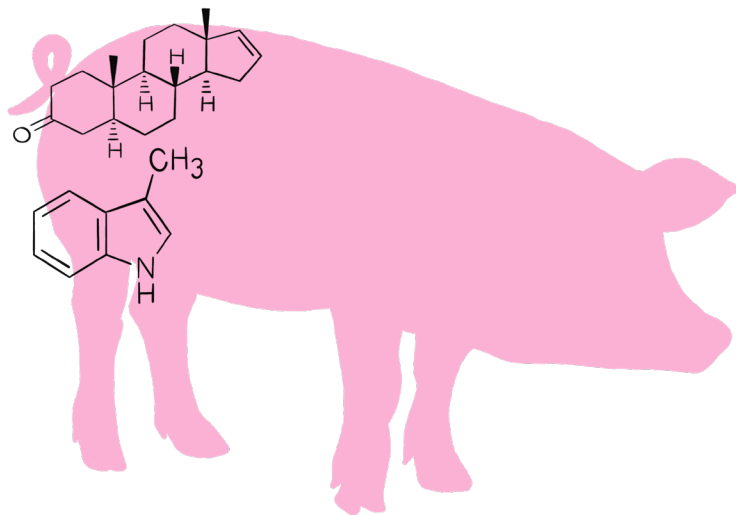


Navigating the complexity of boar taint detection: Advancing towards a castration-free future for piglets

Liat Morgan, Timea Ignat, Maria Font-i-Furnols, Nuria Panella-Riera,
Rune Isak Dupont Birkler



Pig 
Towards sustainable pig production
Ending piglet castration forever





The challenge - boar taint



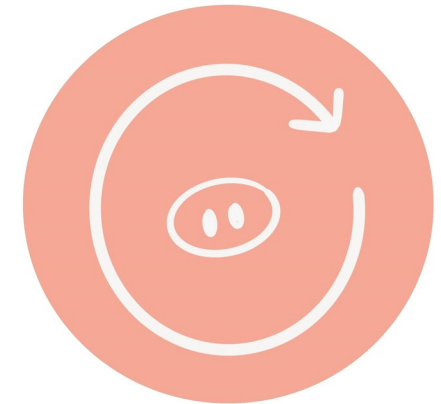
The problem

Bad odor of the meat appears after cooking in about 2-10% of the pigs.



Current main practice

Most piglets today are castrated without anesthesia for the prevention of boar taint.



A change is required

Castration is being criticized by consumers worldwide and will be banned by the EU.



The implications of surgical castration

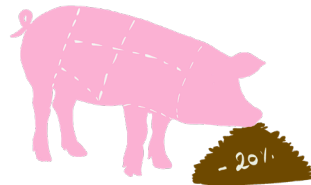
Most piglets worldwide still undergo the painful procedure of surgical castration for the prevention of boar taint



Animal welfare (pain, health, mortality)



Feed requirement (15-20%)



