ABSTRACT

Evaluation of Celluloses and Maize Starch by the Creep Test Method

The aim of this work was to consider the appropriateness of using the creep test for evaluation of visco-elastic characteristics of pharmaceutical fillers and to compare these properties.

Pharmaceutical powders involved in this assessment were powdered cellulose (Vitacel A 300), hydroxyethylcellulose (HEC, Natrosol 250), hydroxypropylcellulose (HPC, Klucel EF), hydroxypropylmethylcellulose (HPMC, K 100) and maize starch.

The powders were compressed with a material-testing machine T1-FRO 50 by compression forces of 0,25; 0,5; 1; 2; 3; 4; 5; 7,5; 10 and 15 kN. Compression data for each tablet were then recorded by a software connected to the compressing machine. The recorded data, such as die displacement and time, were transferred into relation between creep compliance (J) and time. Obtained values were then used for calculating the parameters such as immediate elasticity (E_1), retarded elasticity (E_2), plasticity (P_1) and factor of plasticity (F_P).

To summarize all results, we can say that hydroxypropylcellulose has the highest values of elasticity and the lowest values of plasticity among all tested powders. Conversely hydroxypropylmethylcellulose shows the lowest elasticity and powdered cellulose presents the most plastic behavior.

Generally, it was confirmed that the creep test is a suitable method for evaluating elastic and plastic properties of pharmaceutical excipients and can be used to express elasticity and plasticity numerically and therefore accurately.