Flying swabs: monitoring the presence of veterinary drugs in stables using flies as passive samplers

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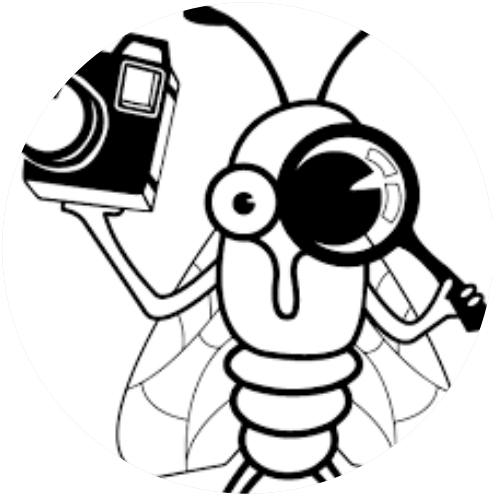
Wageningen Food Safety Research

TRACES 04-06-25



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Introduction

Swabs / wipes for analysis

Advantages

- Wiping is easy to handle for inspectors
- Animal friendly
- Successfully used for monitoring

Disadvantages

- One Swab is not representative for the whole stable
- Many sampling points are time consuming
- Some locations in farm are impossible to reach

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Introduction

Flying swabs for analysis

- Flies, mosquitoes, etc. are already present in stables
- Catching flying insects and analysing them could give a snapshot of all compounds present in a stable

Evaluate if flies can be a new summary-matrix to get a general impression of veterinary drug use in the stable

Activities

Step 1: Transfer study in the laboratory

Evaluate the feasibility of flies for residue control

How?

When?

Where?

- Use flies in a controlled experimental set-up
- Expose to antibiotics on surfaces for 5 days

Step 2: flying swabs from farms

Feasibility of passive samplers in stables

How?

When?

Where?

- Place several flytraps in a farm where veterinary drugs are used to treat animals

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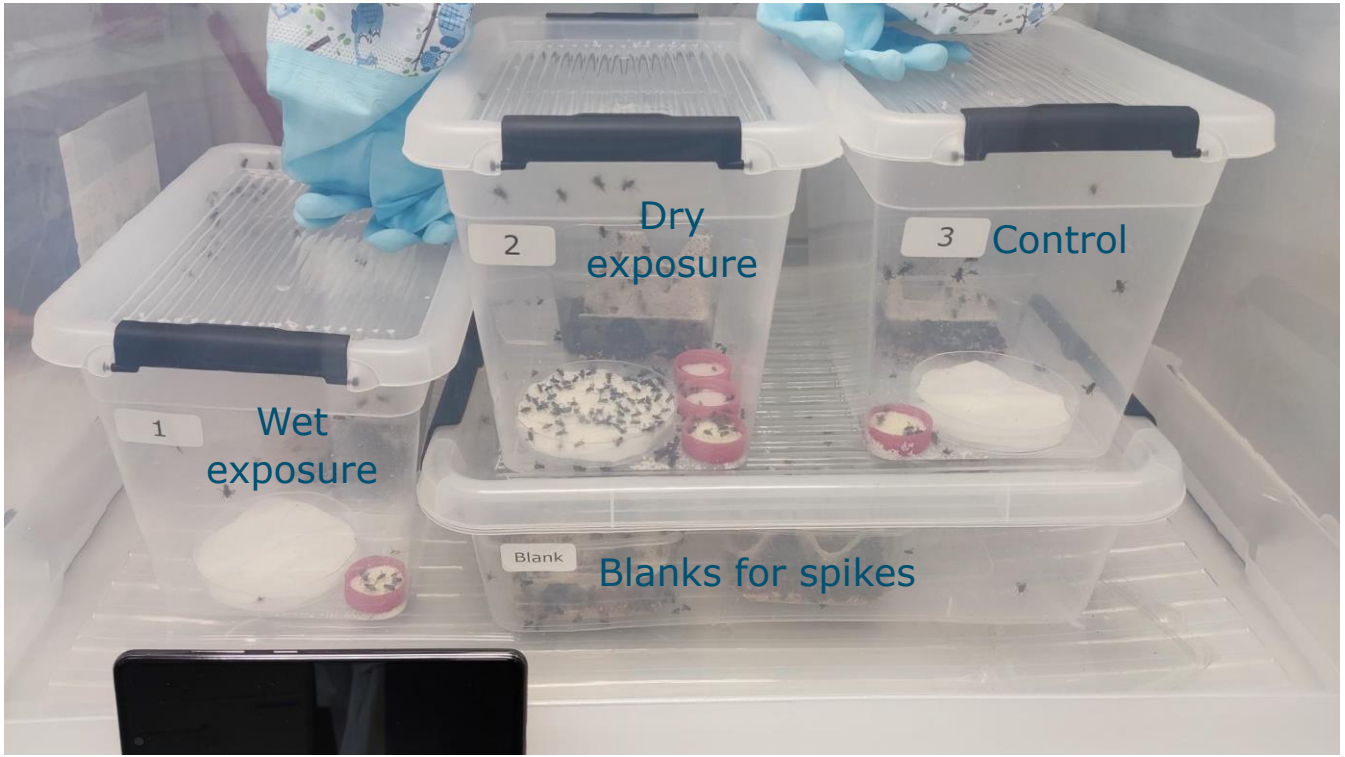
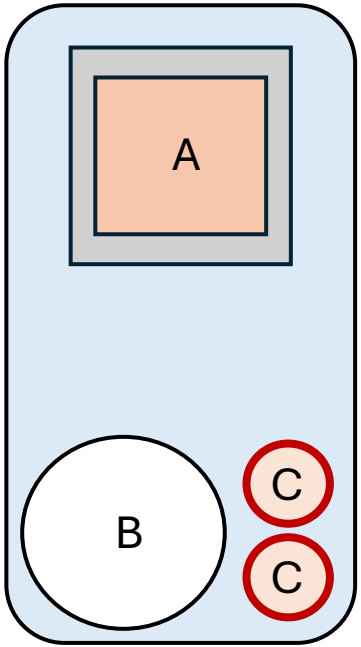
RESULTS

