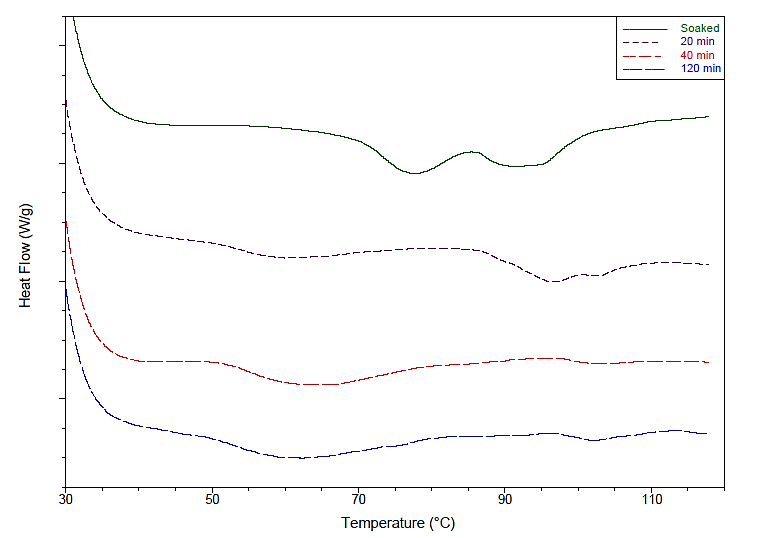
**Supplementary material**

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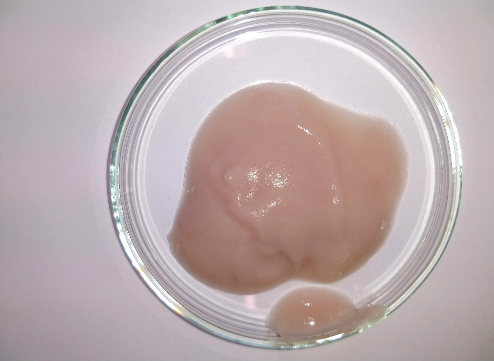
**Figure S1.** Representative macroscopic pictures of processed common beans after application of a thermal treatment (95 °C) with a duration of 20 min (left) and 120 min (right).



**Figure S2.** Representative DSC thermograms of thermally processed common beans with different process-induced hardness levels. In the legend of the figure, associated cooking times are shown. The correspondence with hardness is as follows: 20min – 10 179 g; 40min – 6 713 g; 120min – 3 697 g.

A representative thermogram of soaked common beans (no thermal treatment applied), exhibiting the peak corresponding to residual gelatinisation enthalpy (Tp ≈ 78 °C), is shown for comparison purposes.

**Figure S3.** Average number of mastication cycles as a function of process-induced hardness level. Error bars represent the standard deviation of n = 16 participants in the mastication study.



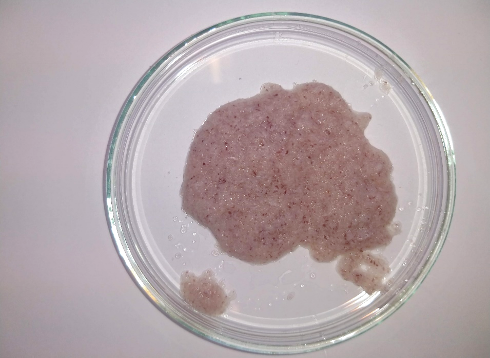
40 – 80 µm



80 – 125 µm



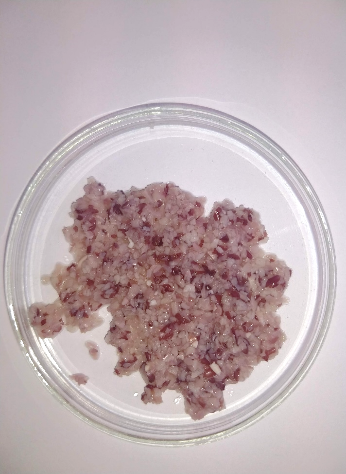
125 – 250 µm



250 – 500 µm



500 – 1000 µm



1000 – 2000 µm

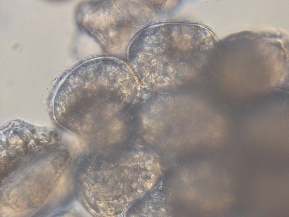
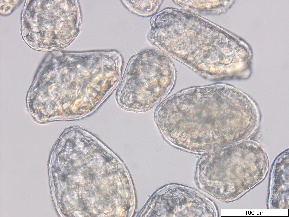
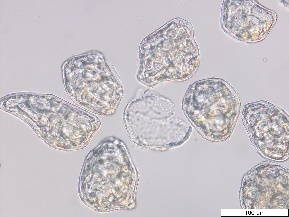


> 2000 µm

Individual cells

Small cell clusters

Big cell clusters



**Figure S4.** Photographic characterisation (top) of the representative particle size fractions present in an oral bolus generated after human mastication of thermally processed common beans. Representative micrographs of the fractions (<500 µm) as observed under the light microscope are also shown (bottom pictures).