Insight Medical Publishing

American Journal of Pharmacology and Pharmacotherapeutics

ISSN 2393-8862

2020

Vol.7 Iss 2

Febuxostat: preformulation study and formulation of nanostructured lipid carriers gel

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Abstract

The objective of this work was to formulate and evaluate NLCs of Febuxostat and their preformulation study for the effective management of gout. Febuxostat is used in the treatment of chronic gout and hyperuricemia, which is a nonpurine selective inhibitor. It inhibits xanthine oxidase both oxidized and reduced form, thus reducing production of uric acid in the body. It is selected as a model drug for research work, because it belongs to BCS class –II which has low solubility and high permeability. Furthermore it is unprotected to enzymatic degradation in both intestine and liver. Hence, its oral bioavailability is affected and the presence of food also decreases its Cmax by 38-39 %, due to which its administration is preferred by the transdermal route. Topical delivery protects the drug from various enzymes and improves the efficacy of the drug as well as bioavailability. In this study physicochemical property of Febuxostat was improved by using hot high pressure homogenisation technique. NLCs of Febuxostat was prepared with solid lipid (Stearic Acid) and liquid lipid (Oleic acid) at five drug: polymer ratios (2:1), (1:1), (1:2), (1:3) and (1:4). The preformulation study of febuxostat included melting point, FTIR study and drug polymer interaction study. The NLCs Gel of Febuxostat were prepared by using carbopol 934.. The formulation F4 showed maximum 87% Controlled release up to 6 hours. The findings of the present research demonstrated the better efficiency of Febuxostat loaded NLCs gel (F4) than standard (pure) Febuxostat in gout treatment. The NLCs formulation through transdermal route could be a useful dosage form to reduce the undesirable side effects associated with an oral route. The methodology used for the preparation is simple and is also industrially feasible. Therefore, NLCs may be considered as an effective vehicle for transdermal delivery of Febuxostat. In conclusion, the NLCs formulation has an immense potential for effective treatment of gout and can further be studied for its clinical implications in future.

Biography:

Currently, I am working as a Research Scholar at Chandigarh University, Gharuan since 2019. I have completed my Bachelor's degree in 2016 and a Master's Degree in 2018 from Amar Saheed Baba Ajit Singh Jujhar Singh Memorial College of Pharmacy, Bela securing third and first positions respectively. I participated in various cultural and extracurricular activities at the college and university level both and have secured top positions. Besides, I took part in various conferences and Seminars on the National level. There are two review articles published under my name including "Nanoparticles: fundamental and their prospective" published in Research Journal of Biological Pharmaceutical and Chemical Sciences and another Review Article on "Gout: causes and Pharmaceutical issues" published in Indo American Journal of Pharmaceutical Sciences and one Research article on "Febuxostat: preformulation study and formulation of nanostructured lipid carriers gel" is communicated. I have One Year experience as Assistant Professor at Himachal Pharmacy College, Nalagarh from 2018 to 2019.

Speaker Publications:

1. "a systematic review on extraction methods, pharmacology, pharmacokinetics and clinical studies of bioactive lead: 6-gingerol"; 2020 - Volume 21 [Issue 15-16]

2." Design and optimization of febuxostat loaded nano lipid carriers using full factorial design", Turkish Journal of Pharmaceutical Sciences DOI: 10.4274/tjps.32656

3. Long chain lipid based tamoxifen NLC. Part I: Preformulation studies, formulation development and physicochemical characterization; March 2013International Journal of Pharmaceutics 454(1) DOI: 10.1016/j.ijpharm.2013.03.034

19th International Conference on Pharmaceutics & Novel Drug Delivery Systems; Webinar; June 18-19, 2020

Abstract Citation:

Navni Sharma, Febuxostat: preformulation study and formulation of nanostructured lipid carriers gel, Pharmaceutica Meet 2020, 19th International Conference on Pharmaceutics & Novel Drug Delivery Systems; Webinar, June 18-19, 2020 (https://novel-drugdelivery-systems.pharmaceuticalconferences.com/middleeast/2020)