

### **Project 3.10 Development of analytical methods for the determination of selected contaminants in dairy products using electrochemical multisensors platform in combination with molecularly imprinted polymer films**

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**www:** <https://ichf.edu.pl/en/groups/functional-polymers>

#### **Background:**

The presented project aims to develop simple analytical methods of selective determination of selected dairy products contaminants based on electrochemical multisensor platforms. Food safety is one of the predominant worries in modern societies. A variety of food additives preserve its freshness or speed up the growth of crops and livestock. The influence of those additives on human health is often neglected. Therefore, it is important to develop fast, cheap, and reliable analytical methods for rapid food analyses.

One of the targeted foods is dairy products, as they are consumed in large quantities. They may contain numerous contaminants appearing in them during food production or processing, such as, growth- promoting hormones, antibiotics, antiparasitic drugs, etc. The project's scientific objective is to establish the fundamentals, elucidate the mechanism of functioning, and develop methods for selective, fast, and easy determination of chosen dairy product contaminants. Molecularly imprinted polymers will be used as the recognition units of the sensors to afford the necessary sensitivity and selectivity. The MIPs will then be integrated with electrochemical transduction units to form multisensory arrays. Such multi-sensing platforms can be used in the environmental studies of the contaminants propagation. Studies of the mechanism of the sensors' operation to elucidate the signal transduction mechanism, which is often not well understood, will be also attempted.

#### **Aim:**

The goal of the project will be development of analytical methods for determination of selected dairy products contaminants, such as growth-promoting hormones, antibiotics or various preservatives. The analytical methods will be based on electrochemical multisensory platforms with selective molecularly imprinted polymers recognition layers fabricated via electrodeposition of thiophene, pyrrole or carbazole-based monomers. Fabricated sensors will be then characterized and tested.

#### **Requirements:**

- Masters degree in chemistry or material sciences;
- experience in electrochemistry or polymer chemistry;
- experience in sensor development would be a bonus;
- experience in work with molecular imprinting would be a bonus;
- ability and readiness to perform experimental and theoretical studies;
- willingness to teach, train, and supervise undergraduate and MSc students;
- hands-on experience in the electrochemical techniques would be a plus;
- hands-on experience in polymer and thin film characterization techniques (e.g. SEM, AFM, IR, Raman) would be a plus;
- experience in quantum-chemical computation data analysis would be a plus;
- good command of written and spoken English will be a plus.