

Incorporation of peptide onto magnetic bead as a selective biosorbent for micropollutants

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The peptide, oligomer of amino acids, which is the simplest biological recognition element, has been known to have high selectivity toward specific target component. By using biopanning protocol, various peptide sequences with high affinity to target components have been found. For example, TNTLSNN exhibiting high selectivity to Pb²⁺ against other heavy metal ions, and KSLENSY having specific affinity to bisphenol A were screened previously. In the present work, various application of peptide was suggested for environmental purpose based on the magnetic bead-peptide system. As a reusable adsorbent to remove Pb²⁺ from water, the peptide-based magnetic adsorbent incorporating Pb²⁺-binding peptide was constructed. A 7-mer lead-binding peptide (TNTLSNN) was covalently bonded onto the surface of magnetic bead. Compared to the bare bead without the linked peptides (6.8 mg/g), the peptide-linked adsorbent showed 9 times higher removal capacity of lead (56.1 mg/g). Since the magnetic bead-based adsorbent can be easily separated from water and can be reused, the cost for formulating peptide-based adsorbent would be compensated.