عنوان مقاله:

Preparation of Nanoparticles Loaded by Dimethyl Fumarate and Their Physical and Chemical Properties Study

محل انتشار:

نشریه پیشرفته شیمی, دوره 8, شماره 1 (سال: 1404)

تعداد صفحات اصل مقاله: 15

نویسندگان:

Abdulazeez lhussein Alhussein - Department of Chemical and Process Engineering, Faculty of Engineering and Built Environment, University Kebangsaan Malaysia (UKM), Bangi P.O. Box ۴۳۰۰۰, Selangor, Malaysia

Tayser Gaaz - Department of Chemical and Process Engineering, Faculty of Engineering and Built Environment, University Kebangsaan Malaysia (UKM), Bangi P.O. Box ۴۳۰۰۰, Selangor, Malaysia

Ahed Jaaz - Medical Physics Department, College of Science, Al-Mustaqbal University, Babylon, Iraq

Forat Alsultany - Medical Physics Department, College of Science, Al-Mustaqbal University, Babylon, Iraq

Abdul Amir H. Kadhum - College of Medicine, University of Al-Ameed, Karbala, Iraq

Ahmed Al-Amiery - Department of Chemical and Process Engineering, Faculty of Engineering and Built Environment, University Kebangsaan Malaysia (UKM), Bangi P.O. Box ۴۳۰۰۰, Selangor, Malaysia

Hussein Al-Bahrani - Department of Chemistry, College of Education for Pure Science, University of Kerbala, Karbala, Iraq

خلاصه مقاله:

When nanotechnology is used in medicine, it makes it easier to find and treat a wide range of diseases. The potentially fatal disease multiple sclerosis (MS) has a disproportionately large impact on young people. One of the oral options for treating this condition is dimethyl fumarate (DMF). This study aimed to use platelet membranes and polymeric nanoparticles (PNs) to develop a drug delivery system that mimics biological cells to treat MS. Here, we produced and characterized solid lipid nanoparticles (SLNs) containing dimethyl fumarate (DMF). To make SLNs, DMF is combined with biocompatible lipids using hot emulsion and ultrasonication techniques. These DMF-SLNs were characterized using transmission electron microscopy (TEM), scanning electron microscopy (SEM), FTIR spectroscopy, and a zeta meter instrument. Characterization revealed that the optimal SLNs had a polydispersity index of (۰.۲۸, ۰.۹۶, ۰.۷۷), a zeta potential of (-۲۲.۷۳ mV, -۲۸.۷ mV, and -۳۰.۱۳ mV), and a mean particle size of (۵۶۲ nm, ۱۹۹۷ nm, and ۸۴۹ nm). The results of this study suggest that the present formulation may be a potential longer-acting formulation for the improved management of MS. SLNs could significantly change the treatment of many illnesses by providing effective drug delivery.

کلمات کلیدی:

Multiple Sclerosis, Dimethyl fumarate, Immunomodulatory fumaric acid