Highly selective molecular imprinted polymer (MIP) based sensor array using interdigitated electrode (IDE) platform for detection of mango ripeness

Abstract

Detection of mango ripeness was performed by developing a highly selective molecularly imprinted polymers (MIP) layer combined with interdigitated electrode (IDE) as sensor. Mango volatiles from different week of ripeness stage were studied and volatiles such as α-pinene, 7-terpinene and terpinolene were selected as markers to indicate different stages of fruit maturity. Through computational modelling, an optimum composition ratio of cross linker, functional monomer and target molecule for IDE-MIP sensor has been successfully determined. Utilizing this optimum ratio, the MIPs templates were then synthesized and deposited onto an array of IDE platform. When the sensor array was exposed to mango volatiles, the IDE-MIP sensor will then exhibit a shift in capacitance compared to a non target IDE-MIP sensor. In an array, the difference capacitance shift of each IDE-MIP sensor would create a specific profile of ripeness identification. The use of polyethylene terephthalate (PET) as a substrate would allow a "low cost and flexible" sensor implementations. This study provides a potential non destructive solution to discriminate the mango ripeness stage hence improving the quality of harvest.

Keywords