Summary of: Molecular detection of porcine reproductive and respiratory syndrome virus, porcine circovirus 2 and hepatitis E virus in oral fluid compared to their detection in feces and serum

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Key Points

- Oral fluid (OF), feces and serum were evaluated for the detection of PRRSV, PCV2 and Hepatitis E virus (HEV) in six farms.
- OF samples had good agreement with serum sample PCR results for the detection of all three viruses.
- The study highlights that pooled samples can potentially be used to investigate viral presence on farms.

Pig oral fluid (OF) use for molecular diagnosis of different pathogens has been increasing particularly due to its stress-free ease of use for disease monitoring and consequent positive impact on pig welfare. Several studies have assessed the use of OF for detection of Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) and Porcine Circovirus Type 2 (PCV2), but studies describing detection of Hepatitis E virus (HEV) RNA in pigs' OF are scarce. Feces remain the primary sample of interest regarding live pigs for HEV detection. This study aimed to detect PRRSV, PCV2 and HEV in OF, feces or serum from six different Slovenian pig farms.

A total of 360 individual serum and group 36 OF and 36 pen and rectum feces samples Pooled samples of OF and feces from all pig categories (5 weeks-old (w/o), 7 w/o, 9 w/o, 11 w/o weaners, fatteners and breeding sows) were collected from each farm and tested by PCR for all three pathogens. All positive pooled samples were tested individually by category using OF samples, feces, serum pools and 10 individual by RT-PCR, PCR and real-time RT-PCR, for PRRSV, PCV2 and HEV respectively. If any of the viruses were detected in OF or feces, all 10 sera samples from the same pig group were tested individually for the same virus. If both OF and feces were negative, sera were tested in two pools of five.

PRRSV was detected in OF of 7, 9 and 11 w/o weaners and fatteners in only one farm. All fecal samples were negative, except the one from 11 w/o pigs where all these pigs were also PRRSV RNA positive. PCV2 was detected only in OF and feces from weaners in three farms. Viral DNA was found in sera of different pig categories of all three PCV2 positive farms. In one farm PCV2 was detected in OF but not in sera of 9 w/o animals and in sera but not in OF of 11 w/o pigs and fatteners. HEV was detected in the youngest weaners (5, 7 and 9 w/o) on one farm, with both OF and fecal samples testing positive. The only farm in which HEV was detected also had positive results for PCV2. Authors hypothesize that the high number of positive samples for HEV in this farm could be due to the immunosuppressive effect of PCV2.

Although not shown in the paper, their results show a good rate of agreement (85% overall agreement) between OF and serum results (either in pool or individually tested) for PRRSV (kappa=0.67, *p*=0.04). For PCV2, agreement was also good between OF and fecal samples (94.4% overall agreement, kappa=0.85, *p*=0.0001), and between fecal and serum samples (77.8% overall agreement, kappa=0.45, *p*=0.02). For HEV, agreement was also good between OF and fecal samples (100% overall agreement, kappa=0.85, *p*=0.007). These highlights that although all three diseases have their own pathophysiological characteristics and, therefore, are detectable in a variety of infection stage samples, pooled samples can potentially be used to investigate viral presence on farms.

Table 2 Presence of viruses in OF, faeces and serum on each farm in different pig categories

	Farm	5 w/o	7 w/o	9 w/o	11 w/o	Fatteners	Breeding sows
PRRSV[a]							
OF	5	*neg.*	*pos.*	*pos.*	*pos.*	*pos.*	*neg.*
faeces		*neg.*	*neg.*	*neg.*	*pos.*	*neg.*	*neg.*
serum pool		*neg.*	*NT*	*NT*	*NT*	*NT*	*neg.*
individual sera[d]		*NT*	10/10	10/10	10/10	0/10	*NT*
PCV2[b]							
OF	2	*neg.*	*neg.*	*pos.*	*neg.*	*neg.*	*neg.*
faeces		*neg.*	*neg.*	*pos.*	*neg.*	*neg.*	*neg.*
serum pool		*neg.*	*neg.*	*neg.*	*pos.*	*pos.*	*neg.*
individual sera[d]		*NT*	*NT*	0/10	8/10	3/10	*NT*
OF	4	*neg.*	*neg.*	*neg.*	*pos.*	*neg.*	*neg.*
faeces		*neg.*	*neg.*	*neg.*	*neg.*	*neg.*	*neg.*
serum pool		*neg.*	*neg.*	*pos.*	*neg.*	*neg.*	*neg.*
individual sera[d]		*NT*	*NT*	6/10	0/10	*NT*	*NT*
OF	6	*pos.*	*pos.*	*pos.*	*neg.*	*neg.*	*neg.*
faeces		*pos.*	*pos.*	*pos.*	*neg.*	*neg.*	*neg.*
serum pool		*NT*	*NT*	*NT*	*neg.*	*neg.*	*neg.*
individual sera[d]		2/10	3/10	9/10	*NT*	*NT*	*NT*
HEV[c]							
OF	6	*pos.*	*pos.*	*pos.*	*neg.*	*neg.*	*neg.*
faeces		*pos.*	*pos.*	*pos.*	*neg.*	*neg.*	*neg.*
serum pool		*NT*	*NT*	*NT*	*neg.*	*neg.*	*neg.*
individual sera[d]		0/10	1/10	2/10	*NT*	*NT*	*NT*

neg. negative result, *pos.* positive result, *NT* not tested
[a] classic RT-PCR
[b] classic PCR
[c] real-time RT-PCR
[d] ten individual sera were tested from each pig age group. Results are shown pos./all tested sera

The full paper can be accessed here: https://bmcvetres.biomedcentral.com/articles/10.1186/s12917-020-02378-4