

## **Diagnosis of sheep fasciolosis caused by *Fasciola hepatica* using Cathepsin L ELISA and lateral flow technologies**

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Fasciolosis, a global parasitic disease of agricultural livestock, is caused by the liver fluke *Fasciola hepatica*. Management and strategic control of fasciolosis depends on early assessment of the extent of disease on farms to allow control measures to be rapidly implemented. Traditionally, this has relied on the detection of eggs in the faeces of animals, a laborious method that lacks sensitivity (especially for sub-clinical infections) and identifies chronic infections only. Molecular tools such as enzyme linked immunosorbent assays (ELISA) offer a faster and more sensitive serological means of diagnosis, with the potential to detect early acute infection before significant liver damage occurs. We evaluated the performance of three functionally-active recombinant forms of *F. hepatica* secreted cathepsin L's as antigens in an indirect ELISA to serologically diagnose liver fluke infection in experimentally infected sheep. We found that these enabled detection of fasciolosis in sheep as early as three weeks after experimental infection, at least five weeks earlier than both coproantigen and faecal egg tests. Furthermore, we developed a lateral flow assay capable of detecting infection as soon as 7 weeks post-infection. The lateral flow assay provides significant time and cost-saving advantages compared to the ELISA, while still demonstrating high levels of sensitivity. With the potential to be used at point-of-care and provide results within 30 mins, lateral flow technology represents a significant advancement over both the coproantigen ELISA and faecal egg count in the diagnosis of *F. hepatica* infection.