



Effect of storage conditions on salbutamol stability in spiked swine urine samples: ELISA analysis with Linear Mixed Models

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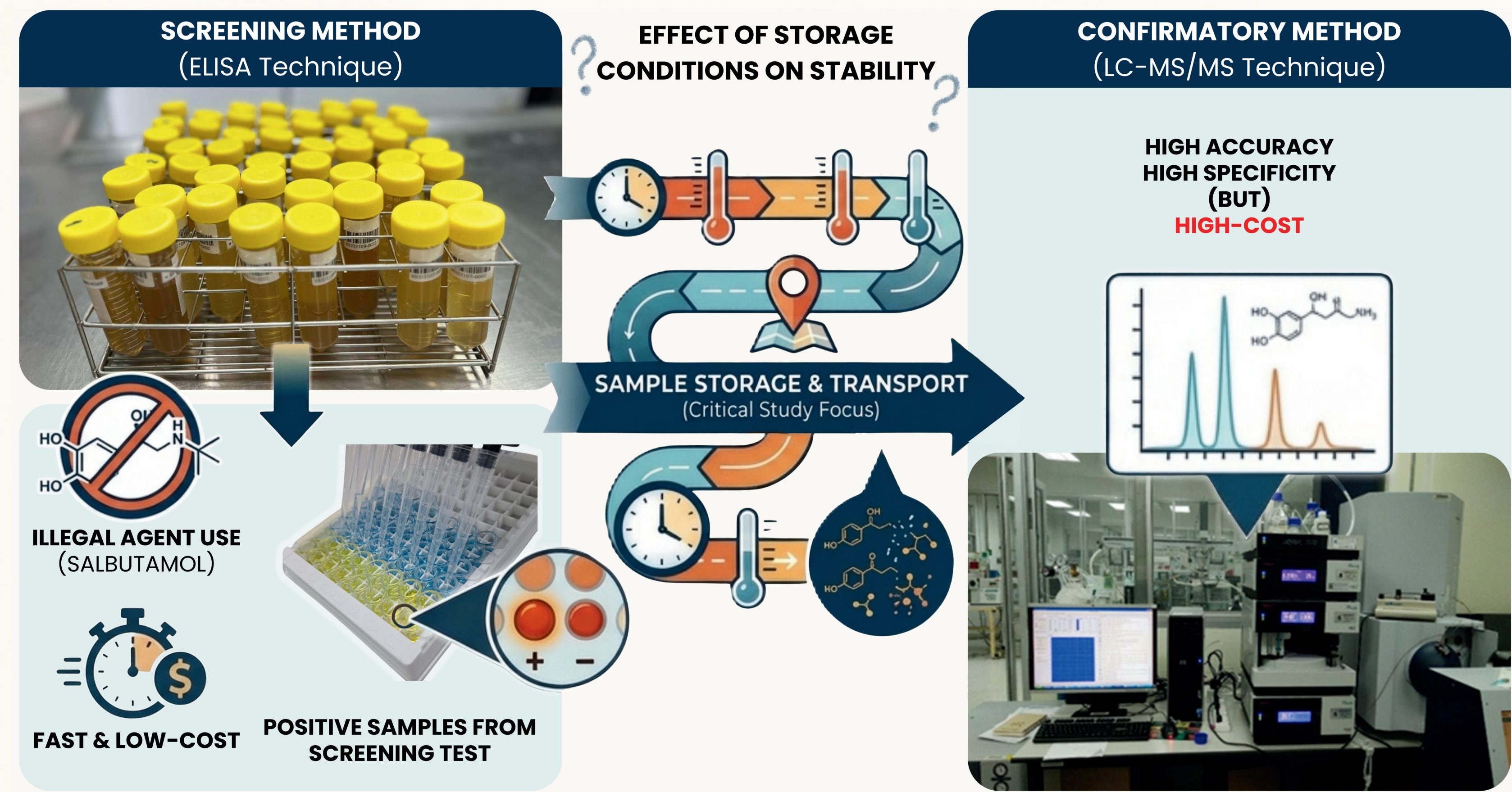
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1. BACKGROUND AND OBJECTIVES

