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Improvement of point of care diagnosis of African Swine Fever

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Background and Objectives. African Swine Fever (ASF) is a highly infectious disease of swine, caused by an enveloped double-stranded DNA virus, the ASF virus (ASFV). Infection with ASFV correlates with a wide range of clinical syndromes from almost unapparent disease to haemorrhagic fever with high fatality rates (95–100%). To date, disease is actively being transmitted all over the world, and there are no licensed vaccines. Therefore, ASF control is based on early diagnosis and the enforcement of sanitary measures.
Due to their characteristics, lateral flow assays are one of the most widely used techniques for point-of-care testing, accelerating the final diagnosis. In this work, we improved the diagnostic performance of rapid tests for both, antibody and antigen detection, through the application of new reagents and cassettes.

Material and Methods. For the improvement of antigen detection, a new recombinant monoclonal antibody produced at Eurofins-Ingenasa was used to develop a lateral flow assay using latex nanoparticles. This new assay was compared to the commercial INgezim® ASF CROM Ag and the PCR described under the WOAH manual, evaluating a total of 124 experimental positive and 160 negative bloods.
For antibody detection, a new version of the recombinant VP72 was employed to develop a colorimetric assay employing colloidal gold. This assay was compared to other commercial assays evaluating a total of 107 experimental positive sera, 73 field negative bloods and 50 field negative sera.
In both assays, new double cassettes (one antigen and one antibody strip per cassette), with an additional window for sample addition were implemented.
Results. The new assay for antigen detection exhibited the same sensitivity as the commercial assay evaluated but with improved specificity. Out of the 160 samples evaluated, no false positive results were detected. The new assay for antibody detection exhibited better sensitivity than the commercial rapid test INgezim® PPA CROM Anticuerpo, but also when compared to the reference ELISA INgezim® PPA Compac, and with the INgezim® ASFV-R ELISA, based on early expressed antigens.
Conclusion. Concerning a highly contagious disease like ASFV, rapid tests are of great interest to control the epidemic due to their fast interpretation, that accelerate the identification of infected pigs and wild board. The assays described in this work improve ASF diagnosis, giving more accurate results for antigen detection and earlier antibody detection. Therefore, the combination of these assays in a single cassette represents a precise tool for the rapid detection of ASF.