Chitosan – The Swiss army knife of winemaking

From the instance humans first succumbed to the siren song of fermenting grapes into wine, it has been prevalent in our art, inspiring many a novel, poem, and song.

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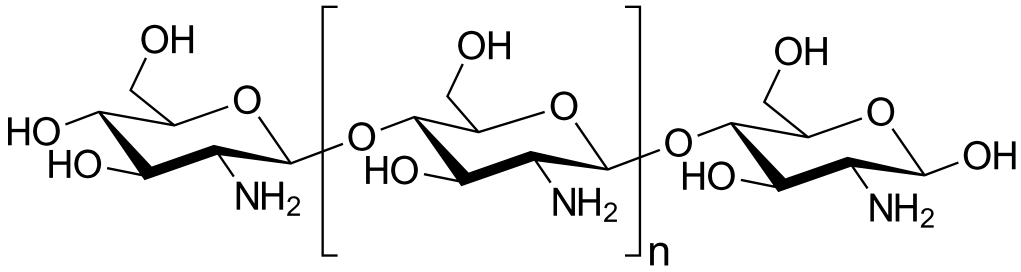

Its production, and especially its consumption, has adorned the tomb walls of pharos, kings and the common man alike. It even features prominently in various biblical texts. Today, despite being produced for millennia, the basic principles of winemaking remain largely unchanged. However, the overall product quality has increased significantly since that first ferment. While this is mainly due to a better understanding of the biochemical principles of fermentation and winemaking, additives have played a significant role in the evolution of wine.

Homer first mentioned the preservative effects of burning sulphur in *The Odyssey*. However, the application of sulphur dioxide (SO_2) in wine was only described much later by Louis Pasteur, the father of modern microbiology, who recommended burning sulphur in wine barrels to preserve its content during storage and export. Since then, the use of SO_2 in wine has largely remained unrivalled. It's only in recent years that its use has been challenged due to various adverse health effects associated with its overconsumption. These include headaches, nausea, stomach irritation and respiratory distress. As a result, the use of SO_2 in wine is tightly regulated by various regulatory bodies, making it the only ingredient winemakers must add to their labels. As a result, this prompted a search for a natural alternative, and in recent times, chitosan has emerged as a promising candidate.

Alkaline treatment of chitin, the second most abundant polysaccharide in nature, results in deacetylation of the chitin biopolymer to yield a positively charged chitin biopolymer. When used in wine chitosan aids in clarification during racking and prevents unwanted fermentation via wild yeast species like *Brettanomyces*. Furthermore, chitosan has been shown to prevent acetic- and lactic acid bacteria proliferation. Moreover, the charge distribution of the chitin biopolymer enables the chelation and removal of cationic metals such as iron, lead, copper, and cadmium. However, despite these benefits, one of the main advantages associated with the use of chitin is its natural origin. The chitin molecule is biodegradable, safe for staff to work with, and has no inherent flavour. Recent studies have suggested that chitosan may have antioxidative properties for thiols in young wines.

The growing interest in natural alternatives for wine preservation reflects a broader shift towards more sustainable and health-conscious practices in winemaking. With its numerous benefits, chitosan has proven to be a promising replacement for sulfur dioxide. As research continues to explore its potential, winemakers may find that chitosan not only enhances the quality and safety of wine but also aligns with consumer demand for cleaner, more natural products. This evolution in winemaking represents a harmonious blend of tradition and innovation allowing winemakers to blend expertise and passion *Intowijn*.