Flies study in the laboratory

STEP 1



Top-view



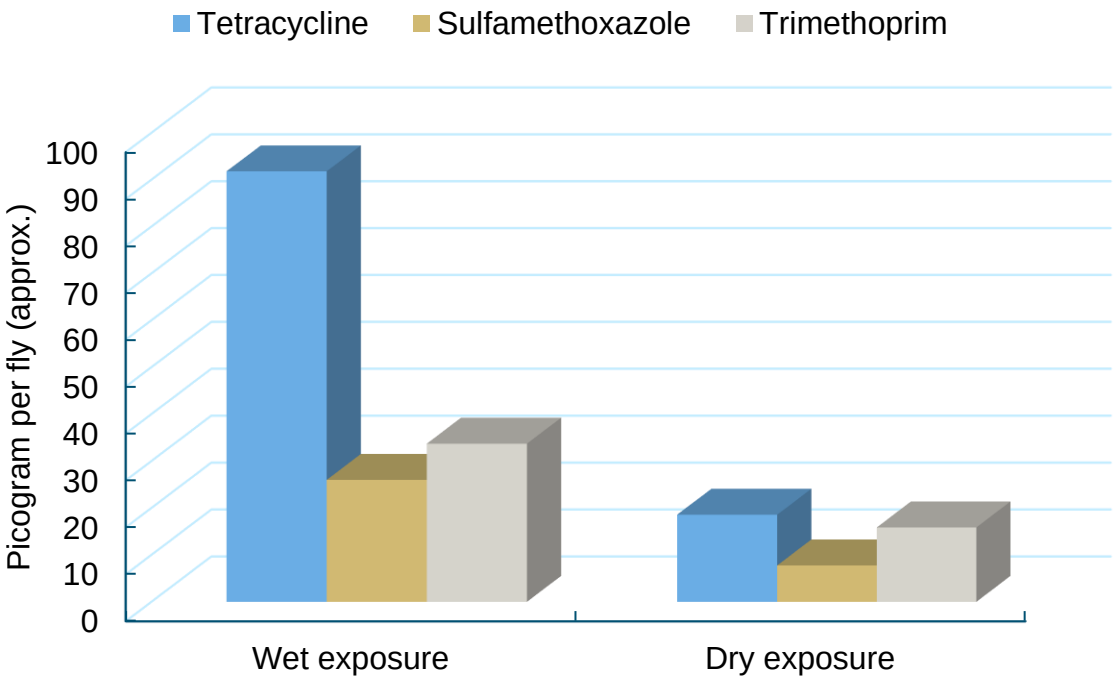
A: Shipping container flies
B: Exposure area
C: Food source / water source

