



Pump Based Chocolate Extruder for Food 3D Printing Technology

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ABSTRACT

In the food industry, 3-Dimensional (3D) printing, also known as Digital fabrication (DF) or additive manufacturing (AM), has limitless possibilities for fabricating complicated geometries, customization, and on-demand production. As a reason, 3D technology is driving significant changes in the food business. The development of a chocolate 3D printer using the pressure pump approach and chocolate as a printing material is described in this study. Here the conventional 3D printer's design was developed as a chocolate 3D printer. As an improvement, a new extruder mechanism was introduced. The extruder was developed to print the chocolate materials. In the working mechanism, the 3D printer reads the design instruction and chocolate material is extruding accordingly, through the nozzle of the pump to the bed of the 3D printer followed by the design (layer by layer). The special part of this chocolate 3D printer is the pressure pump in the extruder part. That pressure pump provides pressure on melted chocolate from the chocolate container to the nozzle point. Sample designs were used to test the 3D printer's usability and efficiency. The obtained results were presented and discussed. Together with these advances this 3D printer can be used to produce complex food models and design unique patterns in chocolate-based sweets by satisfying customers.

Keywords: *3D printing, Additive manufacturing, Food printing, Hot melt extruder, Pressure pump*