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Advancing in 3D Printing Technology for Pharmaceutical Formulations: A Review

Purushottam R. Laddha[1], Prafulla R Tathe[2], Shaikh Farhan Shaikh Irshad[3], Rushikesh V. Tekale[4], Rushikesh S. Bende[5], Tayyab S. Shaikh[6], Sagar P. Nagre[7],
Professor, Department of Pharmaceutical Chemistry Samarth[1]
Samarth College of Pharmacy, Deulgaon Raja, Buldhana
Principal, Samarth College of Pharmacy, Deulgaon Raja, Buldhana[2]
Students,Department of B. Pharmacy, Samarth College of Pharmacy, Deulgaon Raja, Buldhana3-7
Corresponding author: Purushottam R. Laddha
purushottamladdha@gmail.com

Abstract: *Three-dimensional (3D) printing technology in the pharmaceutical field has the potential to revolutionize drug delivery by enabling the creation of personalized and complex dosage forms with precise drug release profiles. Also known as additive manufacturing, this technology utilizes computer-aided design (CAD) software to generate models, which are then printed layer by layer. 3D printing offers personalized medicine options through on-demand manufacturing, addressing challenges related to patient compliance and dosage accuracy for specific individuals. It allows for the easy production of dosage forms with intricate structures and facilitates the rapid manufacturing of small drug batches. The layer-by-layer manufacturing technique ensures higher precision, complex compositions, and enhanced efficacy. Compared to conventional manufacturing methods, 3D printing provides significant advantages, such as the customization of medication dosages tailored to individual patient needs. However, further advancements are required to overcome current limitations and enhance patient safety through personalized on-demand medication. This review explores various 3D printing techniques suitable for pharmaceutical applications, highlighting their role in drug dosage form development and their potential integration into commercial production.*

Keywords: 3 Dimensional printing, drug delivery, personalized medicine, structure.

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