Flies study in the laboratory

STEP 1

Flies study in the laboratory

STEP 1



Transfer of antibiotics from surface to flies confirmed!

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Flies study in the laboratory– Method development

STEP 1

How can we analyse the fly traps

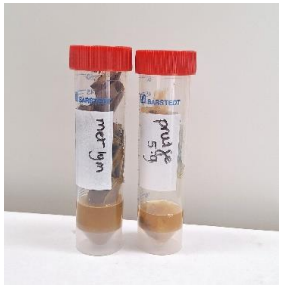
- Very sticky
- With liquid nitrogen it gets stuck in the knives

Extraction method is required

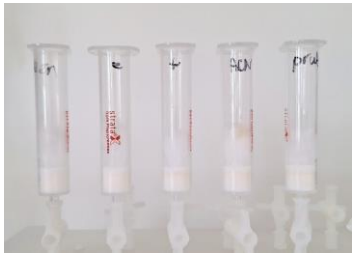
Final method:

(1) Use of a-polar solvents to dissolve glue and release flies → (2) Liquid-liquid extraction to extract compounds → SPE strata-X 200mg protocol

Optimal: Pentane



Optimal: McIlvain/PbAc/EDTA



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What's next?

So far now:

- Transfer of antibiotics to flies confirmed
- Method for glue traps has been developed

Next step:

- Verify method performance with incurred material on glue traps
- Use method on real samples collected from farms

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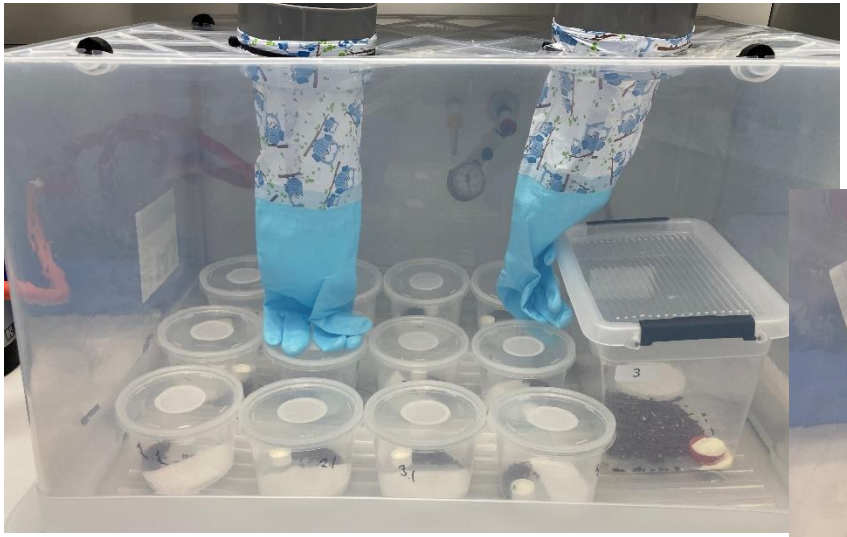
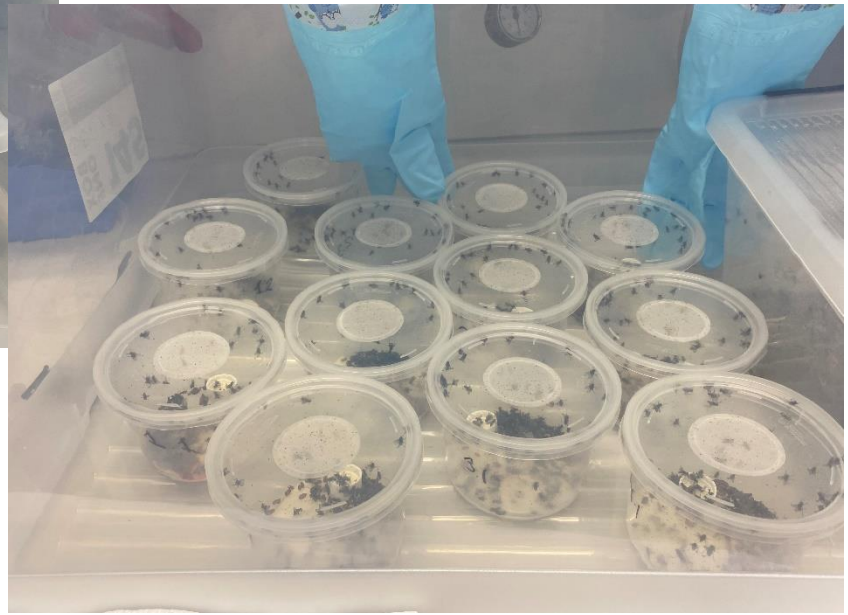
Fly traps in farm – lab study

