

Abstract

Development of a Biosensor for the Detection of Acetoin during Wine Fermentation [†]

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Acetoin is most commonly used in food, flavor, cosmetics and chemical synthesis and is formed during fermentation by the microbial activity of lactic bacteria and yeast. For example, acetoin is the key compound of the biosynthesis of diacetyl which is an important wine flavorant synthesized during alcoholic and malolactic fermentation. Therefore, the detection of acetoin content during the fermentation process could improve the quality of wine due to its involvement in its bouquet. A silicon-based biosensor chip for the detection of acetoin has been developed with a novel acetoin reductase from *B. clausii*. Acetoin will be reduced by the enzyme while NADH will be oxidized to NAD⁺. This reaction is accompanied by a pH shift that can be detected by a capacitive field-effect sensor. The sensor's ability has been investigated using constant-capacitance measurements at acetoin concentrations from 50 μ M to 200 μ M in MES (2-(*N*-morpholino)ethanesulfonic acid) buffer at pH 6.8. The possibility to monitor acetoin by this new type of biosensor could provide an advantage in controlling the fermentation in winemaking.

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