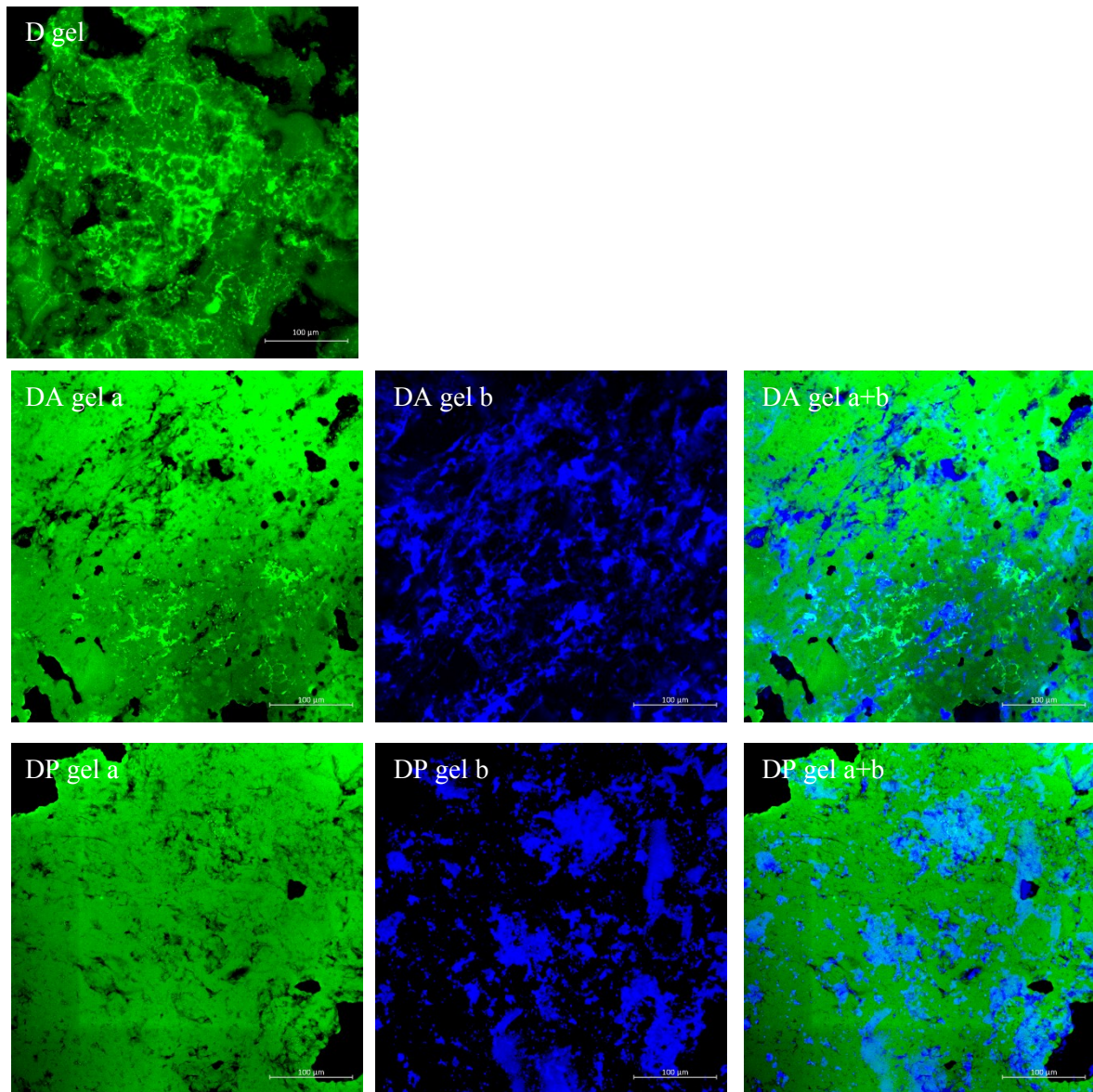


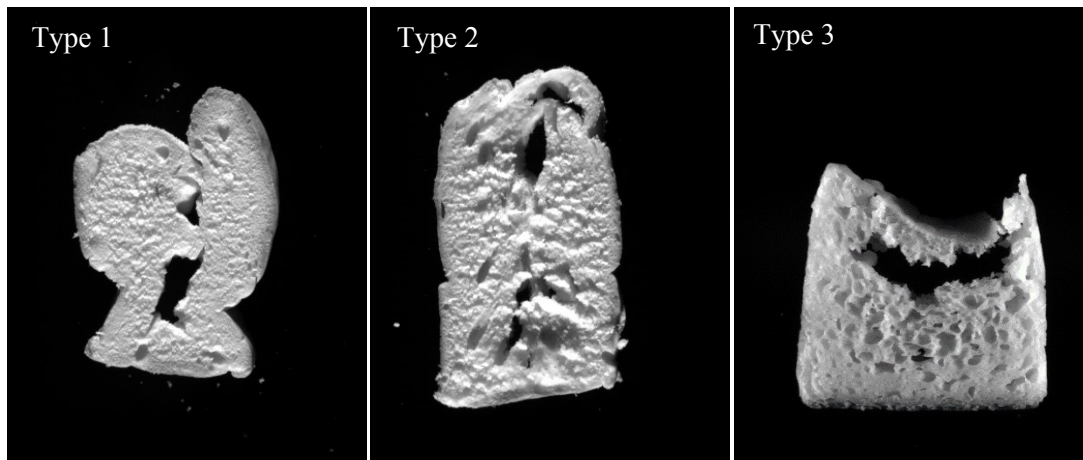
S1. Gluten free doughs made by 100g rice flour + 120g water (D dough), 100g rice flour + 120g water + 2g MC (DA dough), or 100g rice flour + 120g water + 2g PSY (DP dough). Images were acquired by a Zeiss LSM880 confocal laser scanning microscope. Rice flour was stained by FITC shown in green and PSY or MC was stained by calcofluor white shown in blue. The laser excitation and emission wavelengths for the FITC strained samples were set at 488 and 525 nm respectively and for the calcofluor white strained samples were set at 405 and 458 nm respectively. For the doughs with MC or PSY, two channels (a and b) and overlaid images (a+b) are shown.

Comparing the first column (a), flour particles are distributed more evenly upon the addition of hydrocolloids although there is no significant difference between DA doughs and DP doughs comparing all three columns. The reason might be that higher viscosity increased the effect of shearing during dough mixing.



