

# Screening of Cation Resins for the Preparation of Cation Exchanger Mixed Matrix Membranes for Copper Ion Removal

Noor Fadilah Mohd Sabri and Syed M. Saufi

Faculty of Chemical & Natural Resources Engineering,  
University Malaysia Pahang, Lebuhraya Tun Razak 26300 Kuantan, Pahang, MALAYSIA.

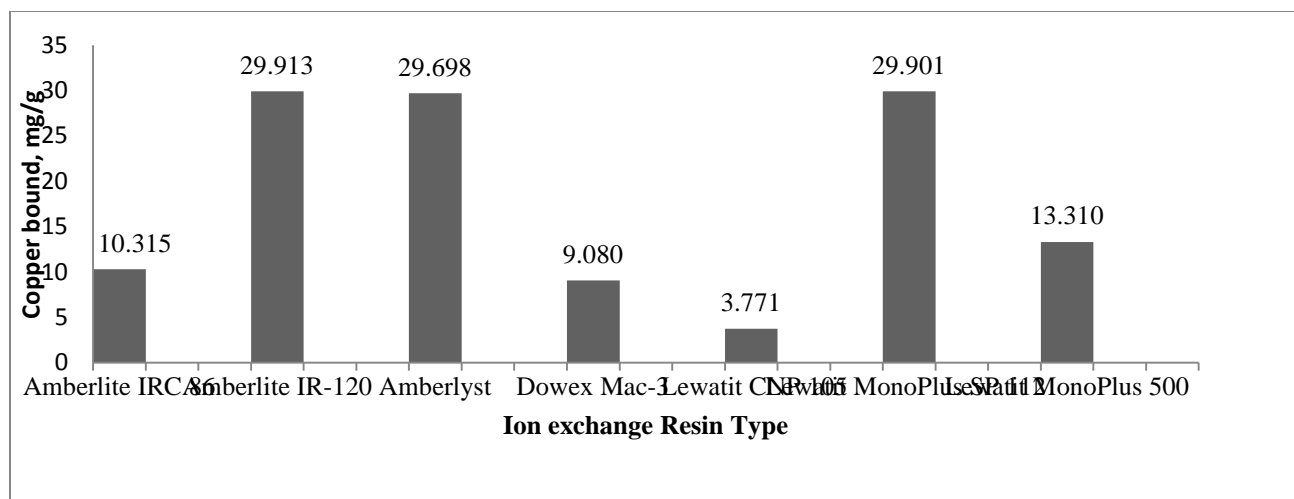
Email: noorfadilah87@gmail.com; smsaufi@gmail.com.

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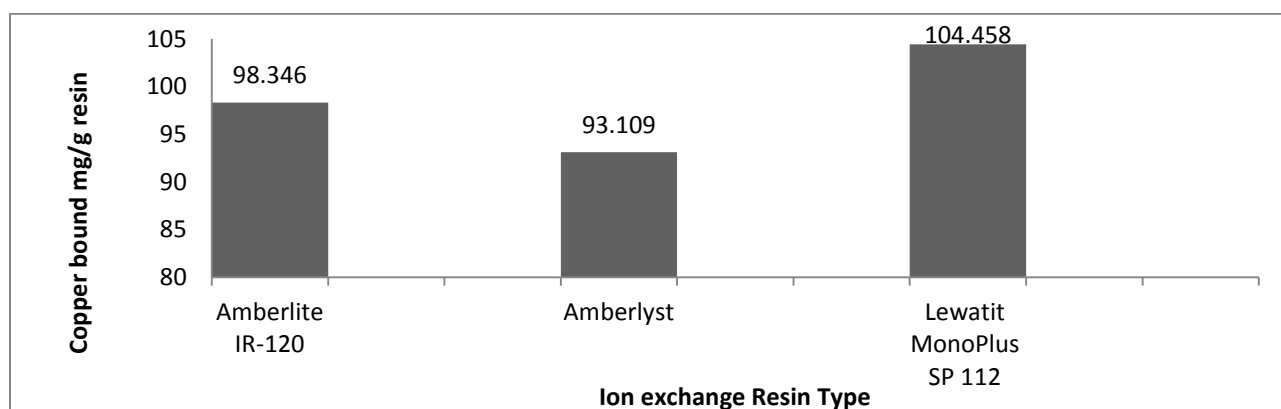
The rapid development of industries contains a large number of potentially harmful compounds such as zinc, copper, mercury and chromium cause harmful effect to humans and the environment (Srivastava and Majumder, 2008). Ion exchange chromatography is widely used in heavy metals removal as there are many advantages such as high treatment capacity and high removal efficiency. However, it still has some limitations especially when operates in packed bed configuration such as low flow rate capability, high pressure drop, flow channeling and long processing time (Ghosh, 2002).

Membrane chromatography can be used to overcome the problems associated with packed bed configuration (Ghosh, 2002). Mixed matrix membrane (MMM) concept can be used to prepare membrane chromatography material. In previous study, anion exchanger MMM chromatography was prepared using MP500 anion resin (Saufi and Fee, 2009) and cation MMM was prepared using SP Sepharose cation resin for protein separation (Saufi and Fee, 2011).

In the current study, cation exchanger MMM chromatography was prepared for copper ion removal from aqueous solution. Different types of cation resins such as Amberlite IR-120, Lewatit MonoPlus SP 112, Dowex Mac-3, Amberlite IRC86, Lewatit CNP 105, Lewatit MonoPlus 500 and Amberlyst were screened for the removal of copper ion. Based on the result shown in Figure 1, Amberlite IR-120, Amberlyst and Lewatit Monoplus bound almost completely copper ion present in 100ppm copper solution used. These three resins were further tested using higher copper solution at 500ppm. As shown in Figure 2, Lewatit Monoplus SP 112 was further selected for the preparation of cation exchanger MMM.



**Figure 1: Copper binding to ground cation resin. The resin (around 50mg) was incubated with 15 ml of 100ppm Cu<sup>2+</sup> solution for overnight.**



**Figure 2: Copper binding to ground cation resin . The resin (around 50mg) was incubated with 15 ml of 500ppm Cu<sup>2+</sup> solution for overnight.**

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