Gas emissions



Farmers' cost

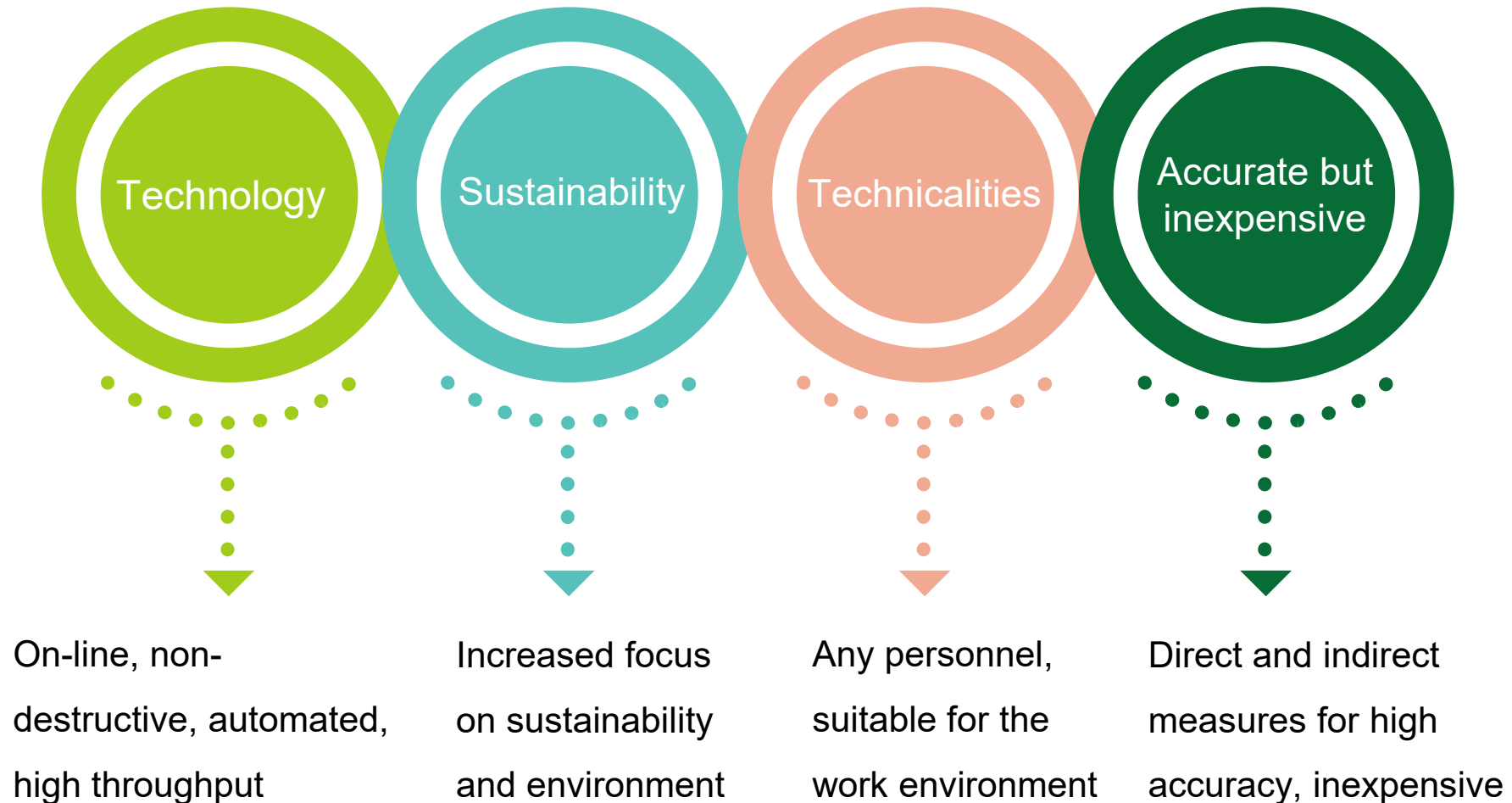




Alternatives to avoid boar taint

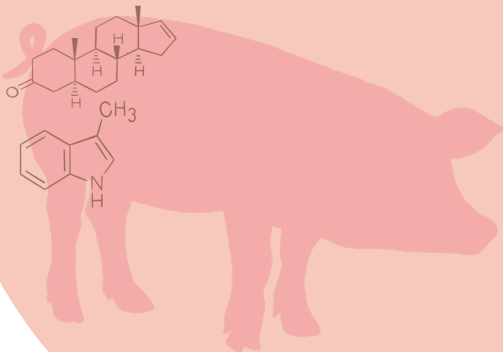
	Animal welfare	Public attitude	Farmer's cost	Sustainable	Costs	Performance
Surgical castration						
Immunocastration						
Mass spectrometry						
Human nose						
The optimal solution						

The optimal solution



What is boar taint?

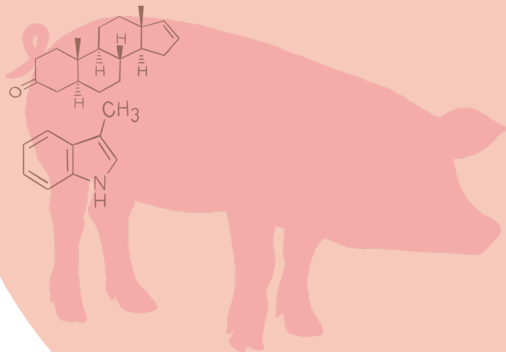
Androstenedione
Skatole
Mass
spectrometry



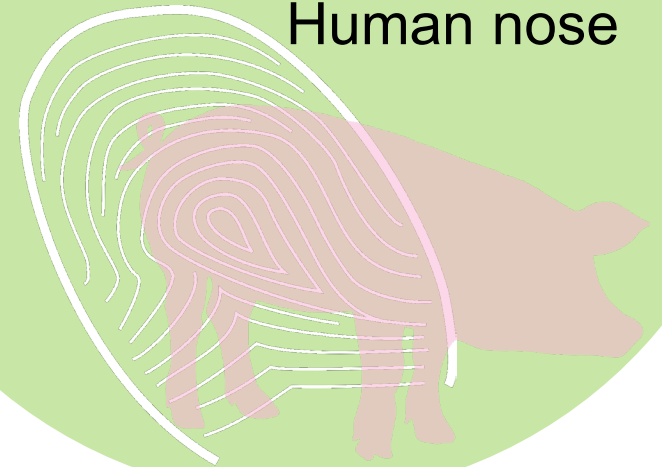
What is boar taint?

