In vitro drug release and ex vivo percutaneous absorption of resveratrol cream using HPLC with Zirconized silica stationary phase

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INTRODUCTION

- Resveratrol (3,5,4\textquotesingle-trihydroxystilbene) is a polyphenol compound naturally occurring in high to moderate quantities in various foods including grapes, peanuts and wine. Chemically, it has two geometrical isomers, trans- and cis-resveratrol, being the trans form biologically more active and also more stable.
- Resveratrol has anti-tumor, anti-inflammatory, anti-oxidant, photoprotective, depigmentation and anti-platelet aggregation properties.
- The combination of several limiting factors including poor water solubility, limited chemical stability, short biological half-life, and rapid metabolism and elimination means that resveratrol demonstrates low bioavailability, especially by oral route.
- Once resveratrol has physicochemical properties that are particularly suitable for diffusion through the human skin, notably its low molecular weight (228.25 g mol\textsuperscript{-1}) and its adequate lipophilicity (log P\textsubscript{ow} = 3.1), a transdermal system could be an alternative drug delivery mechanism.

MATERIAL AND METHODS

To establish the profile of resveratrol permeability into and across human skin. For that, a laboratory-made chromatographic column was used (Zr-PMODS), with its performance being compared to a commercial C18 column.

OBJECTIVE

To present an in vitro model based on HPLC for the characterization of transdermal delivery systems and its ex vivo counterpart for the determination of the resveratrol skin retention profile.

VALIDATION

Robustness, specificity, linearity, limits of detection and quantification, precision and accuracy.

RESULTS

Zr-PMODS proved to be comparable to C18 commercial columns for HPLC quantification.

The method was validated and proved to be simple, selective, precise, accurate and fast and is in accordance to the validation parameters required by ICH guideline.

CONCLUSION

Using the percentage of permeation by dose (62.6%), one can conclude that a person using the 1-g emulsion dose released by the pump containing 20 mg of resveratrol will have, theoretically, 12.53 mg of it liberated into his bloodstream, gradually and continuously for 24 h. To confirm that, the next step is to perform in vivo pharmacokinetic/pharmacodynamics studies.