The study of tannic acid as chelating agent for guidelines to produce iron test kit
Pannipa Pawanna*, Mathurin Yothom, Mancharee Suphonok, Thitiya Daengbutdee
Chemistry Program, Faculty of Science and Technology, Nakhon Sawan Rajabhat University, Thailand
*E-mail: apannipa.p@gmail.com

Abstract: This study investigated the use of tannic acid as a chelating agent for iron test kit based on complex formation between iron and tannic acid. The obtained complex was measured by UV-Visible spectrophotometry. The optimum condition for complexation was studied. It was found that at the pHs ranged from 3 to 7, tannic acid did not provide selectivity. However, at pH 5.4, tannic acid gave more specificity to Fe$^{2+}$ than Fe$^{3+}$, providing the highest absorbance at 564 nm. Thus, tannic acid was suitable chelating agent for total iron measurement through the complex formation of Fe$^{2+}$, by reduction of Fe$^{3+}$ to Fe$^{2+}$. The Fe$^{2+}$ concentrations that can distinguish the purple shades of the obtained complex by naked-eye were in range of 3-100 ppm using 1600 ppm of tannic acid and 10 minutes of reaction time. These conditions gave the maximum absorbance of the complex. The applicability of the proposed test kit was investigated by the determination of Fe$^{2+}$ content in three synthetic samples. The results showed that the concentrations of Fe$^{2+}$ were similar to the commercial test kit. Therefore, this study provided the beneficial data to be used as guideline for the production of low cost and low toxicity test kit for Fe$^{2+}$.

Keywords: Iron; Test kit; Tannic acid