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BV Effects of Hexagonal Boron Nitride as a New Tablet Lubricant and Evaluation of Compression Parameters with Some Lubricants

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Objective: To compare the effects of conventional lubricants including new candidate lubricant 'Hexagonal boron nitride (HBN)' on direct compression powders.

Methods: Flowlac / Avicel PH 102 (1:1) and Starch 1500 / Avicel PH 102 (1:1) were tested Formulations DC-1 and DC-2. Magnesium stearate (MGST), Glyceryl behenate (COMP), Stearic acid (STAC), Talc (TALC), and Polyethylene glycol6000 (PEG) were the studied lubricants. Tablets were manufactured on an instrumented tablet press with various lubricant concentrations. Bulk and tapped densities, and Carr's index parameters were calculated for powders. Tensile Strength, Cohesion Index, Lower punch ejection force and Lubricant effectiveness values were investigated for tablets. The deformation mechanisms of tablets was studied during compression from the Heckel plots with or without lubricants.

Results: Powders formulated with MGST and HBN showed better flow properties based on Carr's index. For tablets MGST was found to be the most effective lubricant based on lubricant effectiveness. HBN was found to be very close to MGST with the same concentrations. Other lubricants showed less effectiveness than that of MGST and HBN. It is observed that an increase in the concentration of HBN, both tensile strength and cohesion index values were decreased because of its surface covering property. Despite covering property, HBN had no significant effect on disintegration time.

Conclusion: Based on the Heckel plots at the level of 0.5, 1, 2, 4%, HBN showed the most pronounced plastic character for both direct compression formulations.

Key words: Cohesion index, direct compression, hexagonal boron nitride, lubricants, lubricant effectiveness