

Integration of pea into baking flour and its effects on bread sensory characteristics

Problem

Wheat-pea intercropping results in improved wheat baking quality. After sorting, differing fractions of pea may remain in the wheat as an impurity, necessitating pea integration in the baking process.

Solution

The sensory profiles of bread with differing pea fractions of up to 7% indicate that the sensory profile of bread remains unaffected by pea additions of up to 5%, reducing the need for costly additional grain sorting.

Benefits

An increased perception of saltiness in bread with the addition of 7% pea may allow for the reduction of salt within baked goods. Due to the higher water absorption capacity of pea¹, salt can taste more prominent if the addition of water is not adjusted accordingly.

Applicability box

Theme

Food chain management

Keywords

Processing, intercropping, cereal crops, legumes, product quality

Context

Germany, but applicable in all contexts/locations

Application time

Post-harvest processing

Equipment

Standard machinery and baking processes

Practical recommendations

Napping sensory profiling:

- Napping is a sensory testing methodology and is an efficient and easy way to identify sensory differences in products without the need for a trained tasting panel

Adjusting water additions to the dough:

- Due to the greater water absorption capacity of the pea flour, more water may be necessary during dough mixing to achieve desired dough consistency.
- The addition of water depends on the bread recipe, flour type, and pea percentage in the flour.
- If the water quantity is not adjusted or increased in dough containing pea flour, the salt profile in bread can be increased. This is particularly prevalent in pea additions over 5%.
- Bread dough may be drier than usual with increasing pea additions when water volume is not adjusted, although no differences in loaf consistency and texture were identified during the bread sensory profiling and assessment.
- Additionally, loaf and bread roll baking volume were not negatively affected by additions of pea of up to 7% (see Practice Abstract N°X), indicating that baking processes, quality and sensory characteristics are in no way negatively affected by pea additions of up to 5%, reducing the need for additional grain sorting in this intercropping combination.



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PRACTICE ABSTRACT N°24

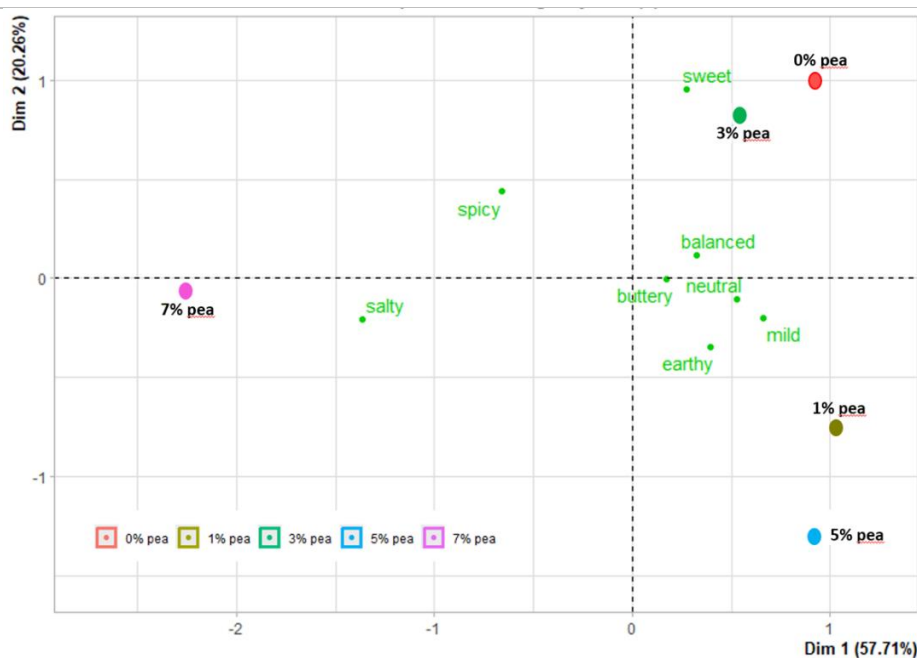


Figure 1: Results of the Principal Component Analysis (PCA) for the bread samples containing pea from 0-7% and their associated sensory profiles. Bread with pea additions up to 5% were found clustered together and indicate similarity in their taste profiles. The sample with 7% pea was an outlier identified as having a salty and spicy (savory) profile.

Further information

Video

- Various videos on practitioners' experiences with wheat-pea intercrops including sowing, harvesting, seed sorting, milling and baking: [@vorwerths-projekt](#) (January 2026, German with subtitles in English).

Further readings

- ¹Burger, TG & Zhang, Y (2019): Recent progress in the utilization of pea protein as an emulsifier for food applications. Trends in Food Science and Technology (86). <https://doi.org/10.1016/j.tifs.2019.02.007>

Weblinks

- More information about organic intercropping in Germany on vorwerths-projekt.de (German)
- <https://www.remix-intercrops.eu/>
- Check the [Organic Farm Knowledge Platform](#) for more practical recommendations.

About this practice abstract

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IntercropVALUES aims to exploit the benefits of intercropping to design and manage productive, diversified, resilient, profitable, environmentally friendly cropping systems acceptable to farmers and actors in the agri-food chain. As a multi-disciplinary and multi-actor project, it brings together scientists and local actors representing the food value chain. It includes 27 participants from 15 countries (3 continents) from a wide diversity of organizations and stakeholders. The project will run for four years and started in November 2022.

Project website: <https://intercropvalues.eu/>



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