



World Organisation
for Animal Health
Founded as OIE



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RRLFMD Update Activity

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Regional Reference Laboratory for FMD in South East Asia (RRL)

NIAH ,DLD, Pakchong, Nakhonratchasima, THAILAND

❖ MAIN ACTIVITY

Antigen Detection

- ELISA serotyping
- Virus isolation
- PCR serotyping

FMD Diagnosis

Antibody Detection

- LPB ELISA
- NSP Test
- SN Test

Strain characterization

- Sequencing
- Vaccine matching

Rb trapping Ab

**GP Anti-FMDV
Ab**

**Inac. Antigen
FMD**

**Mab FMD
(Ongoing)**

Reagent production for ELISA

ISO 17025:2017

Proficiency Testing

- PT Provider for National lab
- Participating FMD PT Program organized by WRL

Quality Assurance

❖ IMPROVEMENT ACITIVITY

Human Resources

- Regularly Training
 - Online
 - Onsite
- PhD Study
- FMDV Diagnosis Workshop
- Refresh Training for national lab
- Evaluation from Experts Team

Building Facility

- Training Building center: **Finished**
- BSL3 facility: **Ongoing**
- Follow up & Evaluation

☐ Human Resources : Regularly Biosafety Training



❑ Human Resources : Regularly Diagnosis Training



❑ Human Resources : Evaluation Mission from Experts Team



❑ Building Facility

- ❑ Training Building
- ❑ BSL3 facility



Follow up & DTRA-MORU Evaluation



❖ Research & Collaboration

- ✓ SATREPS, JICA, JAPAN
- ✓ ACDP, AUSTRALIA
- ✓ KODIARA Lab; NIAH, JAPAN
- ✓ ARDA, Thailand
- ✓ WOH
- ✓ WRL

❖ Research & Collaboration

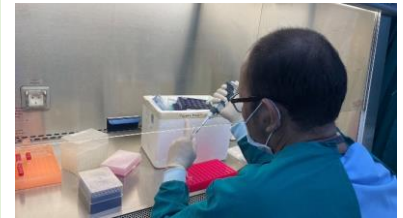
- ✓ Comparison of sensitivity and specificity in six commercial Foot and Mouth Disease Virus non-structural protein ELISA kits in Thailand (**Finished**)
- ✓ Antigenicity comparison of FMD serotype O vaccine strain against foot-and-mouth disease virus from the O/ME-SA/Ind2001 lineage circulating viruses in Thailand (**Ongoing publication**)
- ✓ Establishment of Monoclonal antibody for FMDV for reagent development (**Ongoing process**)
- ✓ Real Time PCR specific Serotype:SSRT-qPCR and Vaccine Matching Study (**ACDP; Ongoing process**)
- ✓ Collaboration with MORU to develop C-ELISA (**Ongoing process, Setting up Training in the future**)
- ✓ Develop the Multiplex real time RT-PCR for FMD field strain in Thailand (**Ongoing process**)

❖ Research & Collaboration

□ SATREPS, JICA, JAPAN

▪ Subproject 1

- Development of diagnostic system for livestock infectious diseases
- : Sub1-a; Foot and Mouth Disease and Similar vesicular diseases



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Development of a real-time RT-PCR system applicable for rapid and pen-side diagnosis of foot-and-mouth disease using a portable device, PicoGene® PCR1100

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❖ Research & Collaboration

❑ KODIARA Lab; NIAH, JAPAN

- ✓ 4th Scientific Meeting and Workshop on Foot-and-Mouth Disease
- ✓ Research project: Investigation study on persistent infection circumstances of foot-and-mouth disease virus in cattle in Thailand (**On going to submit ARDA**)



❖ Research & Collaboration

□ ACDP, AUSTRALIA

- ✓ Real Time PCR specific Serotype : SSRT-qPCR and Vaccine Matching Study
- ✓ Next step → Verify → Transfer → Training



REGIONAL REFERENCE LABORATORY FOR FOOT AND MOUTH DISEASE IN SOUTH EAST ASIA (RRL)



RESEARCH

Comparison of sensitivity and specificity of commercial ELISA kits available in Thailand for detecting antibodies to non-structural proteins of foot and mouth disease virus

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□ Introduction

- ✓ Currently, various NSP-ELISA kits capable of detecting antibodies to FMDV are available in Thailand.
- ✓ Therefore, it is necessary to test the efficiency of the appropriated NSP-ELISA kit on various animal sera within the country.
- ✓ There should be a study on the sensitivity and specificity of the NSP-ELISA kit.



