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ESPERIENZA LAVORATIVA

07/2021 – ATTUALE – Catania (CT), Italia
COLLABORATORE VOLONTARIO ALLA RICERCA – DIPARTIMENTO DI SCIENZE DEL FARMACO E DELLA SALUTE UNIVERSITÀ DEGLI STUDI DI CATANIA

Attività di ricerca operativa e formulativa su sistemi per il rilascio colonico di sostanze nutraceutiche

01/2021 – 06/2021 – Catania (CT), Italia
BORSISTA – DIPARTIMENTO DI SCIENZE DEL FARMACO E DELLA SALUTE UNIVERSITÀ DEGLI STUDI DI CATANIA

Studi formulativi e caratterizzazione di microparticelle polimeriche per il rilascio colonico di sostanze bioattive (D.R. 3198 del 04.11.2020)

11/2020 – 01/2021 – Catania (CT), Italia
COLLABORATORE VOLONTARIO ALLA RICERCA – DIPARTIMENTO DI SCIENZE DEL FARMACO E DELLA SALUTE UNIVERSITÀ DEGLI STUDI DI CATANIA

Attività di ricerca su sistemi per il Colon Drug Delivery di sostanze nutraceutiche

10/2019 – 06/2020 – Catania (CT), Italia
PANELISTA – NUCLEO CHIMICO MEDITERRANEO DR. BRUNO IN COLLABORAZIONE CON IL DIPARTIMENTO DI SCIENZE DEL FARMACO

Saggi olfattometrici

10/2013 – 03/2014 – Taormina (ME), Italia
TIROCINANTE – BRITISH PHARMACY (DOTT. G. VERSO)

Semestre di pratica farmaceutica

ISTRUZIONE E FORMAZIONE

ATTUALE – Piazza Università 2, Catania (CT), Italia
MASTER DI II LIVELLO - FORMAZIONE DI RICERCATORI PER LA SPECIFICA PREPARAZIONE NEL SETTORE DELLE TECNOLOGIE AVANZATE IN DRUG DELIVERY (PROGETTO PON03PE_00216) – Dipartimento di Scienze Chimiche - Università degli studi di Catania

https://www.dsc.unict.it/

17/07/2020 – Piazza Università 2, Catania (CT) , Italia
ABILITAZIONE ALLA PROFESSIONE DI FARMACISTA – Università degli studi di Catania

09/06/2020 – Centro Direzionale Isola F2 , Napoli
24 CREDITI FORMATIVI (CFU) RELATIVI ALLE COMPETENZE DI BASE NELLE DISCIPLINE ANTROPO-PSICO-PEDAGOGICHE E NELLE METODOLOGIE E TECNOLOGIE DIDATTICHE, AI SENSI DELL'ART. 5 DEL D.LGS. 13 APRILE 2017, N. 59 E DEL D.M. 10 AGOSTO 2017, N. 616. – Università Telematica Pegaso

https://www.unipegaso.it/

06/05/2020 – Piazza Università 2, Catania (CT), Italia
LAUREA IN CHIMICA E TECNOLOGIE FARMACEUTICHE (C.T.F.) – Dipartimento di Scienze del Farmaco - Università degli studi di Catania

Campi di studio
- Pharmaceutical technologies and nutraceutical applications

Tesi: Studio di ottimizzazione operativa e formulativa di micropartcelle polimeriche a base di Eudraguard (Relatore: Prof. R. PIGNATELLO)

CFU | 300 | http://www.dsf.unict.it/it

06/08/2016 – Via Lisi 85, Giarre (CT), Italia
CERTIFICATO DI QUALIFICA PROFESSIONALE: OPERATORE INFORMATICO – ISTITUTO IDI Giarre e Letojanni

https://www.istitutoidi.it/

28/05/2016 – Via Lisi 85, Giarre (CT), Italia
CERTIFICATO ECDL STANDARD – ISTITUTO IDI Giarre e Letojanni

https://www.istitutoidi.it/

13/05/2016 – Via Lisi 85, Giarre (CT), Italia
CERTIFICATO ECDL IT-SECURITY – ISTITUTO IDI Giarre e Letojanni

https://www.istitutoidi.it/

13/07/2007 – C/da Moscatello snc, Giardini Naxos (ME), Italia
DIPLOMA MATURITÀ SCIENTIFICA – Liceo Scientifico Statale C. Caminiti, Giardini Naxos (ME)