STEP 2

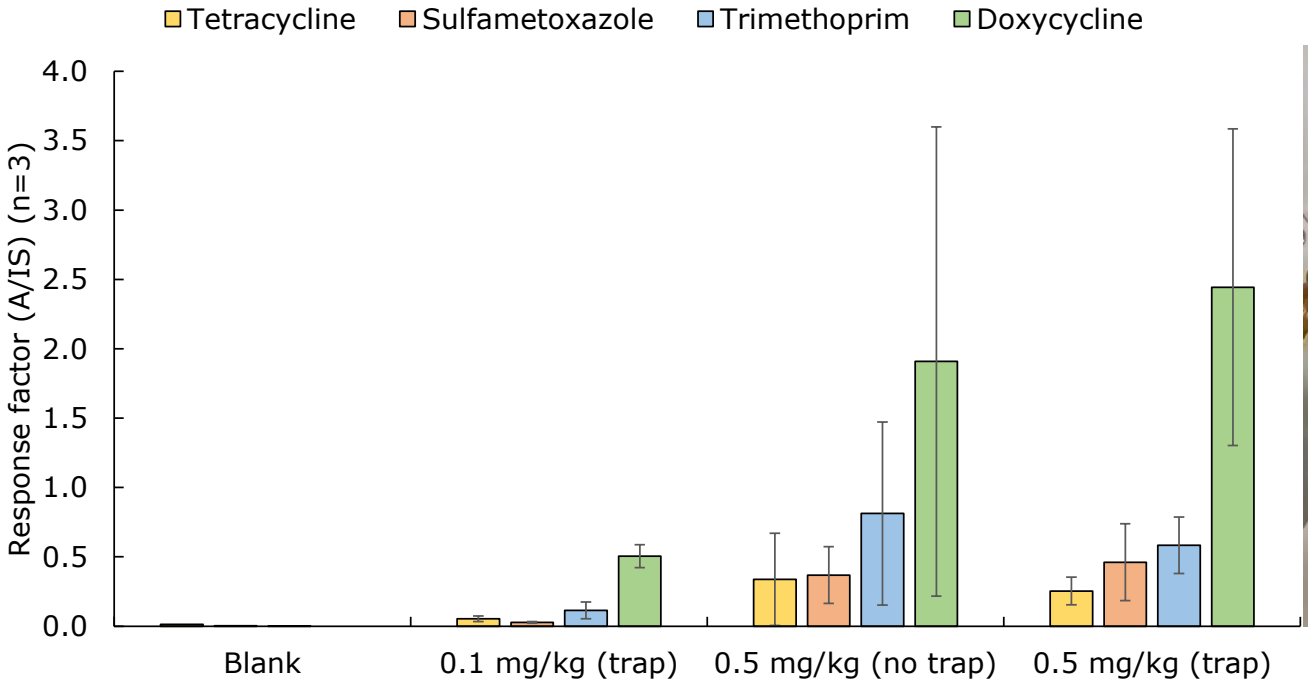




Fly traps in farm – lab study

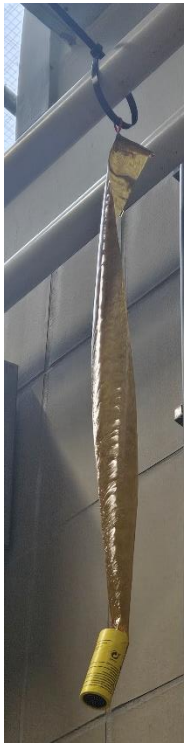
STEP 2

- Incurred flies were placed on glue traps, then analyzed:



Fly traps in farm

STEP 2



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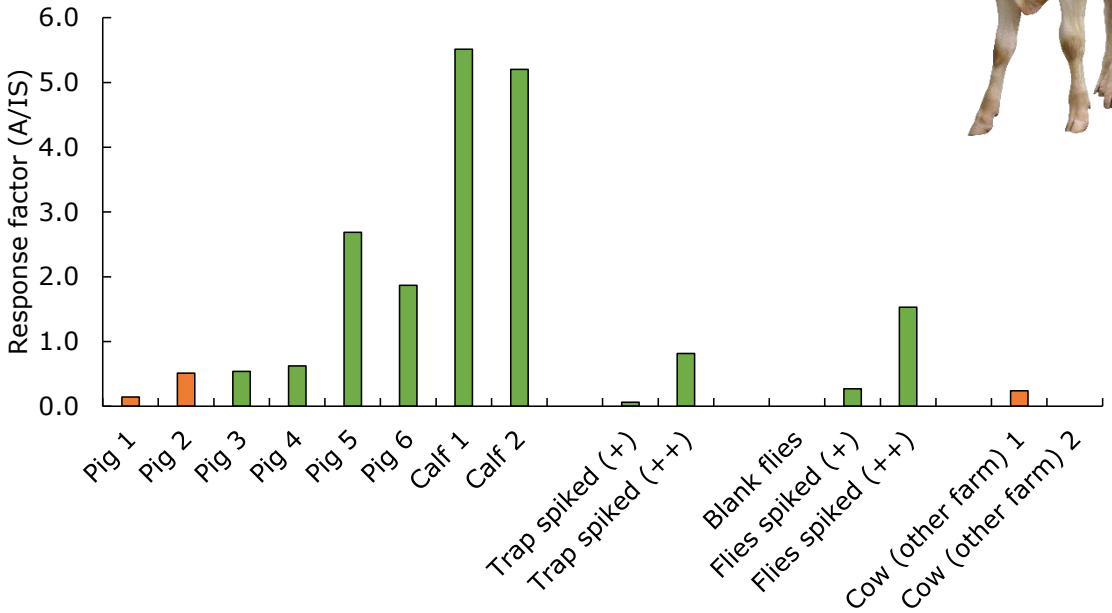
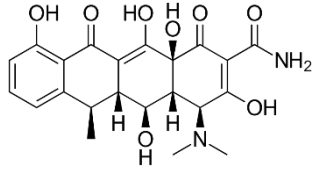
Fly traps in farm – Real samples

STEP 2

- **Traps placed in stable** that received **doxycycline** treatment
- Calves not treated; 25% of pigs did receive treatment few days before fly-catching