S2. Cooked gluten free doughs made by 100g rice flour + 120g water (D gel), 100g rice flour + 120g water + 2g MC (DA gel), or 100g rice flour + 120g water + 2g PSY (DP gel). Images were acquired by a Zeiss LSM880 confocal laser scanning microscope. Rice flour was stained by FITC shown in green and PSY or MC was stained by calcofluor white shown in blue. The laser excitation and emission wavelengths for the FITC strained samples were set at 488 and 525 nm respectively and for the calcofluor white strained samples were set at 405 and 458 nm respectively. For the gels with MC or PSY, two channels (a and b) and overlaid images (a+b) are shown.

It is difficult to see differences between hydrocolloid-containing and non-hydrocolloid-containing gels. However, as seen in column b, MC appears more continuous which is similar to gluten, at least in terms of the microstructural distribution. However, PSY exists as discrete particles in the gel. Combining with the rheological property of PSY, i.e. weak gel¹, PSY can be expected to increase the elasticity of starch/flour gels.



S3. Three types of voids in the crumb structure of gluten free bread formulated with rice flour and hydrocolloids.

Reference

1. A. Haque and E. R. Morris, Combined use of ispaghula and HPMC to replace or augment gluten in breadmaking, *Food Res. Int.*, 1994, **27**, 379-393.