Androstenone
Skatole

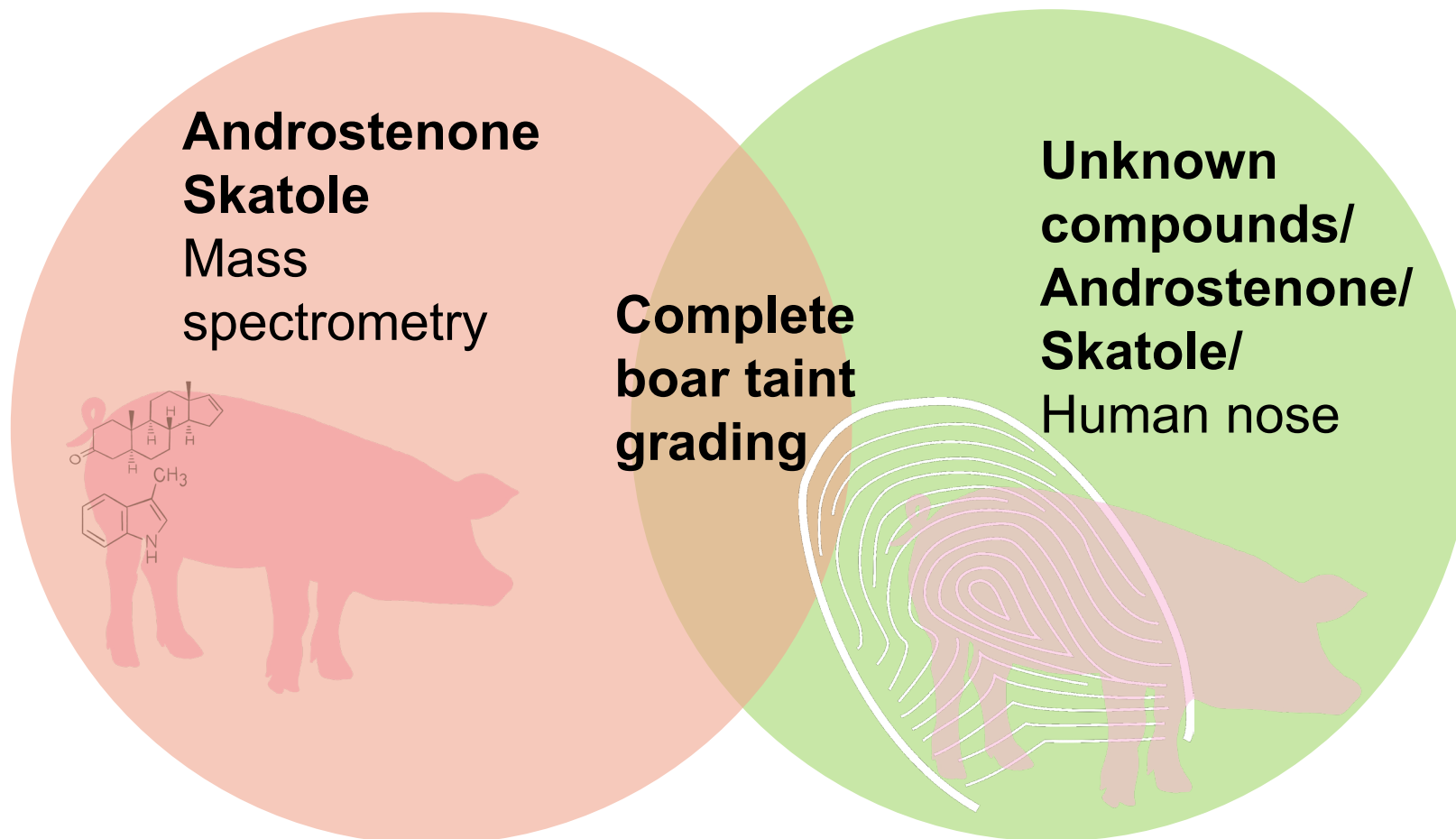
Mass
spectrometry



**Unknown
compounds/
Androstenone/
Skatole/
Human nose**



What is boar taint?



Objectives

- To examine the overlap between the objective measures and the subjective measures for boar taint detection.
- To create a combined model for on-line boar taint detection by advanced optics and artificial intelligence (AI).

Methods

- 12,000 boars were tested by the human nose on slaughter lines in commercial abattoirs.
- All tainted backfat samples as well as additional 30% random samples were analyzed by mass spectrometry for Skatole and Androstenone concentrations, and additional trained human nose panelists.
- Advanced optical technology and artificial intelligence (AI) were used for the detection of boar taint on-line, and creation of a new model.





