

Herd health is the key and highly sensitive determinant of productivity within any livestock husbandry system. Early diagnosis is extremely significant and enables quick recognition of the problem and appropriate application of health control and prevention program. Alternative matrices, such as nasal wipes (NWs), udder skin wipes (USWs) and processing fluid (PF), are acquiring increasing importance in the management of pig health. NWs are collected with the use of gauze, which is wiped across the snout, collecting secretions from the snout and nares. **USWs** consists of secretion from the oral and nasal cavities in suckling piglets deposited on the skin of a sow's udder. **PF** consists of blood and tissue fluids obtained during castration and tail-docking (piglet processing).

Non-invasive material collection (NWs, USWs) or the use of material that has been utilized so far (PF) instead of traditional matrices (blood, nasal swabs) for diagnostic purposes has numerous advantages. Collection of non-invasive matrices would reduce the stress associated with sampling, is cost-effective, non-disturbing animal welfare and allows to collect representative samples. Blood sampling requires the involvement of at least 2 people, animal restraining, generates additional time, work and leads to an increase in production costs and a decrease in the frequency of herd health monitoring. The use and implementation of new matrices for swine diseases diagnostics certainly requires basic research, validation and confirmation of the results obtained in comparison to gold standards (reference tests). Another important element requiring research is evaluating if it is possible to use PF in assessing the piglets' immune status. To survive, piglets need protection, provided by lactogenic immunity (antibodies and other elements involved in the immune response). Cytokines transmitted to piglets along with colostrum may act as a "teacher" in the process of the immune system maturation. However, the phenomenon of cytokine transmission by this route is not well documented yet. Currently, the issues related to the transfer of non-antibody elements of immunity are not well known.

The study will focus on:

- (i) verification of the possibility of using PF samples to assess the piglets immune status based on analysis of the selected immunological parameters with the assessment of correlation with piglets serum, colostrum and mother serum results, as well as production parameters and health status until the end of fattening;
- (ii) determination of the possibility of detecting important porcine viral pathogens in NWs, USWs, samples i.e. porcine reproductive and respiratory virus (PRRSV) and swine influenza virus (SIV) with an assessment of correlation between gold standard and the possibility of using NSs and USWs samples in epidemiological studies;
- (iii) assessment of the impact of material used and the NWs and USWs samples collection procedure on molecular analyses results (type of gauze, volume and composition of the solution in which the gauze is placed after collecting the swab);
- (iv) determination of the possibility of detecting antibodies against SIV, hepatitis E virus (HEV), porcine epidemic diarrhea virus (PEDV), *Actionbacillus pleuropneumoniae*, *Erysipelothrix rhusiopathiae*, *Haemophilus parasuis* in PF samples (the possibility of detection antibodies against mentioned pathogens in PF is not known to date) with the assessment of the correlation between the PF results and the gold standard (serum);
- (v) initial assessment of the epidemiological situation regarding PEDV and HEV (an important zoonotic factor) in Polish pig herds, which is currently little known.

The collected samples will be tested using commercial real-time polymerase chain reaction (PCR) tests to detect genetic material of the viruses, and commercial ELISA kits to detect antibodies against the above-mentioned pathogens. The tests will be performed according to the manufacturers' recommendations. Then the statistical analysis of the results will be performed.

Thanks to demonstrating the usefulness of PF, NWs and USWs in laboratory diagnostics and PF in the piglets immune status assessment, surveillance of swine health could be carried out to a greater extent, regularly, without generating additional work and costs of treatment. The results obtained may constitute the basis for the implementation of new diagnostic strategies for surveillance of swine diseases in the future.