Salbutamol is used to treat respiratory disorders in humans¹. However, its misuse in pigs and cattle to increase lean meat yield and decrease fat poses a risk of toxicity to consumers and harms animal welfare². Therefore, its use in livestock is illegal and banned in many countries, including Thailand, where surveillance for salbutamol misuse in pig farms is operated by the Department of Livestock Development (DLD). Positive samples from initial ELISA screening tests are stored and transported to the central laboratory for confirmation using the LC-MS/MS technique. Since the effects of storage conditions on the stability of salbutamol in swine urine over the holding period remain unclear. Therefore, this study evaluated different storage parameters and recommended proper storage guidelines.



2. METHODS

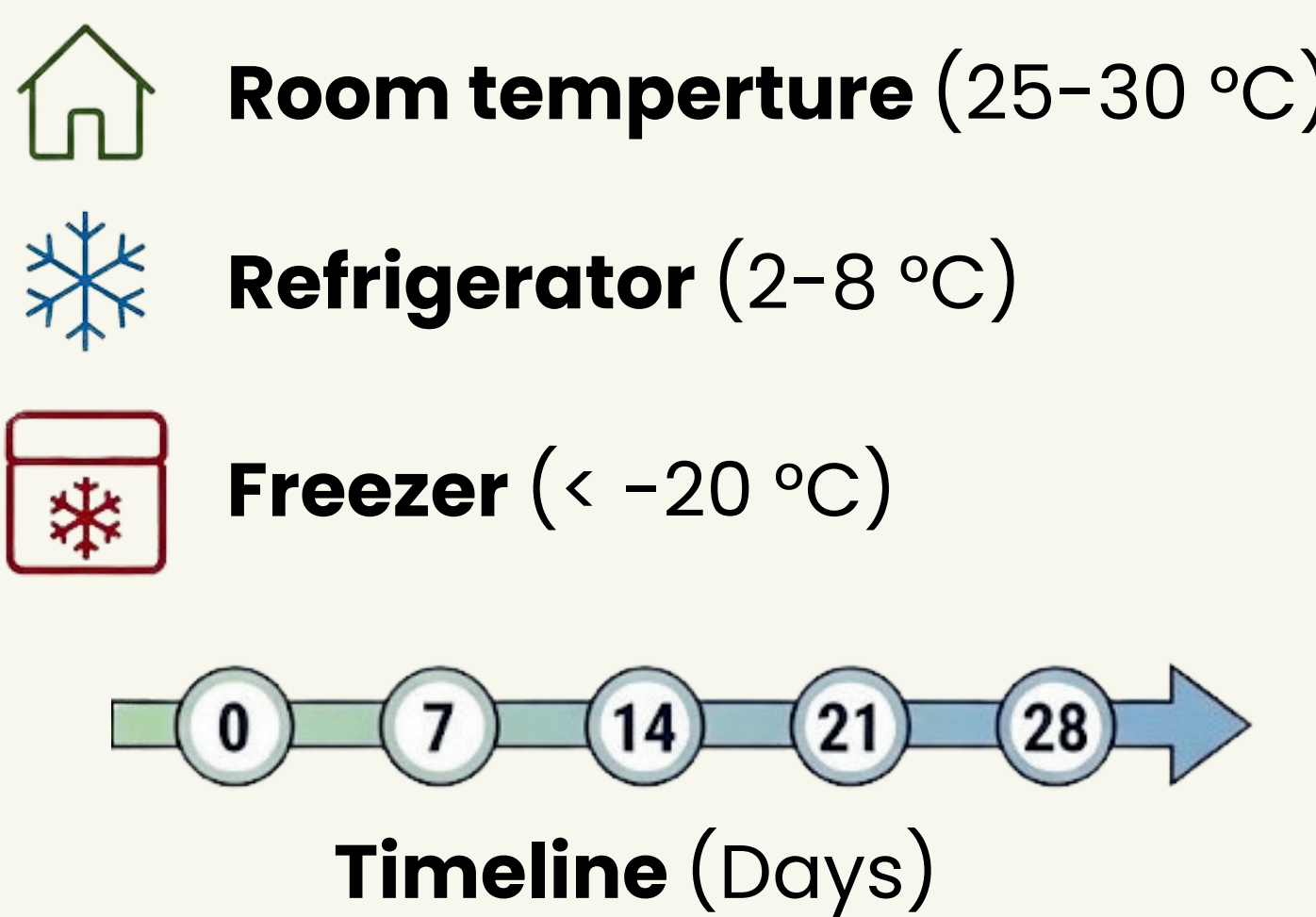
LABORATORY ANALYSIS

SAMPLE PREPARATION



Centrifuged swine urine + Salbutamol standards → 3 Concentrations (2.5, 5, 10 ng/ml)

STORAGE CONDITIONS

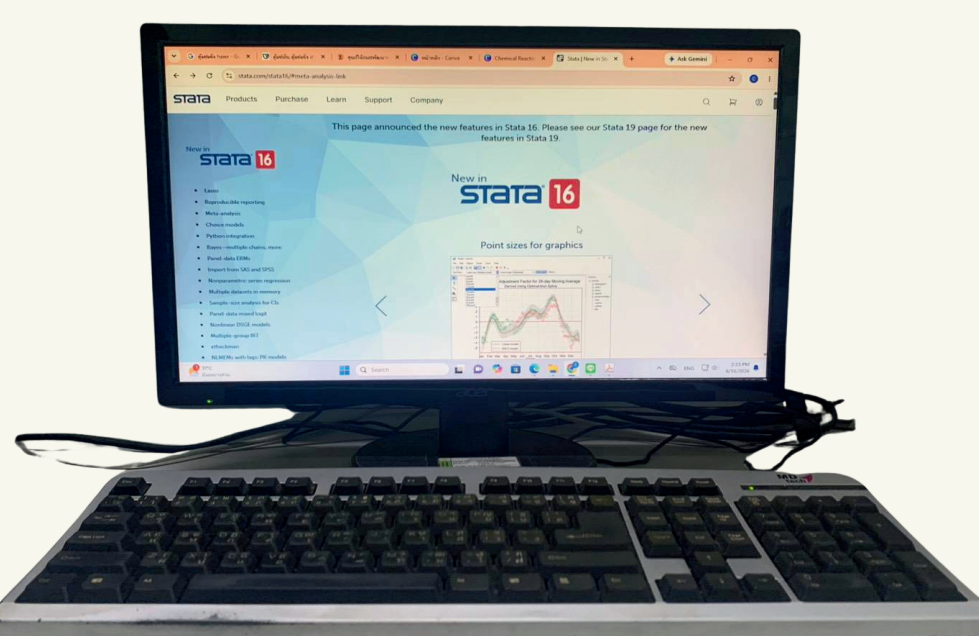


ELISA ANALYSIS



Kwinbon Biotech, China

STATISTICAL ANALYSIS



- **Statistical tool:** Linear mixed model (STATA 12)
- **Outcome:** % Stability
- **Main effect:** Storage conditions
- **Random effect:** Sample ID
- **Statistical significance:** p-value ≤ 0.05



3. RESULTS AND DISCUSSION

Salbutamol stability dropped significantly over time at all storage temperatures compared to day 0. (Figure 1)