https://www.iiscaminititrimarchi.edu.it/public/liceo-giardini_no.html

PUBBLICAZIONI

Fluorescent Nanosystems in Ocular Application - Entry

Encyclopedia MDPI
Fluorescence is a simple and non-invasive way to track the drug through the eye tissues, and it is also widely used in diagnostics to visualize diseased tissues, lesions and pathological markers. Nanomedicine offers the possibility to overcome obstacles related to physiological mechanisms and ocular barriers by exploiting different ocular routes. Functionalization of nanosystems by fluorescent probes could be a useful strategy to understand the pathway taken by nanocarriers into the ocular globe and to improve the desired targeting accuracy.
https://encyclopedia.pub/entry/22810

COMPARISON OF PURE ELLAGIC ACID OR POMEGRANATE EXTRACT RELEASE BY EUDRAGUARD® COLON TARGETED DELIVERY SYSTEMS (CTDSs) - Poster

8th Galenus International Workshop Valencia, 27-29/04/2022
https://congresos.adeituv.es/Galenus_2020/ficha.en.html – 2022

Introduction: The targeted delivery of active substances to the colon has several advantages for both topical and systemic action. The colon has a large surface area for absorption. The targeted delivery allows a reduction of the payload of active compounds because the release occurs directly at the site of action/absorption. In addition, CTDSs protect the loaded actives from pH or enzyme degradation in digestive fluids. In this comparative study, ellagic acid and pomegranate extract (titrated at 20% ellagic acid) were chosen for the widely known antioxidant and anti-inflammatory activities useful against inflammatory bowel diseases (IBD).

Objectives: The purpose of this research is to compare ellagic acid release from pomegranate phytoextract with the pure compound release from food-grade CTDSs.

Materials and Methods: Eudraguard® Biotic (EUGB) and Control (EUGC) copolymers were chosen as carriers. They are approved by EFSA as food additives (with code E1207 and E1206 respectively). Both have been tested in previous studies to realize food-grade CTDSs for potential nutraceutical application. The formulation technique chosen is the Solvent Evaporation (SE). An ethanol solution, containing the lyophilized Eudraguard commercial dispersion and the active compound is dripped, under magnetic stirring (300 rpm), into an equal volume of water. Ethanol is then evaporated by rotary extractor. The formulation is frozen at -80 °C and then freeze-dried. The systems were formulated with matrices consisting of 1) EUGB; 2) EUGC; 3) 90% (w/w) EUGB and 10% (w/w) EUGC; and, 4) 70% (w/w) EUGB and 30% (w/w) EUGC. The release test was performed on a modified model of the dissolution test for gastro-resistant tablets (apparatus 2 and method A) according to European Pharmacopoeia 10^{th} Edn: the procedure consisted in a pH-change assay (i.e., 2 h at pH 1, 4 h at pH 6.8 and then up to 24 h at pH 7.4).

Results and Discussion: The obtained systems appear as highly hygroscopic brownish powders. The release profiles were compared and the degradation process was supported by a SEM study. The systems showed a gastric release less than 15%. The purê EUGB system showed the maximum peak release in the simulated colon environment (pH = 7.4) after 6 h from the beginning of the test. Pure EUGC microparticles or mixed matrices showed a prolonged release of the active compound. These profiles are in agreement with the copolymer properties shown in the fuctional coating of solid dosage forms. Thus, by modulating the ratio of copolymers it is possible to regulate the release of loaded actives in different regions of the intestinal tract.

Conclusions: The proposed systems ensure the release of ellagic acid from the phytoextract with a profile overlapping that of the pure compound. This can be na economic advantage in the development of oral nutraceuticals based on natural products and using targeted delivery technology.

DEVELOPMENT OF DIOSMIN-LOADED NANOSTRUCTURED LIPID CARRIERS BY BOX-BEHNKEN DESIGN: CHARACTERIZATION AND IN VITRO TEST ON ARPE-19 CELLS - Poster

8th Galenus International Workshop Valencia, 27-29/04/2022
https://congresos.adeituv.es/Galenus_2020/ficha.en.html – 2022

Introduction: Inflammatory response is a crucial aspect of most common degenerative disease of the posterior segment of the eye. Diosmin, a natural flavonoid, is considered a protective agent widely used in the treatment of vascular diseases.
The delivery of Diosmin in nanostructured lipid carrier (NLC) intended for ocular delivery could represent a promising strategy to overcome its poor water solubility and improve its anti-inflammatory activity.

