

Preventing infectious swine disease spread with field-based portable device

May 25 2020



Credit: Mathias Reding from Pexels

The impact of swine diseases and other livestock disease outbreaks extends beyond animal sickness and mortality in a highly interconnected world, causing major problems. Following the initial disease outbreak,

laboratory confirmation of the aetiologic infectious agent can take several weeks or even months. Hence, the development of rapid and accurate diagnostic methods is crucial for achieving effective infectious disease control and limiting severe biophysical and socioeconomic effects. The EU-funded SWINOSTICS project has been addressing this challenge and building a portable diagnostic device to detect swine viral diseases in just a few minutes.

The tool is focused on six viruses: African swine fever virus, porcine reproductive and respiratory syndrome virus, swine influenza virus—H1N1 strain, porcine parvovirus, porcine circovirus, and classical swine fever virus. "The [device](#) will use swine oral fluid samples as its main input, even though, it will be compatible with the use of other types of samples, such as feces, blood or nasal swabs," as noted on the project website. "The use of oral fluids as the main input diminishes the time needed for the analysis and simplifies the sample collection, allowing also the collection of wild boar samples."

The diagnostic device developed by SWINOSTICS partners uses advanced biosensing and photonics technologies to tackle emerging and endemic viruses causing epidemics in pig farms in Europe. It will enable "immediate threat assessment at the farm level, with the analytical quality of commercial and institutional laboratories," as stated on the project website. "The device will be portable and will provide results in less than 15 minutes for 4-5 samples simultaneously, making it highly suitable for use in the field. The modular construction of the device would allow future upgrades to increase capacity if so desired."

Over two years into its field diagnostics project targeting the swine industry, the SWINOSTICS team has completed the first integration testing phase, according to a news item. "The scope of this has been to verify that all device modules operate flawlessly in combination with each other and to fix various issues that could affect overall device

functionality."

Various modules

As explained in a press release on the project website, the modules of the SWINOSTICS prototype include the sample delivery and liquids handling module that involves transferring the [sample](#) and other liquids over the sensors and finally to the waste tank, the main processing and communications module that controls the entire operation, the optical analysis module that reads the sensors' output, as well as the temperature conditioning [module](#) that keeps the temperature constant in critical parts of the device. "An Android application has also been developed for controlling the entire device operation through a tablet or mobile phone. This is actually the main user interface to the device."

The [press release](#) adds: "The upgraded version of all device modules, using the feedback from the first integration testing phase, is currently in progress. The upgraded modules will be used for further testing and full laboratory scale validation of the device, using reference samples, before moving to the field."

The SWINOSTICS (Swine diseases field diagnostics toolbox) project will end in April 2021. By facilitating [early diagnosis](#) during infectious [disease](#) outbreaks, it will help speed up the decision-making process and prevent further spreading of epidemics in [swine](#) farms.

More information: SWINOSTICS project website: swinostics.eu/

Provided by CORDIS

Citation: Preventing infectious swine disease spread with field-based portable device (2020, May 25) retrieved 11 July 2024 from

<https://phys.org/news/2020-05-infectious-swine-disease-field-based-portable.html>

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