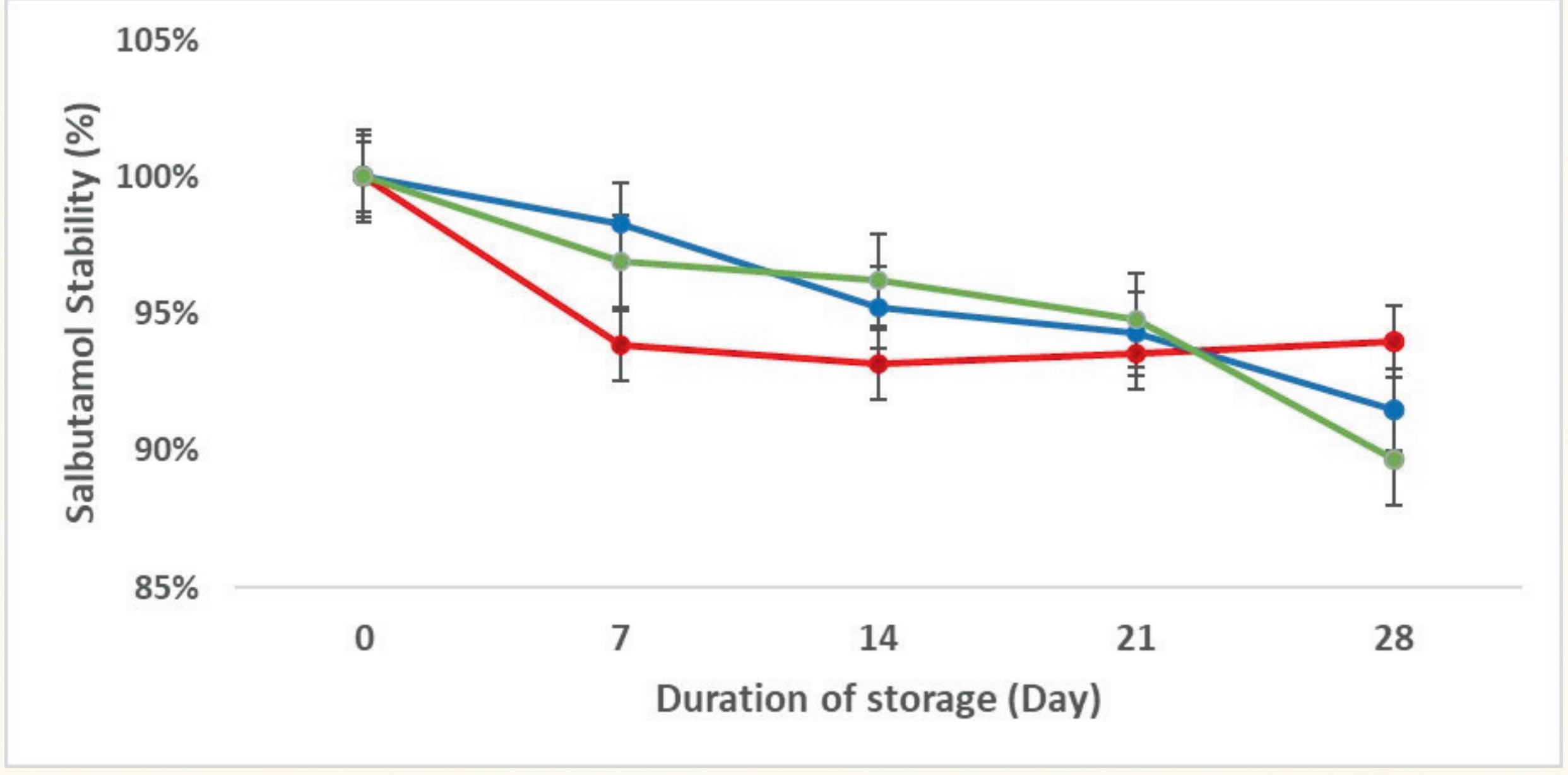


Figure 1. Salbutamol stability over 28 days under freezing (red), refrigeration (blue) and room temperature (green).

Salbutamol was most stable under freezing conditions at day 28^{1,3,4}. Its initial concentration had no significant effect on the degradation rate. (Table 1)

Table 1. Linear mixed model for the association between salbutamol stability and storage temperature at day 28 in centrifuged swine urine.

Storage Temperature	Stability (%)	P-value
Room Temp. (RT)	89.70	0.020*
Refrigerator (RE)	91.49	0.178
Freezer (FR)	93.98	-



4. LIMITATIONS



- Use of centrifuged swine urine



- Small samples volume
- Limited to one sample per storage condition



5. CONCLUSION

Elevated storage temperatures significantly degrade salbutamol stability during the holding period; therefore, swine urine samples must remain frozen until the time of confirmation.



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