

4. CONCLUSIONS

The hollow fiber membrane embedded the VIP spheres was prepared, when the loading content of the VIP in the PES scaffold was changed from 0 to 15 wt %. The imprinted hollow fiber membrane prepared to exhibit good adsorption capacities to vanillin. According to the Scatchard analyses, the vanillin-imprinted polymers exists a class of equivalent binding sites. This property was an advantage in eases for membrane adsorbents of vanillin in hollow fiber scaffold. Thus, this could promise many applications for recognition, separation and concentration of vanillin.

REFERENCES

- Lemanski, J.; Lipscomb, G. G. (2002), "Effect of shell-side flows on the performance of hollow-fiber gas separation modules," *J. Membrane Sci.*, **195**, 215-228.
- Naghizadeh, A.; Mahvi, A. H.; Vaezi, F.; Naddafi, K. (2008), "Evaluation of hollow fiber membrane bioreactor efficiency for municipal wastewater treatment," *Iran. J. Environ. Health Sci. Eng.*, **4**(5), 257-268.
- Pearl, I. A. (1942), "Vanillin from lignin materials," *J. Am. Chem. Soc.*, **64**, 1429-1431.
- Peimin, F.; Bing, W. (2009), "Preparation of molecularly imprinted polymer membrane with blending trimethoprim-MIP and polysulfone and its transport properties," *Korean J. Chem. Eng.*, **26**(6), 1813-1820.
- Sarkanen, K. V.; Ludwig, C. H. (1971), "Lignin: Occurrence, Formation, Structure and Reactions; Wiley-Intersci.: New York.
- Scatchard, G. (1949), "The attraction of proteins for small molecules and ions," *Ann. N. Y. Acad. Sci.*, **51**, 660.
- Son, L. T.; Kobayashi, T. (2011), "Hollow-fiber membrane absorbents embedded molecularly imprinted polymeric spheres for bisphenol A target," *J. Membrane Sci.*, **384**, 117-125.
- Tullis, R. H.; Duffin, R. P.; Zech, M.; Ambrus, J. L. Jr. (2002), "Affinity Hemodialysis for Antiviral Therapy. I. Removal of HIV-1 from cell culture supernatants, plasma and blood," *Ther. Apher.*, **3**(6), 213-220.
- Wulff, G. (1995), "Molecular imprinting in crosslinked materials with the aid of molecular templates a way towards artificial antibodies," *Angew. Chem. Int. Ed. Engl.*, **34**, 1812.
- Zhao, C. S.; Liu, T.; Lu, Z. P.; Chen, L. P.; Huang, J. (2001), "An evaluation of a polyethersulfone hollow fiber plasma separator by animal experiments," *Artif. Organs.*, **25**, 60.
- Zhao, C.; Yu, B.; Qian, B.; Wei, Q.; Yang, K.; Zhang, A. (2008) "BPA transfer rate increase using molecular imprinted polyethersulfone hollow fiber membrane," *J. Membrane Sci.*, **310**, 34-43.