Poster 7

Punch Geometries Impacts Evaluation on Tablet Capping with Newly Proposed Capping Index

Authors: Vivek Patel, Devang Patel, Robert Sedlock, Rahul V. Haware
Presenting Authors: Rahul Haware
Affiliation: Natoli Scientific, Telford, PA-18989
Corresponding Author's email: rhaware@natoli.com

Purpose

An increased tablet anisotropy could lead to increased tablet capping propensity. Adopted tooling design such as cup depth could serve as a key player for inducing tablet anisotropy.

Methods

A new capping index (CI) consisting of a ratio of compact anisotropic index (CAI) and material anisotropic index (MAI) is proposed to evaluate tablet capping propensity as a function of punch depth. CAI is the ratio of an axial and a radial breaking force. MAI is the ratio of an axial and a radial Young's modulus. The impact of various punch cup depths [flat face, flat face beveled edge, flat face radius edge, standard concave, shallow concave, compound concave, deep concave, and extra deep concave] on the capping propensity of model acetaminophen tablets was studied. Tablets were manufactured at 50, 100, 200, 250, and 300 MPa compression pressure at 20 RPM of different cup depth tools using Natoli NP RD 30 tablet press. A partial least square model (PLS) was computed to model the impact of the cup depth and compression parameters on the CI.

Results

The PLS model exhibited a positive correlation of increased cup depth on the capping index in PLS model. The finite elemental analysis confirmed that a high capping tendency with increased cup depth is a direct result of non-uniform stress distribution across powder bed.

Conclusion

Certainly, a proposed new capping index with multivariate statistical analysis gives guidance to select tool design and compression parameters for robust tablets.

Keywords: Capping index, anisotropy