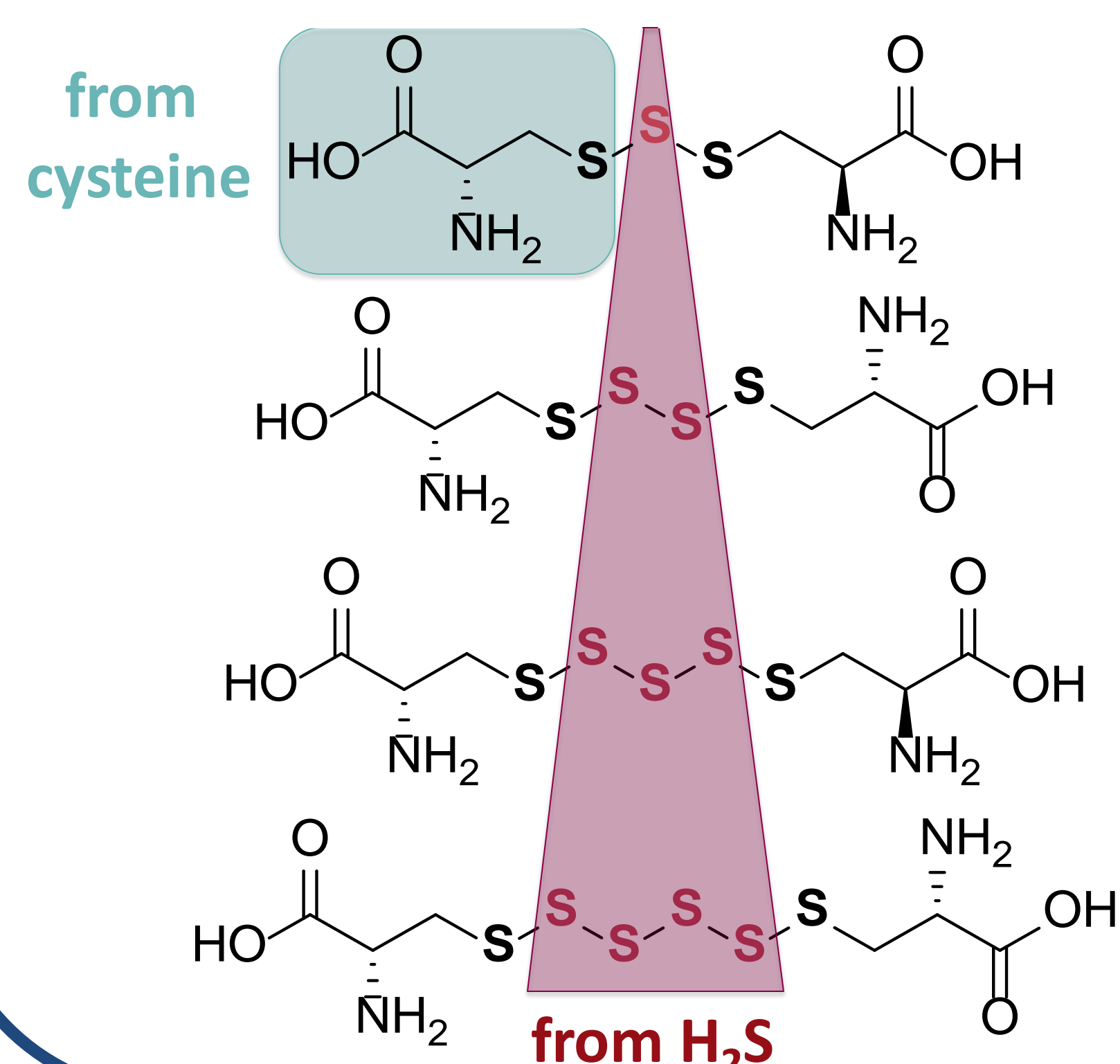
Research questions

- How easily are polysulfanes produced under wine conditions?
- Are polysulfanes stable?
- Do polysulfanes have the potential to act as latent precursors to H₂S?

