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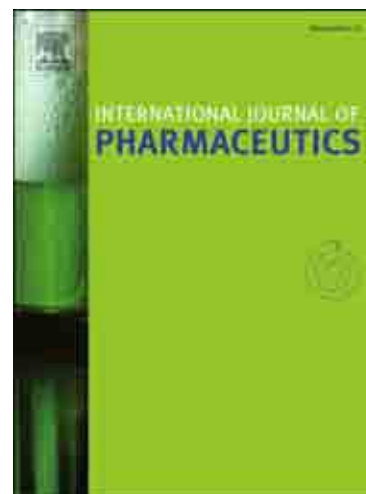
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Lamination of biconvex tablets: numerical and experimental study

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Abstract

Capping and lamination are common industrial problems during the manufacturing of pharmaceutical tablets. Even if they are commonly treated together, these phenomena correspond to different failure patterns of the tablet and, as a consequence, to different mechanisms of cracking. In this work, a specific case of lamination of biconvex tablets was studied. It corresponds to a breakage into two parts of the tablets along a failure plan normal to the compression direction and located approximately at the center of the tablet band.

Simulation with finite element method made it possible to propose that this kind of failure is promoted by tensile stresses localized at the center of the tablet that are induced by the residual die wall pressure and the tablet shape. Moreover, these stresses are favored by a small band thickness. Experimental results confirmed these hypotheses and also showed that this kind of lamination was favored by a high compaction pressure.

As the crack is formed at the center of the tablet, it may not propagate until the tablet band. Failure may thus remain undetected by external visual examination. X-ray tomography made it possible to observe central cracks inside the tablet without tablet

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