

## Malgorzata Szwed

Second Year of Doctoral School

Discipline:

Mechanical Engineering

Agriculture and Horticulture

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Between **February 19 and 23, 2024**, I participated in the winter school “**The potential of cold plasma for the sustainable development of agriculture**”, organized in the Czech Republic by the **University of South Bohemia in České Budějovice**. The school was part of the NAWA Strategic Partnerships project “**Crucial, long-term collaboration for developing innovative, eco-friendly approaches in biostimulant production**”, with the **University of Life Sciences in Lublin** as the project leader.

During the trip, I had the opportunity to attend lectures and workshops on the application of cold plasma in agriculture, particularly in the context of developing sustainable production practices.

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### Participants:

The winter school gathered **28 participants** from the Czech Republic, Poland, Argentina, and Slovakia. Among the attendees were young scientists and doctoral students, who made up over 1/4 of the total participants.

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### Activities:

During the winter school, all planned goals and tasks were achieved, and participants took part in **30 hours of practical workshops**. The topics covered included:

- 1. Cold Plasma in Agriculture:**
  - The application of cold plasma technology to improve the quality and efficiency of agricultural processes.
- 2. Plasma Discharges in Agriculture:**
  - Experiments and analyses regarding the effects of plasma on seeds and soil.
- 3. Physical Methods of Seed Activation:**
  - Constant and variable magnetic fields.
  - Ultrasounds and microwaves.
  - Cold plasma as an activation method.
- 4. Physiological Reactions of Plants to Biostimulants:**
  - Studies on the impact of biostimulants on plant growth, development, and yields.
- 5. Criteria for Selecting Biostimulants for Cereal and Soybean Crops:**
  - Evaluating the effectiveness of biostimulants under various conditions.
- 6. Genetics and Biostimulant Application:**
  - Integrating modern biotechnological methods into agriculture.

7. **Effective and Safe Spraying of Biostimulants on Plants.**
8. **The Effect of Biostimulants on Soil Performance:**
  - Exploring potential improvements in soil structure and properties.





## Visits to Companies and Facilities

During the event, we also had the opportunity to:

- Learn about the production processes of agricultural machinery at **PÖTTINGER**.
- Visit the **Budějovický Budvar** brewery, which provided insight into the traditions and brewing technologies of the region.





The stay was also an opportunity to meet fellow project participants from the Czech Republic, Slovakia, and Argentina. These meetings facilitated the establishment of new scientific contacts and the exchange of experiences related to the topic of biostimulants.

Every free evening was spent exploring the city of České Budějovice, known for its charming old town and numerous historical landmarks. The Town Hall, characterized by its Baroque style and richly decorated façade, made a particularly strong impression on me, as did the Cathedral of St. Nicholas, one of the most significant sacred buildings in the city. Built in the Baroque style, it captivates with its beautiful frescoes and decorations, combining simplicity with grandeur. It serves both spiritual and artistic purposes, making it a key landmark in the region.



The **Town Hall**, located in the market square, is one of the finest examples of Renaissance-Baroque architecture in the Czech Republic. Its façade is adorned with allegorical figures symbolizing civic virtues, and the clock tower offers a panorama view of the entire city. Both landmarks are not only popular tourist attractions but also significant cultural points on the map of České Budějovice.



We also visited **Holoubka Castle**, which impressed us with its Neo-Gothic style and expansive gardens



During the trip, we also visited the town of **Český Krumlov**, a UNESCO World Heritage Site. I was particularly impressed by its picturesque castle and the charming streets of the town.

**Český Krumlov** is located in a scenic bend of the Vltava River and is renowned for its beautifully preserved medieval architecture. The main attraction of the town is the **Český Krumlov Castle**, the second-largest castle in the Czech Republic (after Prague Castle). The castle complex, featuring stunning gardens and a Baroque theater, is an exceptional example of Renaissance and Baroque architecture.

The Old Town is a maze of narrow streets, charming houses, and picturesque alleys, creating an unforgettable atmosphere. At the center of the town lies a square with a Marian column and a town hall. Český Krumlov is also famous for its rich cultural offerings, including festivals and events such as the **Five-Petalled Rose Festival**.





## **Summary:**

The winter school in České Budějovice was not only an opportunity to gain practical and theoretical knowledge in the field of sustainable agriculture but also a chance to establish international scientific connections. The workshops, covering topics ranging from the application of cold plasma to biostimulants, enhanced participants' understanding of modern agricultural technologies.

Additional visits to companies such as **PÖTTINGER** and **Budějovický Budvar** highlighted the practical application of theoretical concepts in industry.

The event served as an excellent platform for exchanging experiences and inspired further scientific research on sustainable agricultural development.