

Accepted Manuscript

Diosgenin-selective molecularly imprinted pearls prepared by wet phase inversion

Stefan-Ovidiu Dima, Walid Meouche, Tanase Dobre, Tanta-Verona Nicolescu, Andrei Sarbu

PII: S1381-5148(13)00133-8

DOI: <http://dx.doi.org/10.1016/j.reactfunctpolym.2013.05.014>

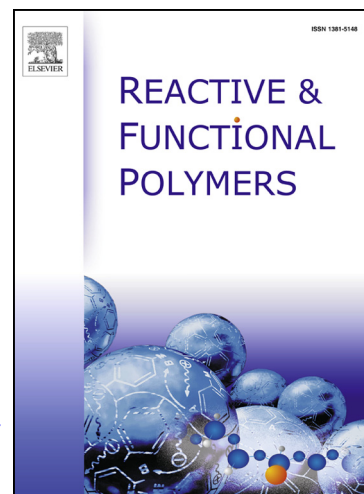
Reference: REACT 3242

To appear in: *Reactive & Functional Polymers*

Received Date: 28 March 2013

Revised Date: 25 May 2013

Accepted Date: 28 May 2013



Please cite this article as: S-O. Dima, W. Meouche, T. Dobre, T-V. Nicolescu, A. Sarbu, Diosgenin-selective molecularly imprinted pearls prepared by wet phase inversion, *Reactive & Functional Polymers* (2013), doi: <http://dx.doi.org/10.1016/j.reactfunctpolym.2013.05.014>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Diosgenin-selective molecularly imprinted pearls prepared by wet phase inversion

Stefan-Ovidiu DIMA^{a,b,#}, Walid MEOUCHE^c, Tanase DOBRE^a, Tanta-Verona
NICOLESCU^b, Andrei SARBU^b

^aUniversity Politehnica of Bucharest, The Faculty of Applied Chemistry and Material Science, Mass Transfer Department, 1-3 Polizu, 011061, Bucharest, Romania, phd.ovidiu.dima@gmail.com

^bNational Research and Development Institute for Chemistry and Petrochemistry Icechim, Polymers Department, 202 Splaiul Independentei, 060021, Bucharest, Romania

^cLaboratoire MAPIEM-EA 4323-Université du Sud Toulon-Var-ISITV, Avenue George Pompidou-BP 56-83162, La Valette du Var, France

Abstract

Functional poly(acrylonitrile-co-acrylic acid) imprinted pearls, selective for diosgenin – a steroidal saponin with the ability to reduce cholesterol from blood – were prepared by wet phase inversion. Three copolymers with the monomer ratios AN:AA90:10, 80:20, and 70:30 were used to prepare the corresponding MIPs (molecularly imprinted polymers) and NIPs (non-imprinted polymers). The rheology studies showed that an 8 w% solution of copolymer in dimethylformamide lead fastest to robust, spherical pearls. Affinity centres were generated via non-covalent bonding between diosgenin's hydroxyl groups and carboxyl moieties of the copolymer matrix. The presence and the quality of the selective binding sites in MIPs were highlighted by optic and electronic microscopy, infrared spectroscopy, thermal analyses, and batch rebinding tests. The imprinting factor (IF) values, ranging from 1.9 to 4.35, decrease with the increasing of the initial concentration of feed solution. When comparing the MIPs concerning the AN:AA ratio, the IF decreases in the order AN:AA80:20 > AN:AA70:30 > AN:AA90:10, suggesting that the 80:20 ratio is the optimum compromise between selectivity (given by AA) and resistance (given by AN). For the best imprinted MIP, 80:20, affinity tests were performed with three competitors, obtaining the average affinity 54%, compared with 31%, 11%, and 4% for the competitors.

Keywords

molecularly imprinted polymers, diosgenin, phase inversion, acrylic copolymers, MIPs

Download English Version:

<https://daneshyari.com/en/article/5210014>

Download Persian Version:

<https://daneshyari.com/article/5210014>

[Daneshyari.com](https://daneshyari.com)