

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/259879795>

Surfactant Modified/Mediated Thin-Layer Chromatographic Systems for the Analysis of Amino Acids

Article in *Journal of Analytical Methods in Chemistry* · December 2013

DOI: 10.1155/2013/973280 · Source: PubMed

CITATIONS

2

READS

148

5 authors, including:



Showkat Bhawani

University Malaysia Sarawak

48 PUBLICATIONS 263 CITATIONS

[SEE PROFILE](#)



Hassan Albishri

King Abdulaziz University

60 PUBLICATIONS 1,163 CITATIONS

[SEE PROFILE](#)



Ziya Ahmad Khan

University of Jeddah, Jeddah, Saudi Arabia

38 PUBLICATIONS 641 CITATIONS

[SEE PROFILE](#)



Mohamad Nasir Mohamad Ibrahim

Universiti Sains Malaysia

137 PUBLICATIONS 1,631 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Final Year Project (Resource Chemistry) [View project](#)



Corrosion Inhibition of Mild Steel in Near Neutral Solution by Kraft and Soda Lignin and Their Related Monomers [View project](#)

Review Article

Surfactant Modified/Mediated Thin-Layer Chromatographic Systems for the Analysis of Amino Acids

Showkat A. Bhawani,^{1,2} Hassan M. Albishri,³ Ziya Ahmad Khan,¹
Mohamad N. Mohamad Ibrahim,² and A. Mohammad⁴

¹ Chemistry Department, Faculty of Science-North Jeddah, King Abdulaziz University, Jeddah 21589, Saudi Arabia

² School of Chemical Sciences, Universiti Sains Malaysia, 11800 Pulau Pinang, Malaysia

³ Chemistry Department, Faculty of Science, King Abdulaziz University, Jeddah 21589, Saudi Arabia

⁴ Analytical Research Laboratory, Department of Applied Chemistry, Faculty of Engineering and Technology, Aligarh Muslim University, Aligarh 202002, India

Correspondence should be addressed to Showkat A. Bhawani; sabhawani@gmail.com

Received 12 July 2013; Accepted 25 October 2013

Academic Editor: Sinem Göktürk

Copyright © 2013 Showkat A. Bhawani et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

This review incorporates a large number of chromatographic systems modified by the surfactants. A large number of solvent systems and stationary phases are summarized in this paper. Three different kinds of surfactants (anionic, cationic, and nonionic) are used as modifiers for stationary phases as well as solvent systems. Surfactants are used at all the three different concentration levels (below, above, and at critical micelle concentration) where surfactants behave differently. Modifications of both stationary phases and solvent systems by surfactants produced a new generation of chromatographic systems. Microemulsion solvent systems are also incorporated in this paper. Microemulsion thin-layer chromatography is a new approach in the field of chromatography.

1. Introduction

It is a well-known fact that amino acids are building blocks of proteins. Amino acids are also essential ingredients of diets of all living beings. Amino acids are biologically important biochemical molecules commonly used in nutritional supplements such as glutamic acid as flavor enhancer [1] and aspartame as a low calorie artificial sweetener [2]. Because of the enormous applications of amino acids in many biological systems chromatographic study of these molecules is very important. This review article deals with the surfactant modified thin-layer chromatographic systems used for the analysis of amino acids.

Surfactants are the promising compounds for the modification of chromatographic data. The unusual results are obtained by using surfactants in chromatographic system as compared to other chemical compounds. Surfactants are the class of compounds which entirely modify the efficiencies of different phases involved in the chromatography. Surfactants expand the potentialities of TLC by resolving complex

mixtures especially those containing neutral and charged compounds. Sumina et al. [3] discussed the modification of TLC by surfactants in three different ways such as (a) use of micellar solutions as mobile phase, (b) use of molecular solutions of ionic surfactants below critical micelle concentration, and (c) use of surfactants for the modification of surfaces by impregnating the surfaces with aq. methanolic or ethanolic solution of surfactants.

According to the literature surfactants provided important separations of amino acids. Some of the separations are very unique and scientifically important. On the other hand micellar thin-layer chromatography (MTLC) has got many advantages over conventional TLC. The most exciting features found in MTLC as compared to conventional thin-layer chromatography that leads to new generation of chromatographic systems are (a) double solvent front that is observed in chromatogram, (b) modifications of adsorbent surfaces, and (c) a change in elution order of compounds [3]. The use of aqueous micellar mobile phases is free from some disadvantages such as strong smell, volatility, flammability,