Boar taint reference measures

- The results from different traditional methods for boar taint detection



Skatole
23

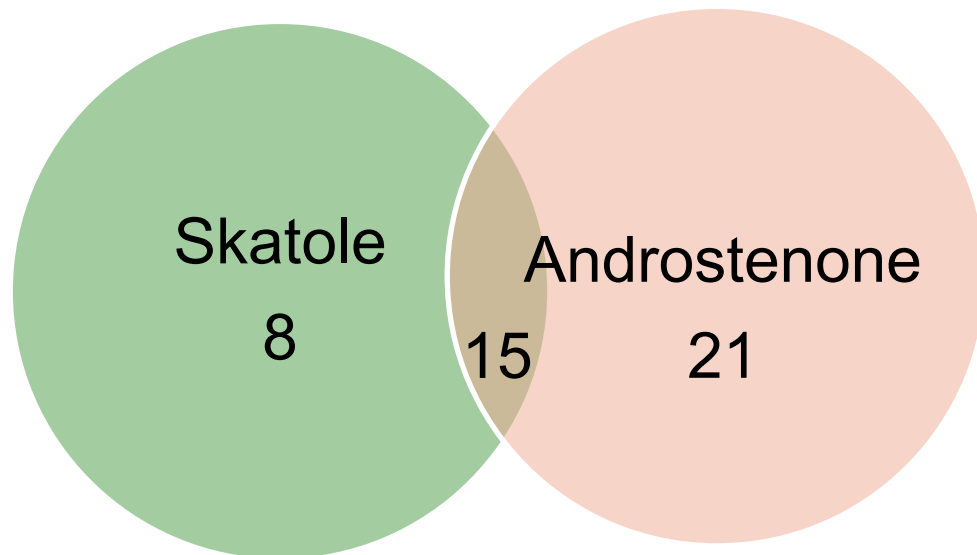


Androstenone
29



Boar taint reference measures

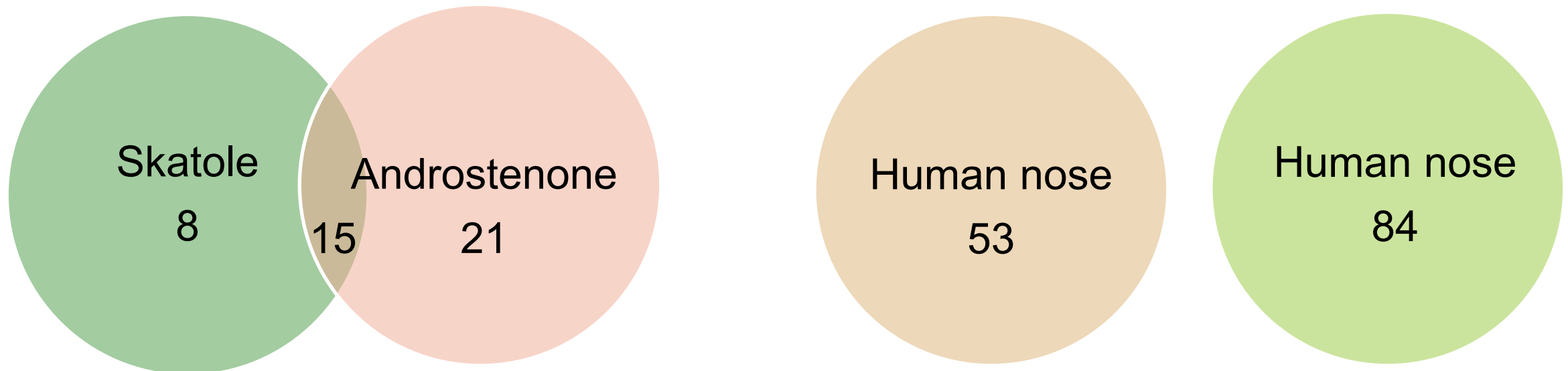
- The results from different traditional methods for boar taint detection





Boar taint reference measures

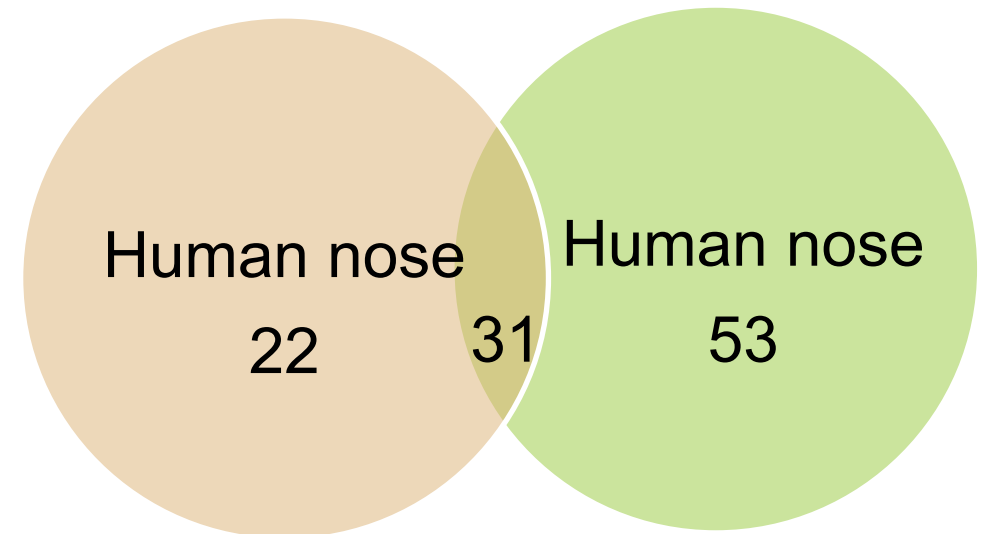
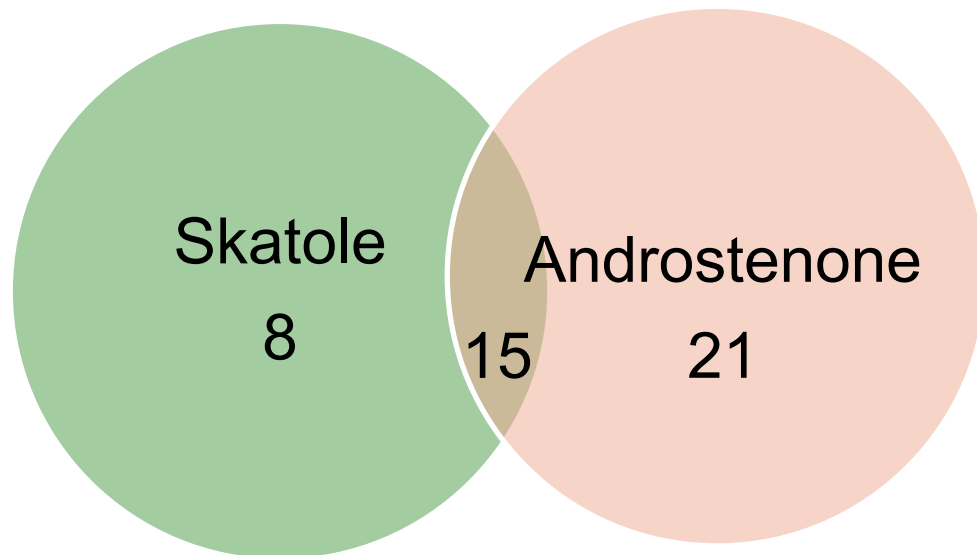
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Boar taint reference measures

