ISWAVLD 2023
International Symposium of the World Association of Veterinary Laboratory Diagnosticians
29 JUNE-1 JULY 2023 Congress Centre Lyon
Towards the veterinary diagnostics of the future

Main topic : Animal Health

HIGHLY SENSITIVE AND USER-FRIENDLY DAS ANTIGEN ELISA FOR THE DETECTION OF A WIDE SPECTRUM OF FMDV SEROTYPES AND STRAINS

DONNET F. [1], GABORIT J. [1], CARPENTIER A. [1], ROCHE M. [1], LIMOZIN A. [1], COMTET L. [1], POURQUIER P. [1]

[1] Innovative Diagnostics, Grabels, France

Introduction

Foot-and-Mouth Disease (FMD) is a worldwide epidemic disease that infects cloven-hoofed animals such as cattle and swine. FMD is one of the most highly contagious viral diseases that causes devastating economic losses. There are seven FMD viruses (FMDv) serotypes : O, A, Asia1, C, SAT1, SAT2 and SAT3. The wide range of hosts, ability of small doses to infect, rapid replication, high levels of viral excretion and multiple forms of transmission make FMD difficult to control and eradicate. Since FMD can spread fast and cannot be differentiated clinically from other vesicular diseases such as vesicular stomatitis (VS) and swine vesicular disease (SVD), rapid and specific identification of the agent is of utmost concern. In regards with those international sanitary needs, Innovative Diagnostics has launched ID Screen® FMDV pan-serotype Antigen Capture, a Double Antibody Sandwich (DAS) antigen ELISA for rapid and specific multi-serotype FMDv detection in oral and nasal swabs, epithelial tissues and vesicular fluids in ruminants, swine and all susceptible species.

Materials and methods

A panel of different monoclonal antibodies (MAb) against each of the FMDv types O, A, and Asia 1 was produced. Most of them could detect only a single-serotype antigen. However, some MAbs, named as panFMD Mab, recognized multi-serotypes. The reactivity profile of each of these panFMD MAbs was investigated by indirect ELISAs, with plates coated with inactivated viruses from different serotypes. The MAbs that showed the wider spectrum of recognition were selected and submitted to further testing for their ability to capture and reveal the different virus strains in DAS ELISA format. The panFMD MAbs were labelled to Horseradish Peroxidase (HRP), and various combinations were tested by DAS ELISA using them either as trapping antibody or as HRP conjugate. Sensitivity was evaluated by testing the seven serotypes of FMDv and analytical sensitivity was tested under a reference panel from an international FMD reference laboratory. Results obtained with the new panFMDv DAS ELISA were compared to commercially available techniques: a MAb –based ELISA kit produced by reference laboratories and a lateral flow device test based on the well described 1F10 MAb. The exclusivity was controlled by testing a SVD and a VS virus inactivated suspension. Intra-plate repeatability and test reproducibility were assessed by calculating coefficient of variation (%CV) between multiple repetitions/runs.

Results

This new ID Screen® FMDV pan-serotype Antigen Capture was able to accurately detect all seven serotypes of FMDV and all tested strains without cross-reacting with other viruses that cause vesicular diseases. The new FMD Antigen panSerotype showed better analytical sensitivity than other techniques. Results lead to indicate there is a wider spectrum of detection, even on SAT antigens. %CV obtained during repeatability/reproducibility analysis were 7% and 8% respectively, proving the excellent stability of this new kit.

Discussion

ID Screen® FMDV pan-serotype Antigen Capture, gives results in less than 75 min and allows for rapid and specific FMDv multiserotype detection while being highly sensitive and user-friendly. This new kit is a reliable tool for the detection of FMDV antigens, demonstrating high reproducibility, repeatability and robustness.