

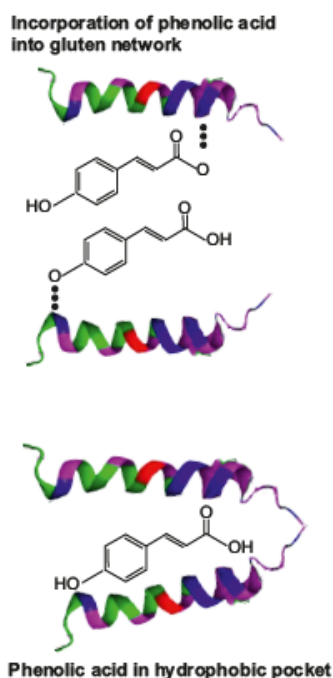
The Institute of Agrophysics, Polish Academy of Sciences, Department of Physical Properties of Plant Materials is looking for **PhD student** in the Interdisciplinary Doctoral School of Agricultural Sciences. PhD student will receive a scholarship (48 months) in the amount of PLN 5,000 / month (gross).

### PhD thesis proposal:

Effect of the model bread dough supplementation with selected phenolic acids on the structure of gluten proteins

- The PhD project will take place for 48 months (from 01.10.2020) at the Department of Physical Properties of Plant Materials, Institute of Agrophysics, Polish Academy of Sciences, Lublin, Poland under PhD supervision of dr hab. Agnieszka Nawrocka ([a.nawrocka@ipan.lublin.pl](mailto:a.nawrocka@ipan.lublin.pl)).
- The PhD is financed within the NCN project OPUS 18. Studentship is ensured during the PhD project.
- Language of PhD course and thesis: English and Polish.
- The PhD candidate should meet the minimum skill standard in chemistry, biochemistry, food chemistry, physics or biophysics. Master Degree completed before the contract starting date is required.
- For application details please go to the website of the [Interdisciplinary Doctoral School of Agricultural Sciences](#).

**Keywords:** *gluten proteins, phenolic acids, FT-IR, FT-Raman, secondary structure, tertiary structure, antioxidative activity.*



Mechanism of interactions between gluten proteins and phenolic acids is unknown, especially during dough mixing. Spectroscopic and rheological results suggest incorporation of phenolic acids' molecules into gluten network during dough mixing process. The incorporation may lead to changes in the structure of gluten network and its mechanical properties. Hence, these changes can be assigned to changes in the quality of both wheat dough and wheat bread. These changes can be observed as decrease in the bread sensory quality (negative effect) and increase in the antioxidant activity of polyphenols (positive effect). Nowadays, wheat bread is supplemented with polyphenols extracts or dietary fibre preparations containing phenolic acids. The scientific aim of the studies is to determine the possible mechanism of interactions between gluten proteins (gliadins and glutenins) and selected phenolic acids during dough mixing using spectroscopic methods. Phenolic acids seem to be good molecules to study interactions between gluten proteins and polyphenols because they are small enough to penetrate protein complex and large enough to crosslink peptide chains at more than one point.

### References

1. Krekora, M., Szymańska-Chargot, M., Niewiadomski, Z., Miś, A., Nawrocka, A. Effect of cinnamic acid and its derivatives on structure of gluten proteins – A study on model dough with application of FT-Raman spectroscopy. *Food Hydrocolloids* 2020, 107, 105935.
2. Nawrocka, A., Szymańska-Chargot, M., Miś, A., Wilczewska, A.Z., Markiewicz, K.H. Aggregation of gluten proteins in model dough after fibre polysaccharide addition. *Food Chemistry* 2017, 231, 51-60.

Please do not hesitate to contact with dr hab. Agnieszka Nawrocka ([a.nawrocka@ipan.lublin.pl](mailto:a.nawrocka@ipan.lublin.pl)) with any questions related to the PhD project.