Supplementary Material

Mechanical cell disruption of mustard bran suspensions for improved dispersion properties and protein release

Food & Function

Francesco DONSI\textsuperscript{a,†,*}
Krassimir P. VELIKOV\textsuperscript{b,c,d,*}

\textsuperscript{a.} Department of Industrial Engineering, University of Salerno, via Giovanni Paolo II 132, 84084, Fisciano (SA), Italy.

\textsuperscript{b.} Unilever Innovation Centre Wageningen, Bronland 14, 6708 WH Wageningen, The Netherlands

\textsuperscript{c.} Institute of Physics, University of Amsterdam, Science Park 904, 1098 XH Amsterdam, The Netherlands.

\textsuperscript{d.} Soft Condensed Matter, Debye Institute for NanoMaterials Science, Utrecht University, Princetonplein 5, 3584 CC Utrecht, The Netherlands.

† Former address: Unilever R&D Vlaardingen, Olivier van Noortlaan 120, 3133 AT, Vlaardingen, The Netherlands

* Corresponding authors: fdonsi@unisa.it, krassimir.velikov@unilever.com
Rheological properties

Figure S1 shows the effect of mechanical cell disruption (MCD) processing on the mustard bran suspension, in terms of effect on viscosity $\eta$, which significantly increases both in the experiments of ramping up the shear rate than of ramping down, as well as in the values of storage and loss moduli $G'$ and $G''$ in comparison to unprocessed and shear mixing- (SM) treated samples, which can be observed in the entire range of shear stress and strain swept, respectively.

It must be pointed out that the unusual behavior exhibited by the viscosity curve at low shear rates (close to 0.1 s$^{-1}$), with a decrease in viscosity when decreasing the shear rate, is most probably related to unsteady state measuring conditions instead of sample properties. It is likely that, given the relatively short ramping time (2 min), which might have resulted in insufficient time to reach steady state at low shear rate values.
Figure S1. Rheological behavior of the mustard bran suspensions (2% wt) for different treatment conditions in terms of viscosity as a function of shear rate (a, ramp up, and b, ramp down), of $G'$ and $G''$ for strain sweep (c, d, respectively).
Figure S2. Total proteins released in the supernatant recovered from mustard bran suspensions (2% wt) unprocessed, treated by SM and after processing by different HPH and MF passes and pressures (indicated on the x-axis legend before the number of passes N).
Figure S3. Characteristic diameters $D_{10}$ (a), $D_{50}$ (b), and $D_{90}$ (c) of the mustard bran suspensions (2% wt) unprocessed, treated by SM, and after processing by HPH for 1 or 3 passes (conditions of 50/100 MPa - S2 in Figure 5), before and after simulated digestion.