

Capability of AgSiN/SU-8 Layer on Silver-Based SPR for Adulterated Honey Detection

ABSTRACT

This study introduces the capability of the AgSiN/SU-8 layer on the silver-based SPR structure for water content detection in stingless bee honey. The 30% water content in pure honey was adulterated by water bath procedure until they reached 18% adulterated honey. The experiment was carried out for two different SPR structures, with and without AgSiN/SU-8 layer to examine its potential in protecting the silver metal from eroding and minimize the formation of the silver oxide. The resonance angles of adulterated honey solutions for these two SPR structures denote a similar behavior by shifting to a higher angle from the pure honey solution. It indicates that the AgSiN/SU-8 layer can select and detect the variation percentage of honey water content. After 24 hours, the Cr/Ag/AgSiN/SU-8 structure produces the equivalent resonance angle value with only 5.26% changes in minimum reflectivity. It shows that the AgSiN/SU-8 layer can protect the silver surface from erosion and preserve the SPR characteristic. Besides, the presence of the AgSiN/SU-8 layer on the silver surface is capable of decreasing the oxygen atomic percentage by 21.48%, hence minimizing the growth of silver oxide. This work is a preliminary study of the AgSiN/SU-8 layer to detect water content in stingless bee honey, at the same time can protect the silver surface from erosion and minimize the formation of the silver oxide.