Objectives: To the best of our knowledge, the design of diosmin loaded NLC for ophtalmic route represents a novelty that has not been yet explored. Thus, Box Behnken design (BBD) was exploited to optimize NLC suitable for diosmin delivery. After diosmin encapsulation, the optimized formulation was investigated for particles size, polydispersity, zeta potential, pH and osmolarity. Finally, in vitro studies were carried out on ARPE-19 cells in order to assess the diosmin loaded NLC (D-NLC) potential citotoxicity and anti-inflammatory effect.

Materials and Methods: NLC were prepared by melt emulsification method followed by ultrasonication. The design was composed by four independent variables (solid lipid concentration, liquid lipid concentration, surfactant concentration and type of solid lipid). The effect of the factors was evaluated on NLC size (response). ANOVA variance was used to assess the significance of the model and the impact of the variables on the response. The optimized formulation was selected according to the desirability function. Diosmin was encapsulated on the optimized NLC (160μM.) Viability test was performed on ARPE-19 cells after 48h of treatment. The cytoprotective effect of Diosmin-NLC was evaluated on an in vitro model of retinal inflammation, after exposure of ARPE-19cells to TNF-α 20 ng/mL and D-NLC 160 μM for 48h.

Results and Discussion: BBD revealed that the model used (2FI) was significant (p value < 0.0001). The optimized NLC was composed of 10% (w/v) Softisan® 100, 3% (w/v) Capryol® 90 and 0.5% (w/v) Tween® 80. The type of solid lipid used was found to be a very significant value for particle size. The size of the optimized NLC were 70.77 nm ± 0.82, which is in the acceptable range for ocular delivery. After encapsulation of Diosmin, particles size remained homogeneous (PDI 0.20 ± 0.07) and with similar diameter (74.5 nm ± 0.88). The value of Zeta Potential is -12 mV ± 0.2. Citotoxicity studies reveales that D-NLC at 160 μM was cytotoxic at concentrations of 0.025 %V/V. TNF-α caused a reduction of cell viability which was slightly but significantly reversed by D-NLC 160 μM at the non-cytotoxic concentrations 0.005-0.075-0.01 %V/V.

Conclusions: The resulting D-NLC formulation could be used as a safe and well-tolerated treatment for potential inflammation of ocular tissues. Further studies should be conducted to assess whether it may be protective against others involved in the inflammatory process in eye diseases.

Fluorescent Nanosystems for Drug Tracking and Theranostics: Recent Applications in the Ocular Field

Pharmaceutics 2022, 14(5), 955
https://doi.org/10.3390/pharmaceutics14050955 – 2022
The greatest challenge associated with topical drug delivery for the treatment of diseases affecting the posterior segment of the eye is to overcome the poor bioavailability of the carried molecules. Nanomedicine offers the possibility to overcome obstacles related to physiological mechanisms and ocular barriers by exploiting different ocular routes. Functionalization of nanosystems by fluorescent probes could be a useful strategy to understand the pathway taken by nanocarriers into the ocular globe and to improve the desired targeting accuracy. The application of fluorescence to decorate nanocarrier surfaces or the encapsulation of fluorophore molecules makes the nanosystems a light probe useful in the landscape of diagnostics and theranostics. In this review, a state of the art on ocular routes of administration is reported, with a focus on pathways undertaken after topical application. Numerous studies are reported in the first section, confirming that the use of fluorescent within nanoparticles is already spread for tracking and biodistribution studies. The first section presents fluorescent molecules used for tracking nanosystems' cellular internalization and permeation of ocular tissues; discussions on the classification of nanosystems according to their nature (lipid-based, polymer-based, metallic-based and protein-based) follows. The following sections are dedicated to diagnostic and theranostic uses, respectively, which represent an innovation in the ocular field obtained by combining dual goals in a single administration system. For its great potential, this application of fluorescent nanoparticles would experience a great development in the near future. Finally, a brief overview is dedicated to the use of fluorescent markers in clinical trials and the market in the ocular field.