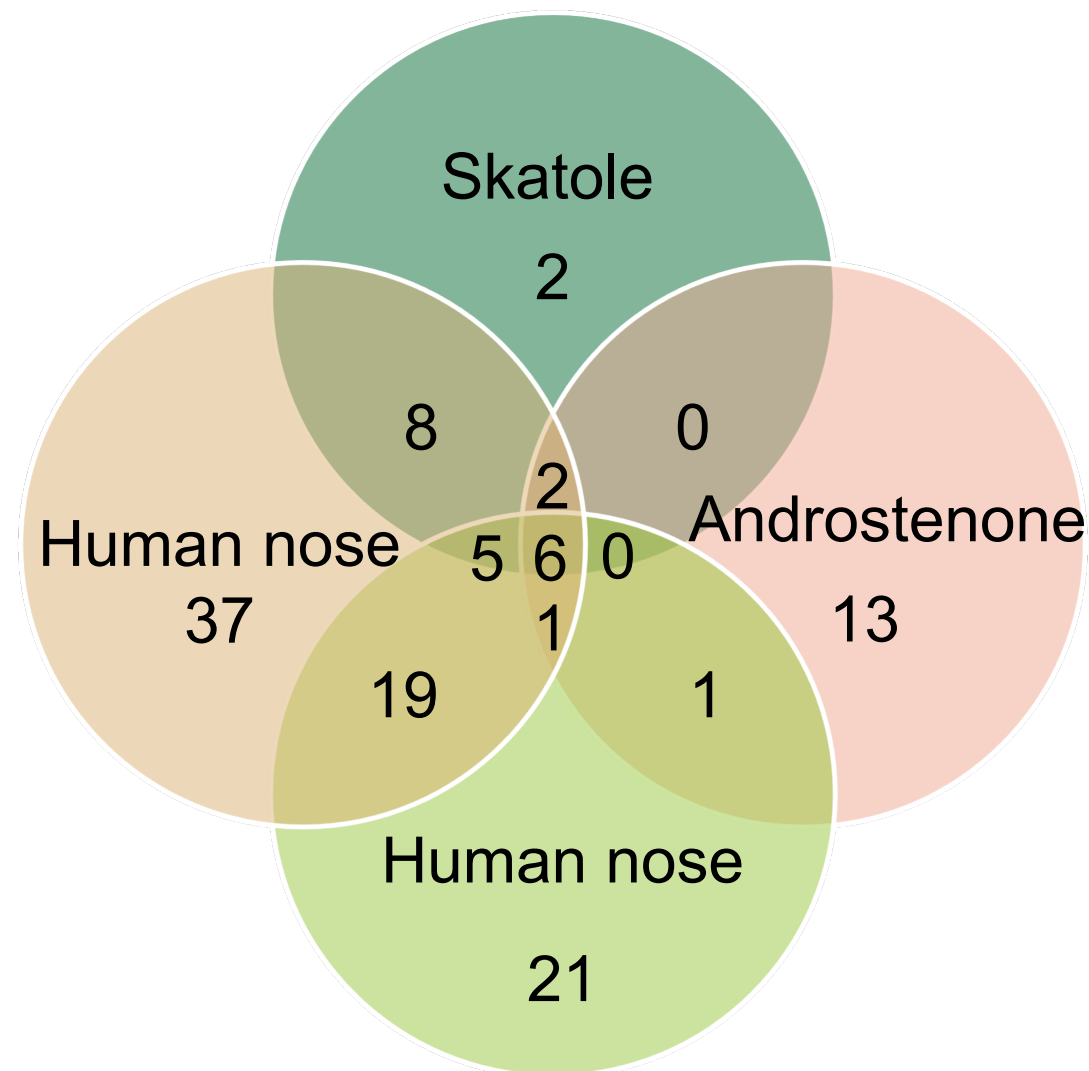
- The results from different traditional methods for boar taint detection





