A machine learning colorimetric biosensor based on acetylcholinesterase and silver nanoparticles for the detection of dichlorvos pesticides

Wonn Shweyi Thet Tun^{a,b}, Chanon Talodthaisong^a, Sakda Daduang^c, Jureerut Daduang^d,

Kanchit Rongchai^e, Rina Patramanon^b, Sirinan Kulchat^{a*}

^aDepartment of Chemistry, Faculty of Science, Khon Kaen University, Khon Kaen, 40002, Thailand.

^bDepartment of Biochemistry, Faculty of Science, Khon Kaen University, Khon Kaen, 40002, Thailand.

^cFaculty of Pharmaceutical Sciences, Khon Kaen University, Khon Kaen 40002, Thailand ^dDepartment of Clinical Chemistry, Faculty of Associated Medical Sciences, Khon Kaen University, Khon Kaen, 40002, Thailand

^eDepartment of Engineering, Rajamangala University of Technology Isan, Khon Kaen, Thailand

*Email: sirikul@kku.ac.th



Figure S1. a) XRD pattern of c-AgNPs, b) ATR-FTIR spectra of trisodium citrate and c-AgNPs.



Figure S2. The average hydrodynamic particle size of c-AgNPs, c-AgNPs with 22.2 mU/ml of AChE and 2 μ M of AThCl at pH 8, and c-AgNPs with 22.2 mU/ml of AChE and 2 μ M of AThCl in the presence of 4 μ M DCV at pH 8.



Figure S3. UV vis absorption spectra of c-AgNPs with AChE (22.2 mU/ml) and AThCl (2 μ M) in the presence of 20 μ M DCV premixed with different interfering substances which may commonly present in water and juice.



Figure S4. The first column is the absorbance at 400 nm of the control sample (c-AgNPs + AChE (22.2 mU/ml) + AThCl (2 μ M) + DCV (20 μ M)) and from second to last column are the absorbances at 400 nm of the control sample with different interfering substances, Na⁺(0.87 mg/ml), K⁺ (0.51 mg/ml), Mg²⁺(0.823 mg/ml), Mn²⁺ (0.36 mg/ml), Ca²⁺ (0.49 mg/ml), Zn²⁺ (0.31 mg/ml), Co²⁺ (0.33 mg/ml), Fe³⁺ (0.036 mg/ml), Hg²⁺ (0.008 mg/ml), As³⁺ (0.026 mg/ml) respectively.