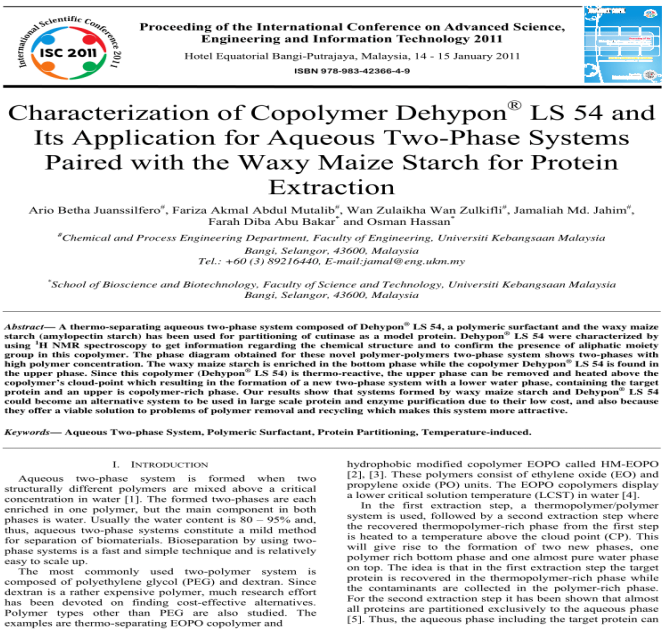
Aqueous Two-Phase Partitioning: Physical Chemistry and Bioanalytical Applications



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Characterization of Copolymer Dehypon® LS 54 and Its Application for Aqueous Two-Phase Systems Paired with the Waxy Maize Starch for Protein Extraction

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***Abstract*— A thermo-separating aqueous two-phase system composed of Dehypon® LS 54, a polymeric surfactant and the waxy maize starch (amylopectin starch) has been used for partitioning of cutinase as a model protein. Dehypon® LS 54 were characterized by using ^{1}H NMR spectroscopy to get information regarding the chemical structure and to confirm the presence of aliphatic moiety group in this copolymer. The phase diagram obtained for these novel polymer-polymers two-phase system shows two-phases with high polymer concentration. The waxy maize starch is enriched in the bottom phase while the copolymer Dehypon® LS 54 is found in the upper phase. Since this copolymer (Dehypon® LS 54) is thermo-reactive, the upper phase can be removed and heated above the copolymer's cloud-point which resulting in the formation of a new two-phase system with a lower water phase, containing the target protein and an upper is copolymer-rich phase. Our results show that systems formed by waxy maize starch and Dehypon® LS 54 could become an alternative system to be used in large scale protein and enzyme purification due to their low cost, and also because they offer a viable solution to problems of polymer removal and recycling which makes this system more attractive.**

***Keywords*— Aqueous Two-phase System, Polymeric Surfactant, Protein Partitioning, Temperature-induced.**

I. Introduction

Aqueous two-phase system is formed when two structurally different polymers are mixed above a critical concentration in water [1]. The formed two-phases are each enriched in one polymer, but the main component in both phases is water. Usually the water content is 80 – 95% and, thus, aqueous two-phase systems constitute a mild method for separation of biomaterials. Bioseparation by using two-phase systems is a fast and simple technique and is relatively easy to scale up.

The most commonly used two-polymer system is composed of polyethylene glycol (PEG) and dextran. Since dextran is a rather expensive polymer, much research effort has been devoted on finding cost-effective alternatives. Polymer types other than PEG are also studied. The examples are thermo-separating EOPO copolymer and hydrophobic modified copolymer EOPO called HM-EOPO [2], [3]. These polymers consist of ethylene oxide (EO) and propylene oxide (PO) units. The EOPO copolymers display a lower critical solution temperature (LCST) in water [4].

In the first extraction step, a thermopolymer/polymer system is used, followed by a second extraction step where the recovered thermopolymer-rich phase from the first step is heated to a temperature above the cloud point (CP). This will give rise to the formation of two new phases, one polymer rich bottom phase and one almost pure water phase on top. The idea is that in the first extraction step the target protein is recovered in the thermopolymer-rich phase while the contaminants are collected in the polymer-rich phase. For the second extraction step it has been shown that almost all proteins are partitioned exclusively to the aqueous phase [5]. Thus, the aqueous phase including the target protein can

B.Y. Zaslavsky: Aqueous Two?Phase Partitioning Physical Chemistry and Bioanalytical Applications, Marcel Dekker, Inc., New York, Basel, Oxford, ISBN.Aqueous two?phase partitioning. Physical chemistry and bioanalytical applications. Edited by Boris Y. Zaslavsky, Marcel Dekker, Inc.; New York.Covers the fundamental principles of solute partitioning in aqueous two-phase systems, explains their important practical features, and furnishes methods of characterization. The information provided by the partition behaviour of a solute in an aqueous two-phase system is examined.AQUEOUS TWO-PHASE PARTITIONING: Physical Chemistry and Bioanalytical Applications, Boris Y. Under optimum conditions a single protein from a complex mixture may be highly concentrated in one of the phases, while the other phase contains the remaining ones.This books (Aqueous Two-Phase Partitioning: Physical Chemistry and Bioanalytical Applications [FREE]) Made by Boris Y. Zaslavsky About.Aqueous two-phase partitioning: physical chemistry and bioanalytical applications. Responsibility: Boris Y. Zaslavsky. Imprint: New York: M. Dekker, cPhysical Chemistry and Bioanalytical Applications Partitioning of Solutes In Aqueous Two-Phase Systems: Physicochemical Properties of Phases in Aqueous.thecomicbookguide.com: Aqueous Two-Phase Partitioning: Physical Chemistry and Bioanalytical Applications.thecomicbookguide.com: Aqueous Two-Phase Partitioning: Physical Chemistry and Bioanalytical Applications () by Boris Y. Zaslavsky and a great.Aqueous two-phase partitioning: physical chemistry by Boris Y Zaslavsky. Aqueous two-phase partitioning: physical chemistry and bioanalytical applications.thecomicbookguide.com: Aqueous Two-Phase Partitioning: Physical Chemistry and Bioanalytical Applications: Never used!.Read Online or Download Aqueous two-phase partitioning: physical chemistry and bioanalytical applications PDF. Similar analytic books.d LEPABE, Department of Chemical Engineering, Faculty of Engineering of the University of Porto, There are two main types of aqueous two-phase systems (ATPS) .. [5] B.Y. Zaslavsky, Aqueous Two-phase Partitioning: Physical Chemistry and. Bioanalytical Applications, CRC Press, thecomicbookguide.com: Aqueous Two-Phase Partitioning: Physical Chemistry and Bioanalytical Applications. () by Zaslavsky, Boris Y. and a great Jan.Hi, everyone in the polymer-inorganic salt aqueous two phase system, the volumes Partitioning - Physical Chemistry and Bioanalytical Applications", Marcel.Aqueous two phase systems (ATPS) based on water-soluble polymers have potential application in industry due to the low cost of Zaslavsky, B.Y. Aqueous Two-Phase Partitioning: Physical Chemistry and Bioanalytical.Aqueous two phase partition systems (ATPS) have been widely used for the , Physical Chemistry and Bioanalytical Applications.The relation between composition, rheology, and morphology in phase separated Goddard, E. D., and K. P. Ananthapadmanabhan, Applications of polymer-surfactant systems, in Polymer-surfactant systems, edited . Zaslavsky, B. Y., Aqueous Two-Phase Partitioning; Physical Chemistry and Bioanalytical Applications.thecomicbookguide.com - Buy Aqueous Two-Phase Partitioning:

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