

Utilization of orchid extract for determination of copper (II) ion using flow injection analysis system

Petcharat Sirisakwisut¹, Thanikarn Sukaram², and Sumonmarn Chaneam^{2,3*}

¹Phrapathom Witthayalai School, Nakhon Pathom, 73000, Thailand

²Department of Chemistry, Faculty of Science, Silpakorn University, Nakhon Pathom, 73000, Thailand

³Flow Innovation-Research for Science and Technology Laboratories (FIRST Labs), Bangkok, Thailand

*e-mail: schaneam@gmail.com

Anthocyanins exhibited chromogenic change from purple to red when they reacted with copper (II) ion. This color change could be observed easily. In this study, we were interested to use the anthocyanins found in the orchid *Dendrobium senia earsakul* extract as natural reagent for determination of copper (II) ion. The orchid extraction procedure were investigated including extraction solvent, time and temperature. The orchid extract was then used as a reagent in flow injection analysis system (Fig.1) without further purification. Difference in absorption after reaction with copper (II) ion was measured photometrically at 400 nm. The physical parameters such as, flow rate, injection volume and length of mixing coil were optimized. Using the optimum condition, we can rapidly analyze copper (II) ion at 73 sample/h with good precision (%RSD<4.5). The linear range of 1.0-5.0 mM was obtained with R^2 of 0.9964. The effect of foreign ions such as Pb^{2+} , Zn^{2+} , Ni^{2+} , Ca^{2+} , K^+ , Na^+ and NH_4^+ were also studied. Our method had many advantages because it was simple, fast and convenient. Moreover, the reagent extracted from orchid was cheap, safe and absolutely environmentally-friendly.

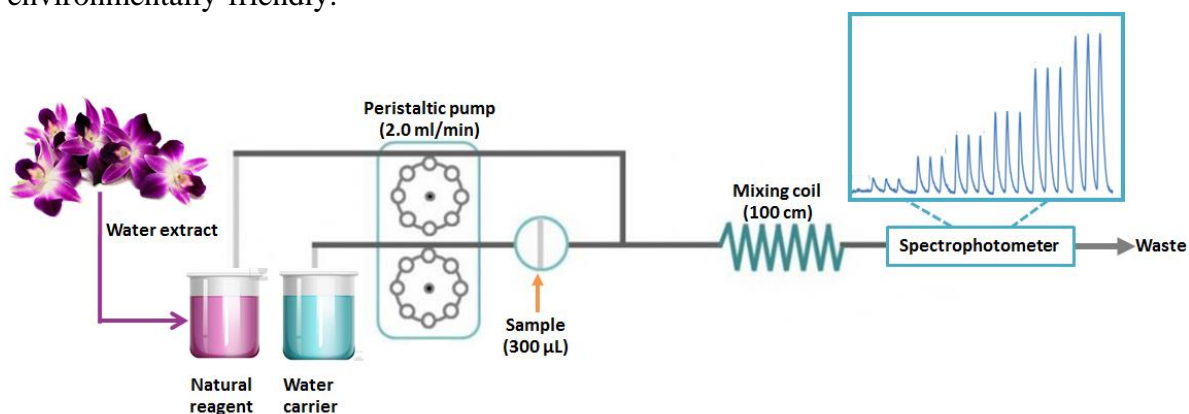


Fig 1. The FIA manifold for determination of copper (II) ion using extract from orchid

Keywords: Natural pigment; Orchid; Anthocyanin; Copper (II) ion; Flow injection analysis

Acknowledgements: The authors would like to thank The DPST Research Grant (017/2557) from the Institute for the Promotion of Teaching Science and Technology, Thailand. The research fund from the Faculty of Science, Silpakorn University (SRF-PRG-2559-05) are gratefully acknowledged.