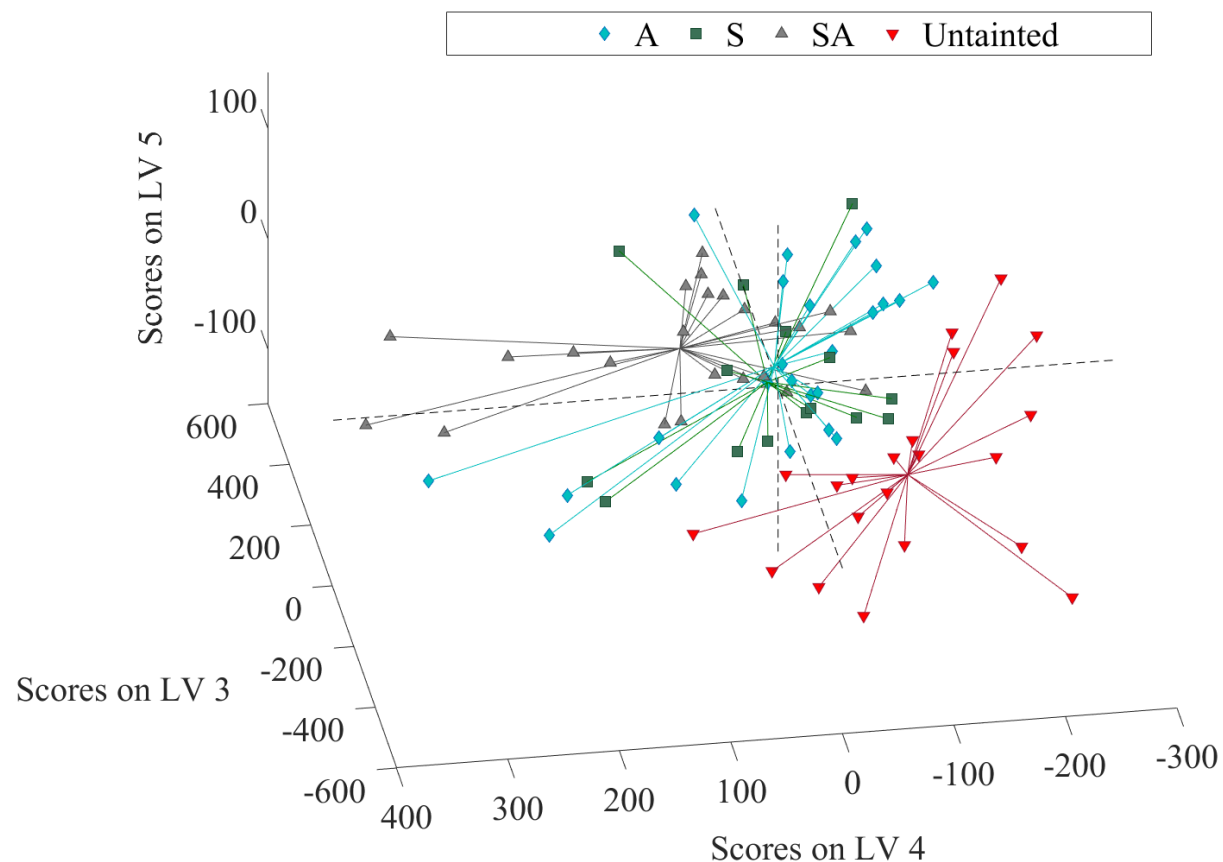
Boar taint reference measures

- The overlap between the different traditional methods for boar taint detection
- Only 4% of the samples had both compounds above the sorting level as well as detected by the human nose.



A novel optimized approach

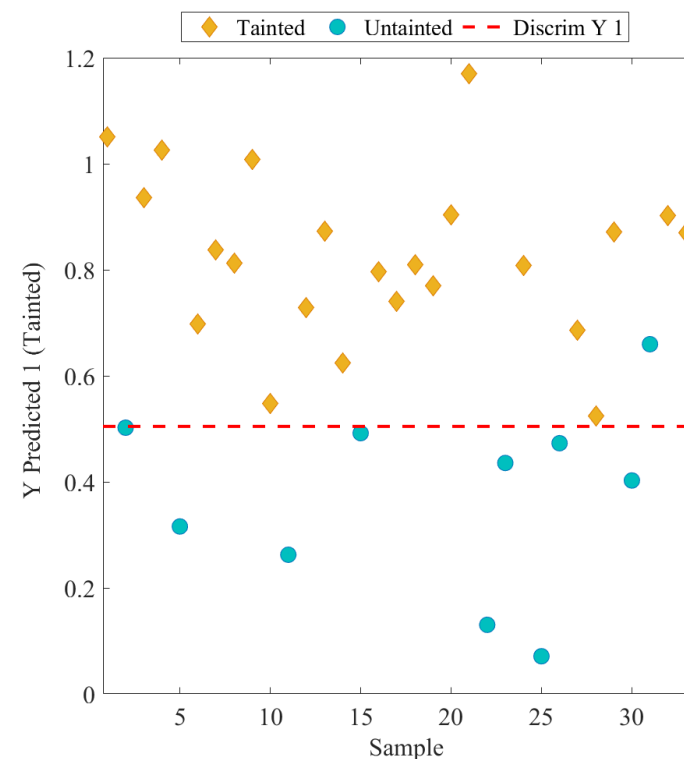
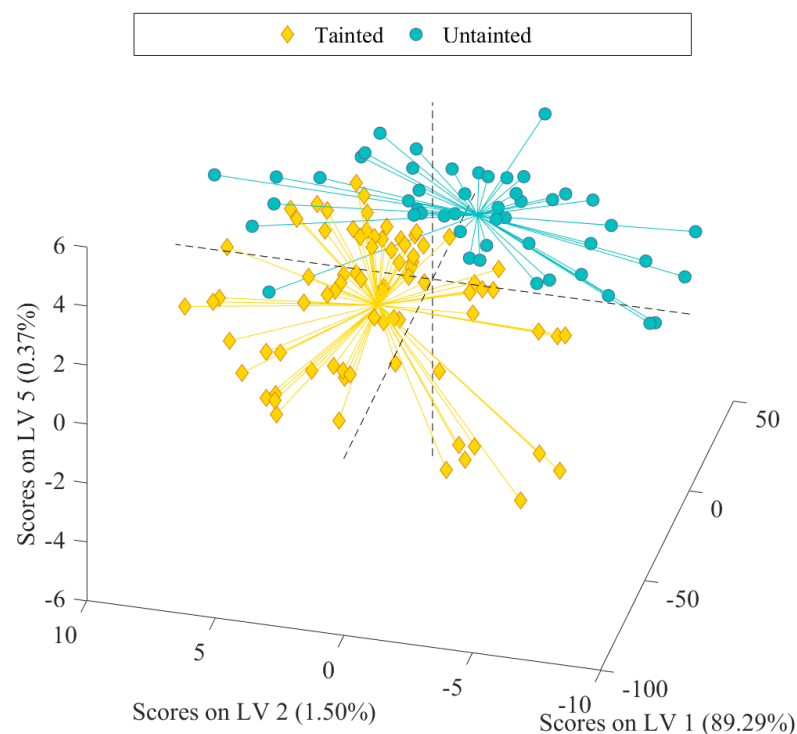
- Advanced optics and AI were used for the detection of boar taint on the slaughterline.
- Different models were developed with accuracy of 90%-100% for the presence of boar taint.
- The importance of measuring both Androstenone and Skatole is shown