Release study of food-grade polymeric colonic drug delivery systems: evidence of pH-dependent behavior by Scanning Electron Microscopy (TFA PO033) - Poster

SCI21 – XXVII Congresso Nazionale della Società Chimica Italiana, 14-23/09/2021
http://www.sci2020.org/index.php/programma/book-of-abstract – 2021
Colon-targeted drug delivery systems (cDDS) are designed for the oral administration of active ingredients. These systems can protect the cargo from the stomach and small intestine environment, ensuring a selective release in the colon area. These systems are, therefore, ideal for a local therapeutic action against IBD (inflammatory bowel disease) or to improve the systemic effect of active agents sensitive to the environments of the previous tracts of the digestive system. Following previous studies of ours, in which the food-grade copolymers Eudraguard® Biotic and Control have been proposed for the production of microparticles loaded with natural compounds (nutraceuticals) [1] [2], in this study we aimed to acquire a microscopic evidence of the process of degradation of the above polymers in gastric, enteric and colon pH conditions. The systems were formulated using an ESE technique (emulsion-solvent evaporation) and were loaded with Resveratrol as a model drug. To perform the Scanning Electron Microscopy (SEM) analysis, specimens of each cDDS were maintained under magnetic stirring at different pH conditions: for 1 h in simulated gastric fluid (SGF), for 3 h in simulated intestinal fluid (SIF) or for 4 h in simulated colonic fluid (SCF). The microscopic behavior of the systems was correlated with in vitro drug release studies, carried out
under a pH-change protocol between pH 1.2 to 7.4 [1]. SEM pictures confirmed that all the systems ensured a limited gastric release of resveratrol (below 20% of the loaded dose), as evidenced by the presence of small pores in the surface of microparticles kept in SGF. The system constituted by Eudraguard® Biotic only showed the maximum release in the colon environment, and SEM analysis confirmed the presence of completely degraded microparticles in these conditions. The systems produced with pure Control allowed a sustained drug release over time and in SCF showed only partially degraded microparticles. Using the mixed polymeric matrices, with increasing the percentage of Eudraguard® Control the systems progressively lost the colon release capacity and gave a sustained over time with a plateau
in the small intestine conditions.

[1] C. Curcio, A.S. Greco, S. Rizzo, L. Saitta, T. Musumeci, B. Ruozi, R. Pignatello, Development, Optimization and Characterization of Eudraguard®-Based Microparticles for Colon Delivery. Pharmaceuticals 2020, 13(6), 131.
[2] C. Curcio, A. Bonaccorso, T. Musumeci, R. Pignatello, "Oral Controlled Delivery of Natural Compounds Using Food-Grade Polymer Microparticles". Current Nutraceuticals, 2021, 2(2), 145-153.

Development, Optimization and Characterization of Eudraguard®-based Microparticles for Colon Delivery

Pharmaceuticals 2020, 13(6), 131
https://doi.org/10.3390/ph13060131 – 2020
Development of pH-dependent systems for colon delivery of natural active ingredients is an attractive area of research in the field of nutraceutical products. This study was focused on Eudraguard® resins, that are methacrylate copolymers approved as “food grade” by European Commission and useful for the production of food supplements. In particular, Eudraguard® Biotic (EUG-B), characterized by a pH-dependent solubility and Eudraguard® Control (EUG-C), whose chemical properties support a prolonged release of the encapsulated compounds, were tested. To obtain EUG microparticles, different preparation techniques were tested, in order to optimize the preparation method and observe the effect upon drug encapsulation and specific colonic release. Unloaded microparticles were initially produced to evaluate the influence of polymer characteristics on the formulation process; subsequently microparticles loaded with quercetin (QUE) as a low solubility model drug were prepared. The characterization of microparticles in the solid-state (FT-IR spectroscopy, differential scanning calorimetry and X-ray diffractometry) indicated that QUE was uniformly dispersed in a non-crystalline state in the polymeric network, without strong signs of chemical interactions. Finally, to assess the ability of EUG-C and EUG-B to control the drug release in the gastric environment, and to allow an increased release at a colonic level, suitable in vitro release tests were carried out by simulating the pH variations along the gastro-intestinal tract. Among the evaluated preparation methods, those in which an aqueous phase was not present, and in particular the emulsion-solvent evaporation method produced the best microparticle systems. The in vitro tests showed a limited drug release at a gastric level and a good specific colon release.