Experimental design

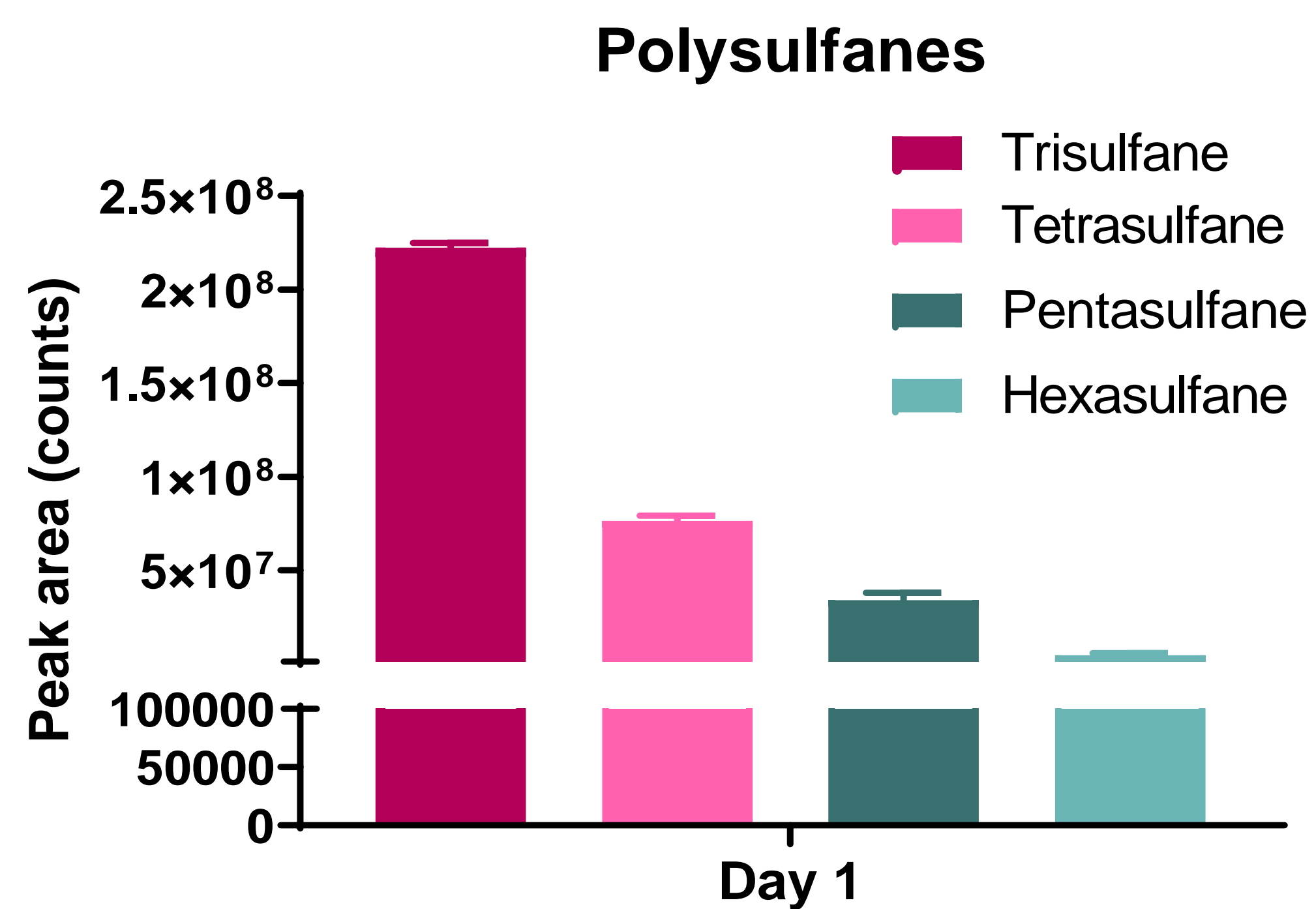
- Dicysteinyll polysulfanes were formed in model wine by combining cysteine, H₂S, copper, and iron in the presence of oxygen (see below).
- The mixture was degassed and treated with commonly used wine antioxidants, such as ascorbic acid (AA) and sulfur dioxide (SO₂).
- Polysulfane and H₂S concentrations were monitored over six months.