A novel optimized approach

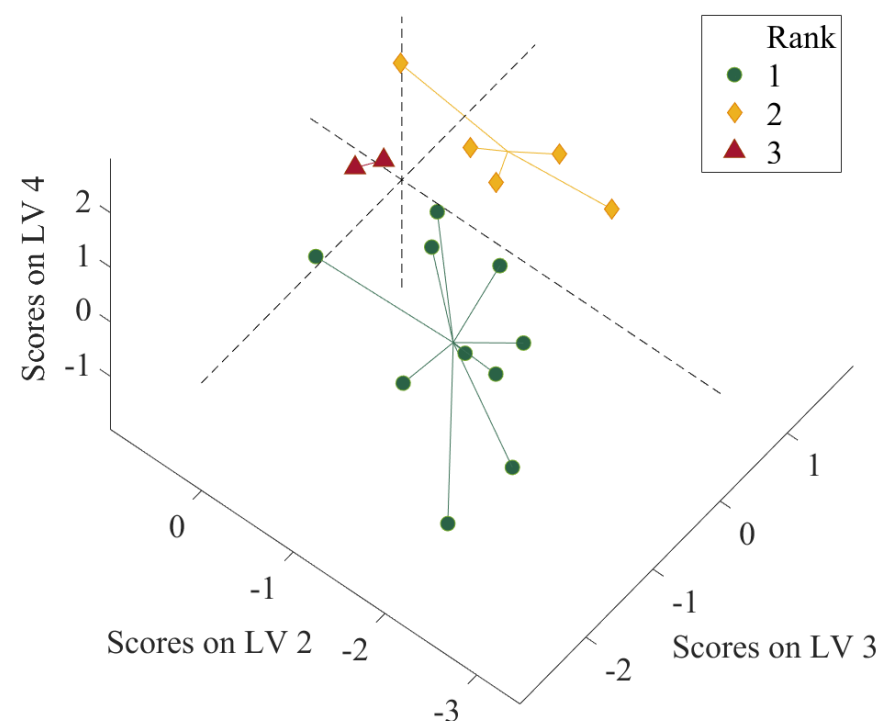
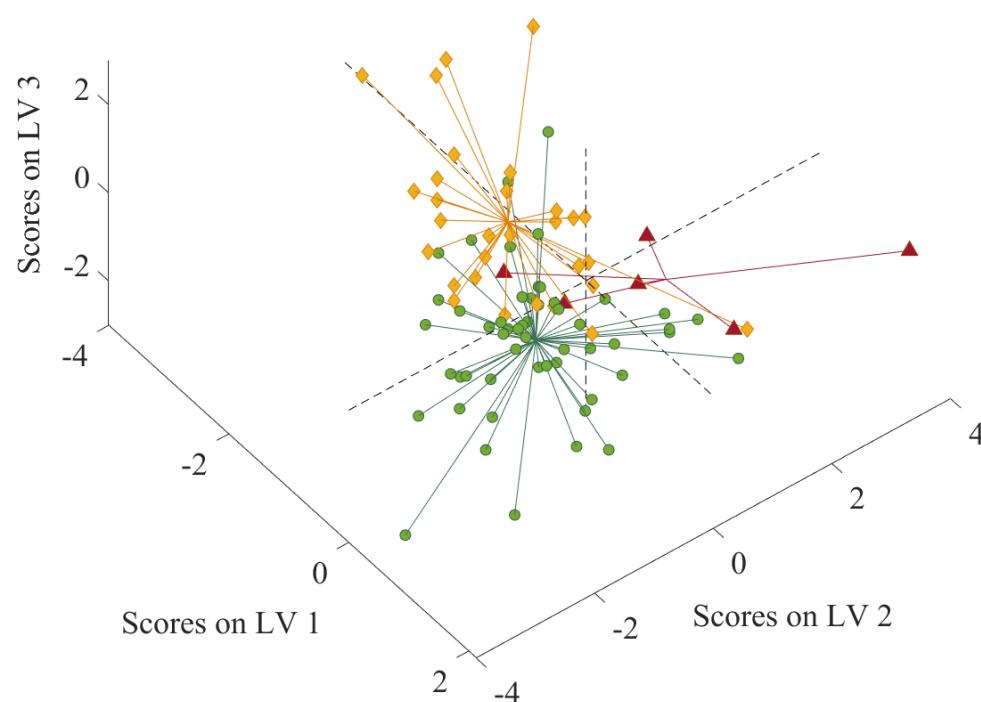
- A representative model for boar taint prediction, **sensitivity- 100%**, **specificity- 91%** . Considering **Skatole, Androstenone, and the unknown chemical fingerprint sensed by the human nose**.