Doxycycline



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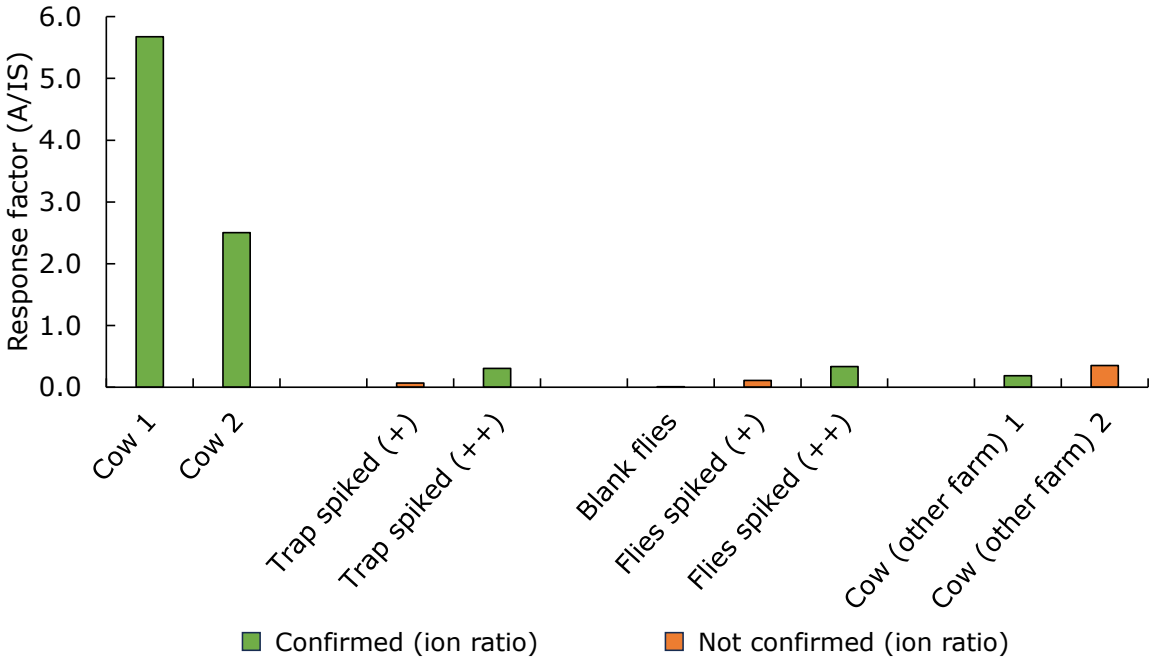
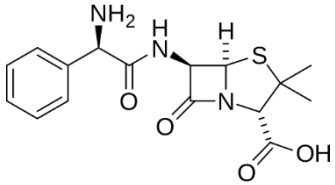
Fly traps in farm – Real samples

STEP 2

- **Traps placed in stable** that received **ampicillin** treatment
- Active treatment of multiple animals during fly-catching



Ampicillin



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Conclusions

- **Transfer** of antibiotics from surface to fly was **confirmed** in a controlled experiment
- **Method was developed** for sample preparation of glue traps
- **Method successfully applied** to incurred fly samples
- **Real samples** from treated farms **reflect antibiotic usage**

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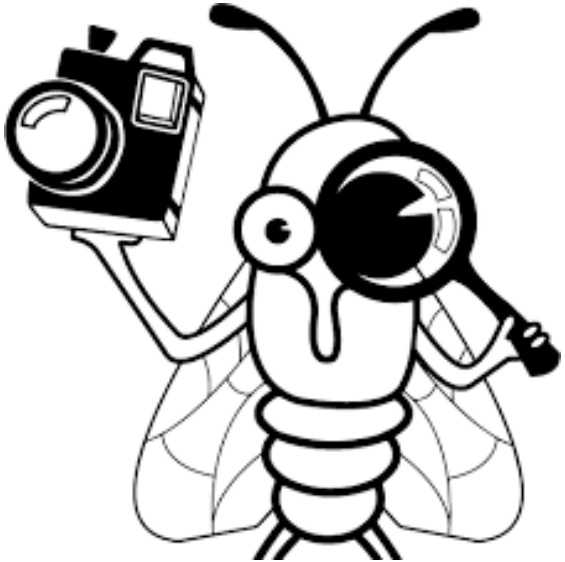
Outlook

- Flies or dust?
- Time & location?
- Metabolism?
- Implications

Using flies as passive samplers on a farm offers a promising tool for gaining insight into the residues present in that environment

Thank you!



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