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A controlled release system based on poly (Lactic Acid) for release of additives used in oil production

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The development of new, more efficient and cheaper materials, including biodegradable ones, has been the focus of a number of studies. The technology used to obtain materials containing active agents incorporated in degradable polymer matrixes has been expanding, with application in many areas. Among these, the petroleum industry can greatly benefit from technology for controlled release of additives. The controlled release systems used for application of chemicals in the production of petroleum basically involve the capture of a solid or liquid additive by a porous or smooth particulate material. After being encapsulated, the chemical additive is applied. Depending on the conditions of the moiety (aqueous or organic material, salinity, pH, temperature, etc.), the additive is released in controlled form, according to the way it was captured, by diffusion of the additive or erosion of the matrix. This work reports development of a system for controlled release of chemical additives encapsulated in a matrix of poly(lactic acid) (PLA). The concentration of the emulsification agent used to prepare the microspheres influences the size and size distribution of the particles, as well as their morphology, verified by scanning electron microscopy (SEM). Two different types of additives were encapsulated: CDN (soluble in organic media) and AET (soluble in aqueous media). The influence of the PLA's molar mass was much stronger for the organic medium, in which the polymer is soluble, than the aqueous medium, in which the polymer is degraded, with the kinetics depending on other components present in the water.

Biography

Elizabete F Lucas is Chemical Engineer and obtained her D.Sc. degree in Polymer Science and Technology from Federal University of Rio de Janeiro (UFRJ) in 1994. She is Associate Professor at UFRJ since 1994 and has been accumulating a great experience in Polymer Science Applied to Petroleum Production for about 25 years. She is the director of the Laboratory of Macromolecules Applied to Petroleum Production (LMCP), has published 107 scientific papers, presented more than 250 talk/poster at conferences and written 3 books, 1 polymer dictionary, 1 vocabulary of oil chemistry and refining (in 4 languages), 1 book translation and 3 chapters of books. Since she has a strong interaction with petroleum industry, about 90 research reports and 36 technical reports have been prepared. The main studies involve polymer synthesis/characterization/properties, physical-chemistry of polymer solution, rheology of polymers and methods to evaluate the performance of polymers applied to different operations in oil production, from drilling to oil and water treatment. In such field, she has directed 30 master dissertations and 14 doctor thesis, and has 7 master dissertations and 11 doctor thesis under direction.

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