Dicysteinyll polysulfanes

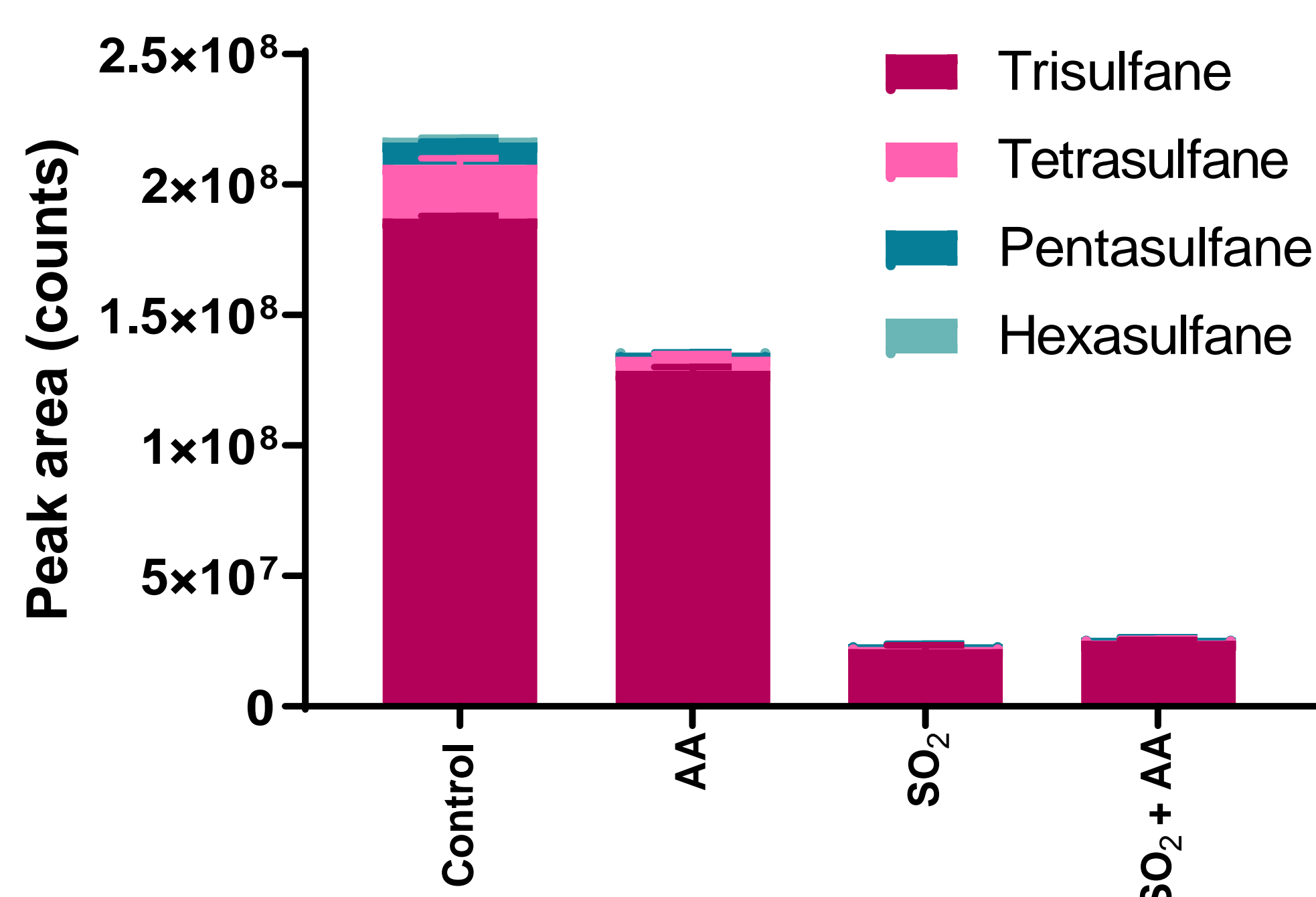


Main result

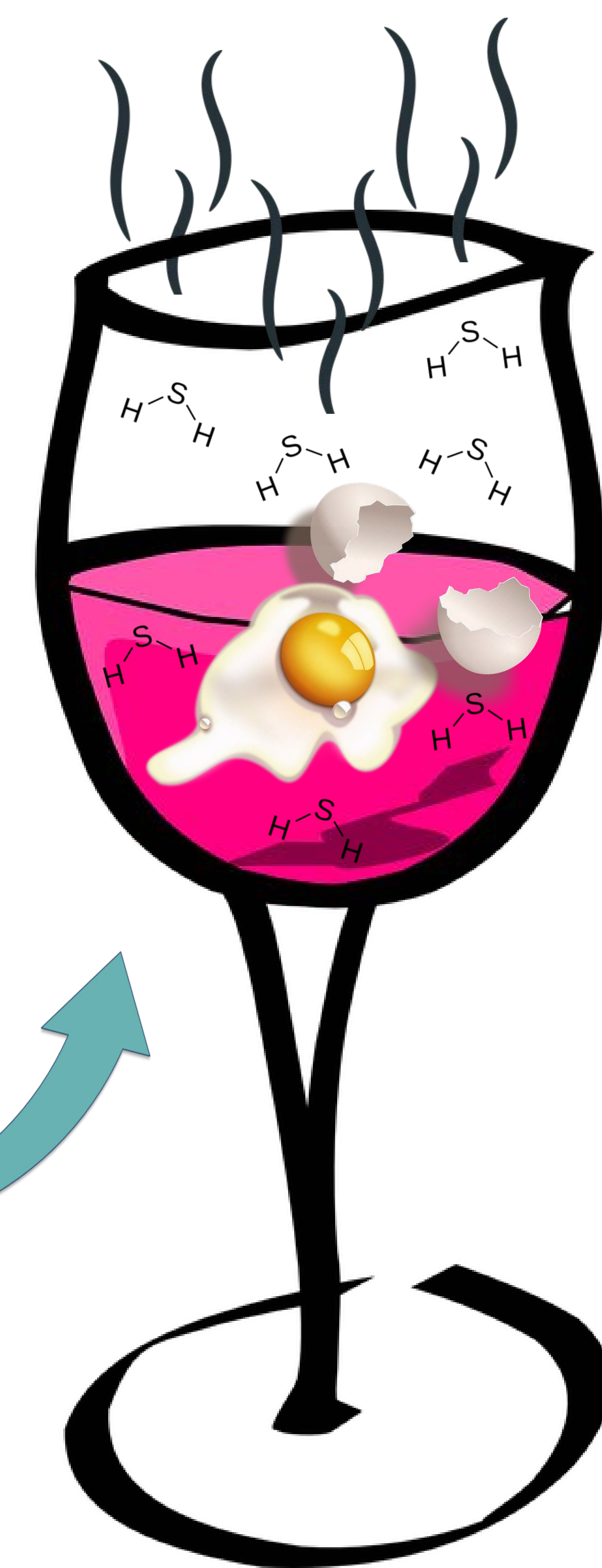
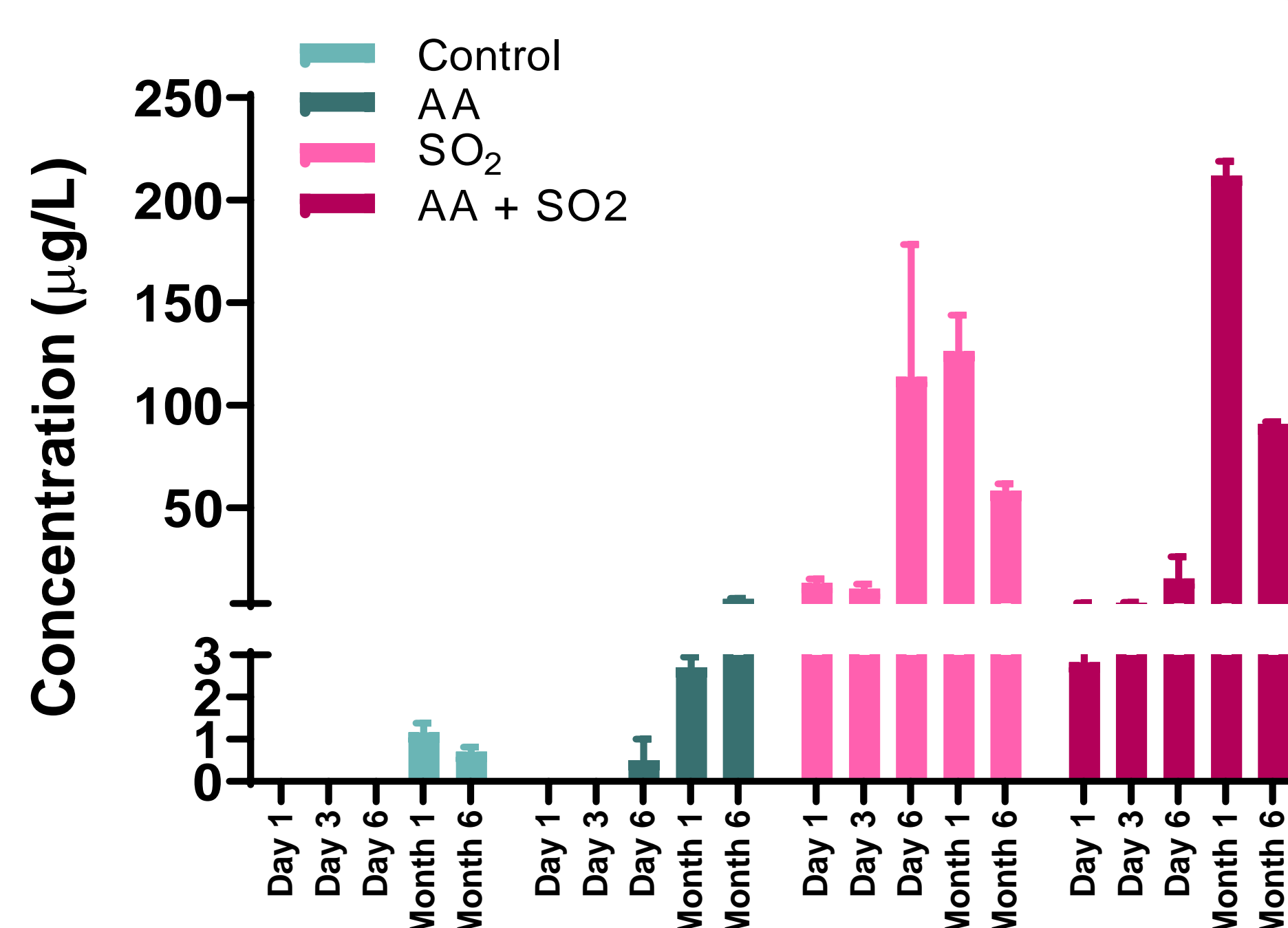
- Four dicysteinyll polysulfanes arising from H₂S incorporation were identified.
- The stability of the polysulfanes was related to the sulfur chain length, with decreased stability associated with increased sulfur chain length.
- H₂S was released from the polysulfanes over the course of six months.
- SO₂ was associated with the rapid degradation of polysulfanes and liberation of H₂S.
- Sulfitolysis appeared to play a role in H₂S release.



Polysulfanes - Month 6



Hydrogen sulfide



Take-home messages

- Polysulfanes may act as latent sources of H₂S under wine conditions.
- The release of H₂S from polysulfanes is accelerated in the presence of SO₂.
- Formation of polysulfanes/release of H₂S in wine needs to be verified.

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