Materials and Methods

Serum sample

- Positive serum samples : 400 samples
- Negative serum samples : 400 samples



Six NSP-ELISA kits

- Biovet Foot-and-Mouth Disease Virus Antibody Test Kit, ELISA FMDV NSP-3Bb ELISA (multi-species)
- ID Screen FMD NSP Competition
- VPro FMDV NSP AB ELISA
- IDEXX Foot-and-Mouth-Disease FMD, Multispecies Antibody Test Kit
- PrioCHECK FMDV NS
- KUcheck-F FMDV-NSP ELISA

☐ Sensitivity of six NSP-ELISA test kits

Test kit	Animal type	Sensitivity (%)	95% CI
Biovet	Cattle	99.22 (383/386)	97.75–99.84
	Pigs	100 (14/14)	76.84–100
	Total	99.25 (397/400)	97.82–99.85
ID Screen	Cattle	99.48 (384/386)	98.14–99.94
	Pigs	100 (14/14)	76.84–100
	Total	99.50 (398/400)	98.21–99.94
VDPro	Cattle	97.67 (377/386)	95.62–98.93
	Pigs	92.86 (13/14)	66.13–99.82
	Total	97.50 (390/400)	94.45–98.79
IDEXX	Cattle	97.93 (378/386)	95.96–99.10
	Pigs	100 (14/14)	76.84–100
	Total	98.00 (392/400)	96.10–99.13
PrioCHECK	Cattle	98.45 (380/386)	96.65–99.43
	Pigs	100 (14/14)	76.84–100
	Total	98.50 (394/400)	96.76–99.45
KUcheck-F	Cattle	98.96 (382/386)	97.37–99.72
	Pigs	100 (14/14)	76.84–100
	Total	99.00 (396/400)	97.46–99.73

***Sensitivity range 97.50 – 99.00%**

☐ Specificity of six NSP-ELISA test kits

Test kit	Animal type	Specificity (%)	95% CI
Biovet	Cattle and goats	99.00 (99/100)	94.55–99.97
	Pigs	100 (300/300)	98.78–100
	Total	99.75 (399/400)	98.62–99.99
ID Screen	Cattle and goats	100 (100/100)	96.38–100
	Pigs	100 (300/300)	98.78–100
	Total	100 (400/400)	99.08–100
VDPro	Cattle and goats	100 (100/100)	96.38–100
	Pigs	100 (300/300)	98.78–100
	Total	100 (400/400)	99.08–100
IDEXX	Cattle and goats	100 (100/100)	96.38–100
	Pigs	100 (300/300)	98.78–100
	Total	100 (400/400)	99.08–100
PrioCHECK	Cattle and goats	100 (100/100)	96.38–100
	Pigs	100 (300/300)	98.78–100
	Total	100 (400/400)	99.08–100
KUcheck-F	Cattle and goats	92.00 (92/100)	84.84–96.48
	Pigs	99.00 (297/300)	97.11–99.79
	Total	97.25 (389/400)	95.13–98.62

***Specificity range 97.25 – 100%**

❑ Diagnostic accuracy of six NSP ELISA kits

Test kit	Diagnostic accuracy (%)	95% CI
Biovet	99.50	98.72–99.86
ID Screen	99.75	99.10–99.97
VDPro	98.75	97.71–99.40
IDEXX	99.00	98.04–99.57
PrioCHECK	99.25	98.37–99.72
KUcheck-F	98.12	96.93–98.95

***Accuracy range 98.12 – 99.75%**

❖ Conclusions

- The sensitivity range 97.50 - 99.00%, specificity range 97.25 - 100%, accuracy range 98.12 - 99.75%, and concordance range 0.96 to 1.00.
- This study found that the sensitivity and specificity of all six NSP-ELISA kits were statistically similar and significantly.
- The results can be used as information for deciding to use the test kits.
- This allows the Department of Livestock Development to procure a wider variety of kits and use them as a guidelines to increase the options for using more NSP-ELISA kits available in the market.



Thank you for your attention