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PII: S0039-9140(18)30887-7  
DOI: <https://doi.org/10.1016/j.talanta.2018.08.076>  
Reference: TAL18997

To appear in: *Talanta*

Received date: 16 May 2018  
Revised date: 23 August 2018  
Accepted date: 27 August 2018

Cite this article as: Lucksagoon Ganranoo, Ratchanaporn Chokchaisiri and Kate Grudpan, Simple simultaneous determination of iron and manganese by sequential injection spectrophotometry using astilbin extracted from *Smilax china* L. root, *Talanta*, <https://doi.org/10.1016/j.talanta.2018.08.076>

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## Simple simultaneous determination of iron and manganese by sequential injection spectrophotometry using astilbin extracted from *Smilax china* L. root

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### Abstracts

Simple simultaneous determination of iron and manganese by sequential injection spectrophotometry using astilbin extracted from *Smilax china* L. root is proposed. It is based on the kinetic difference of the complexation of the ions and astilbin. With a simple sequential injection system, the simultaneous determination can be performed at pH 10 and can be followed at a wavelength of 440 nm. A throughput of 12 samples per hour was obtained with detection limits ( $3\sigma$ ) of  $0.05 \text{ mg L}^{-1}$  iron(III) and  $0.20 \text{ mg L}^{-1}$  manganese(II), respectively. Application of the proposed system to real ground water sample was demonstrated. The results agreed with that of the atomic absorption spectrophotometric reference method.

**KEYWORDS:** Sequential injection; Iron; Manganese; Simultaneous determination; Astilbin; Ground water

### 1. Introduction

The utilization of groundwater in Thailand is increasing as a result of the rapid expansion of the city and its industrial production. In the future, groundwater analysis could become a focus of attention. Iron and manganese are the most common inorganic chemicals in groundwater as they naturally co-occur from weathering and leaching of metal-bearing minerals and rocks [1-2]. The maximum acceptable concentration of iron and manganese in drinking water proposed by the World Health Organization is  $0.3$  and  $0.1 \text{ mg L}^{-1}$ , respectively [3]. In comparison, drinking water in Thailand measures  $0.5$  and  $0.3 \text{ mg L}^{-1}$  for concentrations of iron and manganese, respectively [4]. Although these are not the levels that create health concerns, the presence of higher levels of iron and manganese in drinking water is a cause for investigation as this may produce a bad odor, a metallic taste and a

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