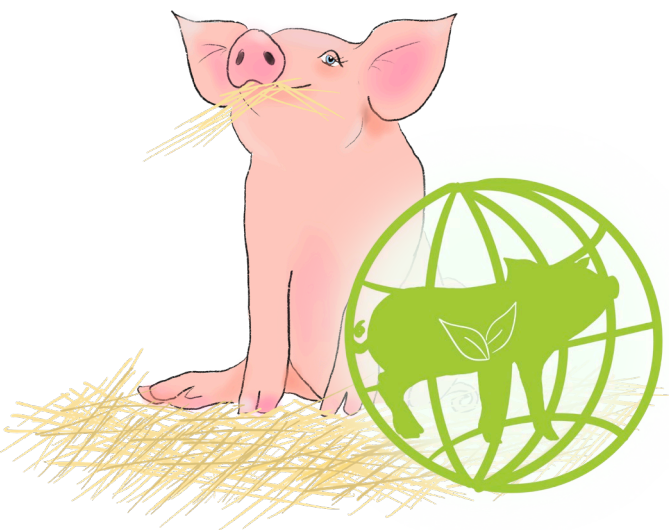


A novel optimized approach

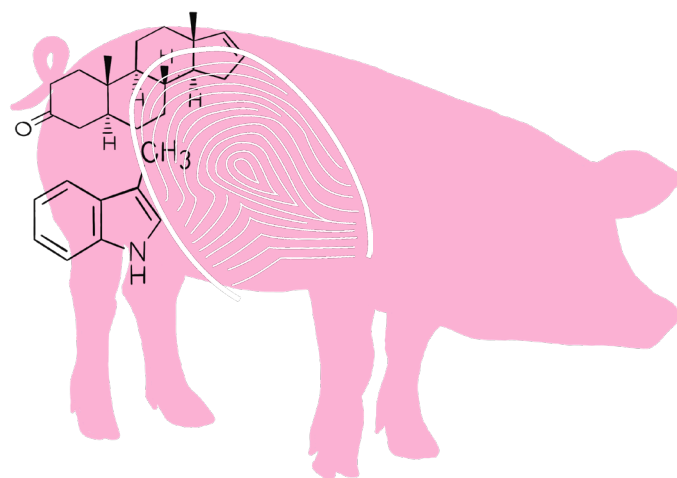
- A representative model for boar taint grading. Considering Skatole, Androstenone, and the unknown chemical fingerprint sensed by the human nose.



Conclusions



Raising entire males- profitable, sustainable, and welfare friendly.



Importance to measure Androstenone, Skatole and the unknown fingerprint



Advanced optics and AI is a feasible solution



Piglet castration can be ended- just to decide

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Guy Morgan
Amir Adamov

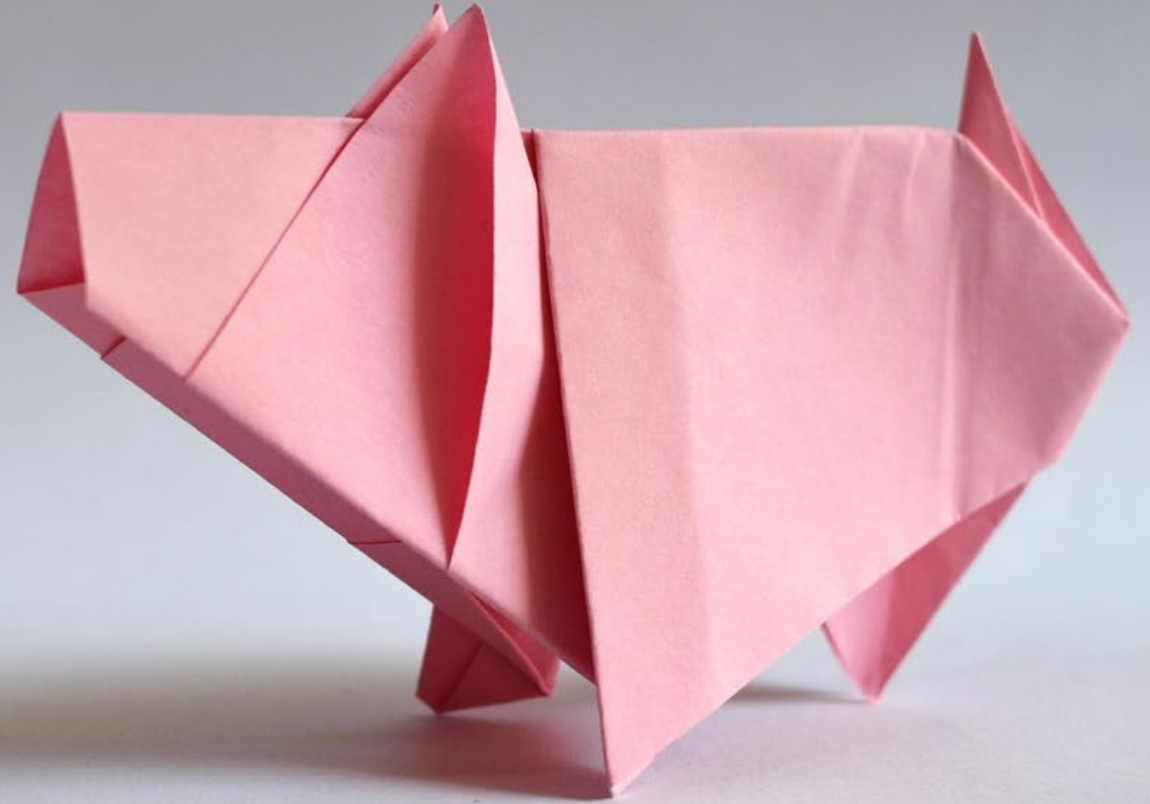


Maria Font-i-Furnols
Nuria Panella-Riera
The entire team at IRTA



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Thank you for the attention!



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