

Title:

Brewers' spent grain exploitation in the production of fibre enriched fresh egg pasta

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Abstract:

Brewers' spent grain (BSG) is a low-value co-product of the brewing industry produced in large quantities. Owing to its composition rich in proteins, fibre and phenolic compounds, BSG has the potential to be utilised in food products, providing health benefits for consumers.

The aim of this work was to evaluate the possibility of BSG exploitation in the production of fibre enriched fresh egg pasta. To improve pasta structure, the addition of egg white powder (EWP) was also evaluated.

In order to simultaneously study the effect of the two considered factors (BSG and EWP amount), an inscribed Central Composite Design was developed. Pasta samples were produced as sheets for *lasagna*, using wheat flour, semolina, 20% whole egg, and keeping moisture to a constant level. BSG ranged from 6.2 to 25% and EWP between 0 and 12%.

Highly significant models ($p < 0.001$) of different complexity were calculated for all the pasta quality parameters, except for weight increase during cooking. The most influencing factor resulted to be the amount of BSG, which directly affected the matter loss during cooking, the break load of raw pasta, the Young's modulus of both raw and cooked pasta and the CIE a^* parameter of raw and cooked samples. Moreover, as the amount of BSG increased, break strain of raw and cooked pasta, break load of cooked pasta, and CIE L^* and b^* parameters of both raw and cooked pasta decreased. The addition of EWP improved structural characteristics of cooked pasta, due to the tighter protein network developed by increased amount of ovalbumin.

In conclusion, this research demonstrated that BSG can be successfully exploited in the production of fibre enriched fresh egg pasta, thus contributing to a higher sustainability of the brewing process.