Development of 3D Printed Personalized Chewable Tablets for Use in Older Adults With Dysphagia

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Swallowing difficulties impact 30-40% of older adults impairing their treatment adherence and negatively affecting the therapeutic benefits of drugs. This study seeks to use 3D-printing technology, considered one of the advanced technologies in personalized medicine; It can manufacture high-quality, safe customized doses. A novel printing semi-solid-extrusion technique was used without any heat to provide Personalized-Chewable tablets? which makes manufacturing and swallowing them more accessible. Computer-aided design (Tinkercad) software created the tablet's shape. A green paste consisting of starch, Avicel, talc, lactose, hydroxypropyl cellulose gel at a concentration of 6%, and Alpha-Lipoic Acid was used as a sample drug. The prepared paste was filled into the printer's needle; specific parameters were set to achieve the designed shape. The tablets were subjected to a Friability and hardness tester to ensure their handling capability. Using HPLC, the drug concentration was determined. Results showed that the 3D printer achieved the designed shape. It showed suitable parameters (0%) Friability, (22.3N) Hardness which guaranteed the strength of their structure. The printed tablet's homogenous, flawless surface was visible in SEM photos, which suggested that every layer had undergone flawless extrusion processing. In five distinct concentrations ranging from (15.6, 31.3, 62.5, 125, and 250 g/ml), the HPLC method demonstrated a good linear relationship. A survey was conducted to understand healthcare professionals' perceptions regarding 3D-printed tablets. This 3D-printed chewable tablet is a groundbreaking innovation in medication delivery, providing older adults and others who have trouble taking traditional forms of medication with a more user-friendly alternative.

Awards Won:

Fourth Award of $500