

In this work we focused on the preparation and improvement of biosensors for detection of activity of proteases and selected bacterial pathogens. Proteases play important role for different biological processes. Monitoring of their activity is also important for dairy industry. The detection of different pathogenic bacteria such as *Escherichia coli*, *Salmonella typhimurium* and *Listeria monocytogenes* is also important for safety of milk products in order to avoid unnecessary deaths and suffering from infections. In this work we used different acoustic and optical biosensors for detection of protease activity and bacterial pathogens. For the detection of protease activity, we used an acoustic and optical methods with conjunction with  $\beta$ -casein and monitored the cleavage of the  $\beta$ -casein layer at presence of various proteases such as trypsin, chymotrypsin and plasmin. For detection of bacteria, we use aptamers specific for *Listeria monocytogenes*, *Salmonella typhimurium* and *Escherichia coli* in conjunction with gold nanoparticles. We also studied the formation of aptamer layer using acoustic method. We determined limit of detection (LOD) for all developed biosensors and compared their sensitivity between themselves and known literature.