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1 Fused deposition modelling of sodium caseinate dispersions

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8 Abstract (max. 100-150 words)

9 Only recently, researchers have started experimenting with 3D printing of foods.
10 The aim of this study was to investigate 3D printed objects from sodium caseinate
11 dispersions, exhibiting reversible gelation behaviour. Gelation and dispensing
12 behaviour were explored and structures of different protein content and with oil
13 droplets were prepared. Additions of pectin, sucrose and starch facilitated FDM of
14 sodium caseinate dispersions with different layers and an enzymatic cross-linking
15 procedure was enabled printing of caseinate dispersions at lower dry matter
16 content. A modified Poiseuille equation for power law fluids was applied to
17 describe dispensing behaviour of the caseinate dispersions and may be used to set
18 dispenser pressure and line speeds. Finally, oil droplets are introduced in the
19 dispersions with a premixing method and a dispenser with side-inlet. It is suggested
20 that such specific spatial distribution of oil droplets provides more freedom in
21 custom design of healthy foods, thus providing a niche for FDM of foods.

22
23 **Keywords:** 3D food printing, sodium caseinate, gelation, dispensing, personalised
24 food

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