COMPATIBILITY OF ACTIVE SUBSTANCES WITH AUXILIARY SUBSTANCES IN MEDICINAL PRODUCTS

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Introduction

Nowadays, auxiliary substances play an important role in the release of the active substance from the pharmaceutical form, through their ability to alter the bioavailability of the active substance. The main reason for the change in bioavailability is the chemical interaction between the ingredients in the “active substance - excipient" system by formation of complexes of polymers, micelles, associates of micelles, macromolecules, chemisorption, etc. Therefore active ingredient must be compatible with the auxiliary substances, which can be tested by Differential scanning calorimetry (DSC), FT-IR spectroscopy studies, High-performance liquid chromatography (HPLC).

Keywords

Compatibility, excipients, physicochemical factors.

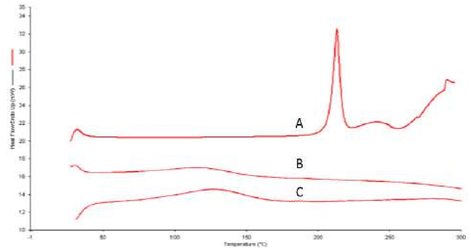
Purpose

The purpose of the present study was to evaluate physicochemical factors and their impact in the selection process of auxiliary substances for the development of medicinal products.

Material and methods

Analyzing the studies of different bibliographic bases, it was found that excipients are not an indifferent mass used in a purely technological aim. For example, the amphetamine in combination with carboxymethylcellulose is practically not absorbed and, accordingly, no pharmacological effect is provided. Phenobarbital in polyethylene glycol is poorly soluble and, as a result, is not absorbed. To improve the dissolution rate of drugs formulated in solid dispersions (example: Piroxicam, Norfloxacin, Nifedipine, Ibuprofen) it is recommended to use polyethylene glycol with different molecular weight.

Differential scanning calorimetry is one of the most common methods in order to analyze interactions between components in the formulation. The enthalpy and melting point of different formulations were measured by DSC-60 (Perkin Elmer, Netherlands). Samples (3-5 mg) were accurately weighed to 0.01 mg and placed in aluminum pans then the lids were crimped using a Perkin Elmer crimper. The scanning rate was 10°C min-1 and the range of the temperature was 30 -300°C. The indium standard was used to calibrate the instrument.



Thermograms of pure spironolactone, spironolactone with PEG 400, spironolactone with glycerin

Results

The thermogram of pure spironolactone (SP) showed a sharp endothermic peak at 212°C that indicated the purity of spironolactone. This peak might also indicate melting of the drug. This sharp endothermic peak of spironolactone was disappeared in the thermograms of SP in the liquid vehicle with PEG 400 and glycerin respectively. Thermograms showed that no interactions between SP and excipients have been occurred.

Conclusions

Due to analysis of the bibliographic studies, it was observed that the effect of excipients on the bioavailability of the active substance is very essential. Therefore it requires a special study, which should ensure the stability, maximum bioavailability and pharmacological action of medicinal products.