

# Bulletin

Boehringer Ingelheim Vetmedica, Inc.

TECHNICAL

## Multiple Pathogen Challenge Study Confirms Efficacy of 3FLEX™ Vaccine Mixture

3FLEX™ is the trade name associated with the mixture of Ingelvac CircoFLEX®, Ingelvac MycoFLEX®, and Ingelvac® PRRS MLV swine vaccines. Previous studies using single-agent challenges had demonstrated lack of immunologic interference among the antigens contained in the vaccine mixture. This laboratory study was conducted to evaluate the efficacy of the trivalent vaccine mixture against multiple infections by challenging pigs with all three relevant pathogens simultaneously.

### Materials & Methods

Healthy, weaned pigs 21 +/- 5 days of age on Day 0 were blocked by body weight and randomly assigned to treatment groups (Table 1). All pigs were serologically negative for PRRS virus and *M. hyopneumoniae* ELISA antibodies and had PCV2 IFA antibody titers < 1:2000. Pigs were injected intramuscularly (IM) in the neck with their randomly assigned treatment on Day 0, challenged on Day 31, and necropsied on Day 56. Pigs were simultaneously challenged with virulent *M. hyo*, PCV2, and PRRS virus strain JA142. Clinical observers, laboratory technicians, and the pathologist were blinded to treatment.

**Table 1. Study design**

Treatment	N (pigs)	Vaccination	3-Agent Challenge	Necropsy
Challenge Control	20	--	Day 31	Day 56
Ingelvac MycoFLEX®	20	Day 0	Day 31	Day 56
Ingelvac CircoFLEX®	20	Day 0	Day 31	Day 56
Ingelvac® PRRS MLV	20	Day 0	Day 31	Day 56
3FLEX™ (3 vaccine mixture)	20	Day 0	Day 31	Day 56

### Results

Consistent with many previous studies, monovalent vaccines provided protection against their associated pathogen. The trivalent vaccine mixture provided protection against all three pathogens while improving clinical signs (respiration score) and ADG (Table 2).

**Table 2. Improvements compared to challenge controls**

Treatment	ADG	Respiration score	Gross lung lesion score	PCV2 IHC score	PRRS VI†
Challenge Control					
Ingelvac MycoFLEX®			√		
Ingelvac CircoFLEX®			√	√	
Ingelvac® PRRS MLV	√				†
3FLEX™ (3 vaccine mixture)	√	√	√	√	†

√: P<0.05, 2-sided tests. †: PRRS virus isolation (VI) data not statistically analyzed, data trend indicated.

### Conclusions

The 3FLEX™ vaccine mixture administered as a single 2.0 mL IM injection to pigs approximately three weeks of age was **safe and effective** against multiple pathogens. **Lack of interference** among antigens confirmed previous studies' findings. Use of the trivalent vaccine mixture **considerably reduced time, labor, and number of injection sites** compared to using three separate monovalent vaccinations.