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3D printing technology: The new era for food customization and elaboration

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1 **3D printing technology: The new era for food customization and elaboration**

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10 **Abstract**

11 *Background:* Digitalizing food using 3-Dimensional (3D) printing is an incipient sector that has
12 a great potential of producing customized food with complex geometries, tailored texture and
13 nutritional content. Yet, its application is still limited and the process utility is under the
14 investigation of many researchers.

15 *Scope and approach:* The main objective of this review was to analyze and compare published
16 articles pertaining 3D food printing to ensure how to reach compatibility between the huge
17 varieties of food ingredients and their corresponding best printing parameters. Different from
18 previously published reviews in the same journal by Lipton et al. (2015) and Liu et al. (2017),
19 this review focuses in depth on optimizing extrusion based food printing which supports the
20 widest array of food and maintains numerous shapes and textures. The benefits and limitations of
21 3D food printing were critically reviewed from a different perspective while providing ample
22 mechanisms to overcome those barriers.

23 *Key findings and conclusions:* Four main obstacles hamper the printing process: ordinance and
24 guidelines, food shelf life, ingredients restrictions and post processing. Unity and integrity
25 between material properties and process parameters is the key for a best end product. For each
26 group, specific criteria should be monitored: rheological, textural, physiochemical and sensorial

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