CLAIMS

1. Process for the production of a three-dimensional item by extrusion and deposition of a string of dough, comprising the following steps:

a) providing an extruder comprising a cylindrical tubular body having a first end closed by a bottom having at least one nozzle and a second end, and a piston comprising a rod and a piston head that can be removably coupled to one another;

b) feeding a viscoelastic food dough into said cylindrical tubular body;

c) providing said piston inside the side wall of said cylindrical tubular body, said piston head being in contact with said side wall of said cylindrical tubular body and freely slidable inside said cylindrical tubular body, and said viscoelastic food dough being entirely contained between said piston head and said bottom;

d) extruding said viscoelastic food dough by progressively advancing said rod and said piston head, said piston head being coupled with said rod and pushed by it, inside said cylindrical tubular body towards said bottom of the cylindrical tubular body along a sliding path, resulting in the supply at a preset speed of a continuous string of dough from said at least one nozzle;

e) interrupting the extrusion of said viscoelastic food dough by stopping the progress of said rod at a specific position along said sliding path and by immediate movement of said rod towards said second end, in order to decouple said rod from said piston head and let said piston head be pushed by said viscoelastic dough towards said second end of the cylindrical tubular body;
wherein the progress of said rod inside said cylindrical tubular body towards said bottom and the movement of said rod towards said second end are controlled by means of a control system of the extruder; and
during said step e) of interrupting extrusion of said viscoelastic food dough, said specific position of said rod along said sliding path corresponds to a preset position previously saved by said control system of the extruder or said specific position of said rod along said sliding path is recorded by said control system of the extruder at the time when said rod is separated from said piston head.

2. Process according to claim 1, wherein, during said step e) of interrupting the extrusion of said viscoelastic food dough, said rod is retracted towards said second end by a preset distance.

3. Process according to claim 1 or 2, wherein said step e) of interrupting the extrusion of said viscoelastic food dough is followed by an additional step of starting

again the extrusion of said viscoelastic food dough, bringing said rod back into said specific position along said sliding path, thus restarting the supply of a continuous string of dough from said at least one nozzle.

4. Process according to any one of the preceding claims, wherein said continuous string of dough, extruded during step d), undergoes a treatment of partial surface drying after deposition thereof.

5. Process according to claim 4, wherein said partial surface drying is carried out by application of a flow of air, preferably air at a temperature of between 60°C and 90°C, more preferably at 80°C.

6. Process according to any one of the preceding claims, wherein said viscoelastic food dough is a dough based on food meal, preferably a dough suitable for the production of pasta.

7. Process according to any one of the preceding claims, for the production of a three-dimensional item printed by a 3D-printing procedure, preferably for the production of pasta.

8. Printer for the production of an item printed by means of a 3D-printing procedure, preferably for the production of pasta, comprising:
- an extruder (1) for extruding a viscoelastic food dough, comprising a cylindrical tubular body (2), having a first end (3) closed by a bottom (8) having at least one nozzle (9) and a second end (4), and a piston (10), comprising a rod (11) and a piston head (12), said piston head and said bottom being adapted to contain said viscoelastic food dough between them, said rod (11) and said piston head (12) being able to be removably coupled to one another, said piston being able to be inserted through said second end (4) inside the side wall (2a) of said cylindrical tubular body (2), so that said piston head (12) is in contact with said side wall (2a) of said cylindrical tubular body (2), wherein said rod (11) is movable between said first end (3), namely an end-stroke position, and said second end (4), namely a rest position, along a sliding path, and said piston head (12) is freely slidable inside said cylindrical tubular body (2) and pushable by said viscoelastic food dough towards said second end (4) when said rod (11) is moved towards said second end (4) and said rod (11) and said piston head (12) are uncoupled; and
- a control system able to:
- control the progress of said rod (11) in said cylindrical tubular body (2) towards said bottom (8) by stopping said progress at a specific position along said sliding path corresponding to a previously saved preset position or at a specific position along said sliding path recorded at the time when said rod is separated from said piston head; and
- control the movement of said rod (11) towards said second end (4).

9. Printer for the production of an item printed by means of a 3D-printing procedure according to claim 8, comprising at least one load cell for measuring the force applied to said piston head (12), said load cell being connected to said control system.

10. Printer for the production of an item printed by means of a 3D-printing procedure according to anyone of claims 8 or 9, wherein said extruder (1) comprises coupling means for the removably coupling of said rod (11) and said piston head (12), preferably said coupling means being engaging means, magnetic coupling means or electromagnetic coupling means.

11. Printer for the production of an item printed by means of a 3D-printing according to anyone of claims 8-10, wherein said piston head (12) of said extruder (1) further comprises a venting valve suitable to put in fluid communication the space of the cylindrical tubular body (2) comprised between said piston head (12) and said bottom (8) and the space of the cylindrical tubular body (2) comprised between said piston head (12) and said second end (4), said venting valve working in open mode or closed mode.