Combining sustainable farming with high-quality and authentic chicken and cattle products

From "One Quality" research to farm practice and policy.

29th October 2026

Brussels, Belgium

INTAQT One Quality

INTAQT in a nutshell

Bruno Martin and Cécile Berri
INRAE

Context

- Livestock is a strategic sector for the European Union: 40% of the agricultural added value – 4 million farms – 7 million jobs
- Cattle (milk and meat) and poultry meat provide more than 60 % of animal sourced proteins consumed in Europe





Growing societal expectations are driving demand for more sustainable and ethical farming practices, with increasing attention to animal welfare, environmental impact, and product quality.





Coexistence a continuum of production systems ranging from: pasture-based to indoor fed cattle farms, outdoor slow-growing to indoor fast-growing broilers





THE EUROPEAN UNION'S HORIZON
ME UNDER GRANT AGREEMENT N° 01000250

1. The INTAQT project

Objectives and methodology

01. Objective of the INTAQT project

Understand the relationships between farming practices and product quality across three production sectors - beef, dairy, and poultry - and to provide stakeholders with efficient tools to support the management of both farm sustainability and product quality and authenticity.



- 21 partners (11 academics, 3 industries, 7 SMEs)
- 10 countries involved
- 2021 → 2026









"One Quality" concept
→ Intrinsic quality characteristics directly related to the **products**: health, nutritional value, sensory characteristics, processing properties
→ Extrinsic quality characteristics related to livestock systems: environmental, societal and economical **sustainability**

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01. Approach and methodology

1



Multi-stakeholder groups (national, European) → livestock systems, quality criteria, innovative practices, feedback on results

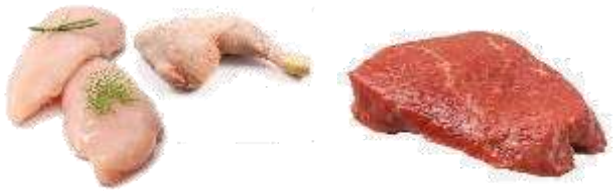
2



Livestock surveys → Practices, animal welfare, environmental impacts and services;
Products sampling; Living lab

3





Laboratory analysis → Intrinsic quality (health, nutritional value, sensory, technological properties)



4



Modelling the impact of farming practices on product quality to develop authentication and predictive tools.

5

Multi-criteria assessment of intrinsic product quality and analysis of synergies and trade-offs between quality and sustainability.



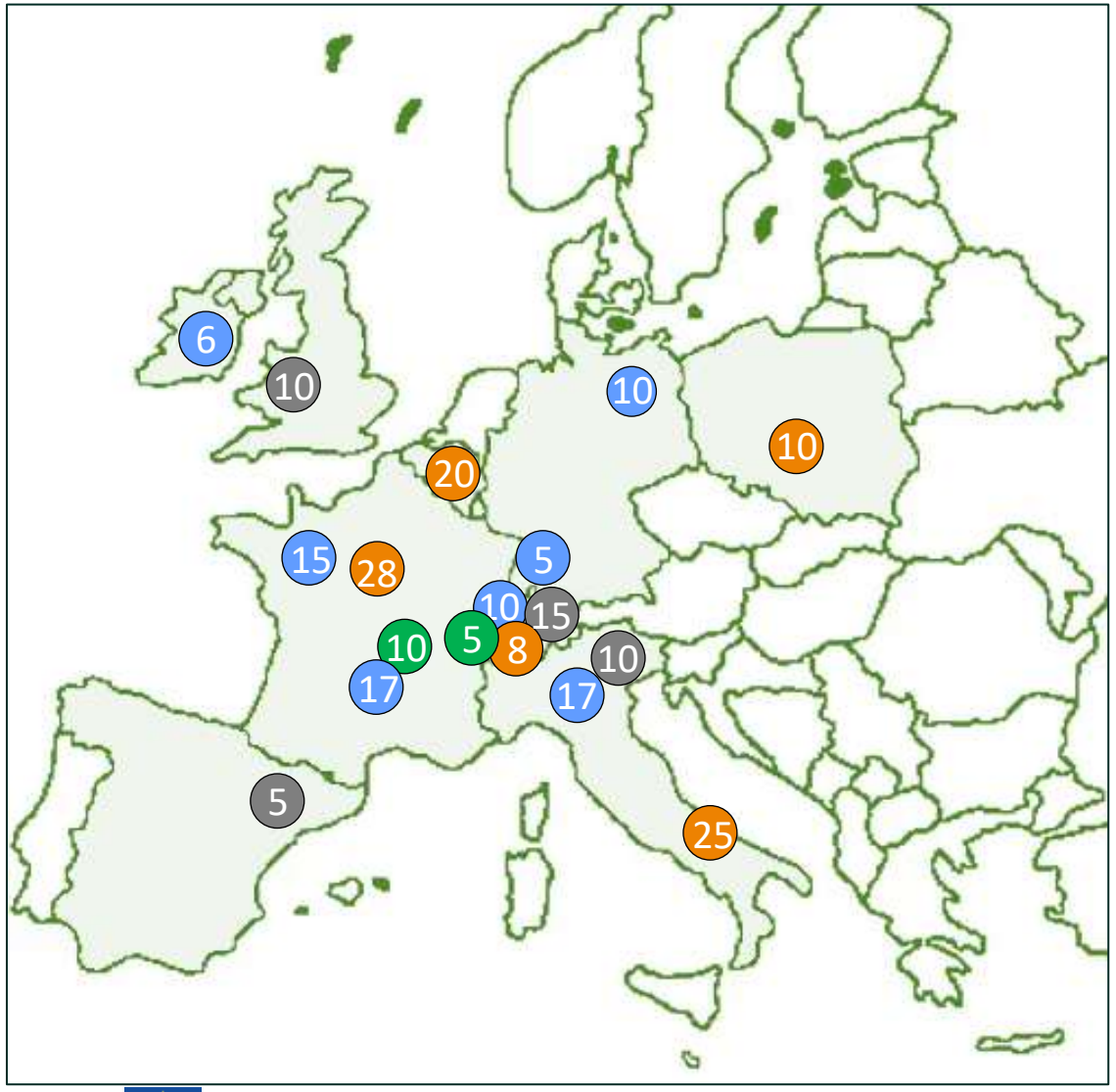
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Communication and dissemination.



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01. Farm network



We cover a **wide range of farming systems**, but this does **not reflect the representativeness of production** in each country.

91 broiler farms

Standard

80 dairy farms

Conventional

15 suckler farms

Conventional

30 fattening farms

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01. Quality traits studied



Consultation of stakeholders (dairy, beef and poultry sectors):

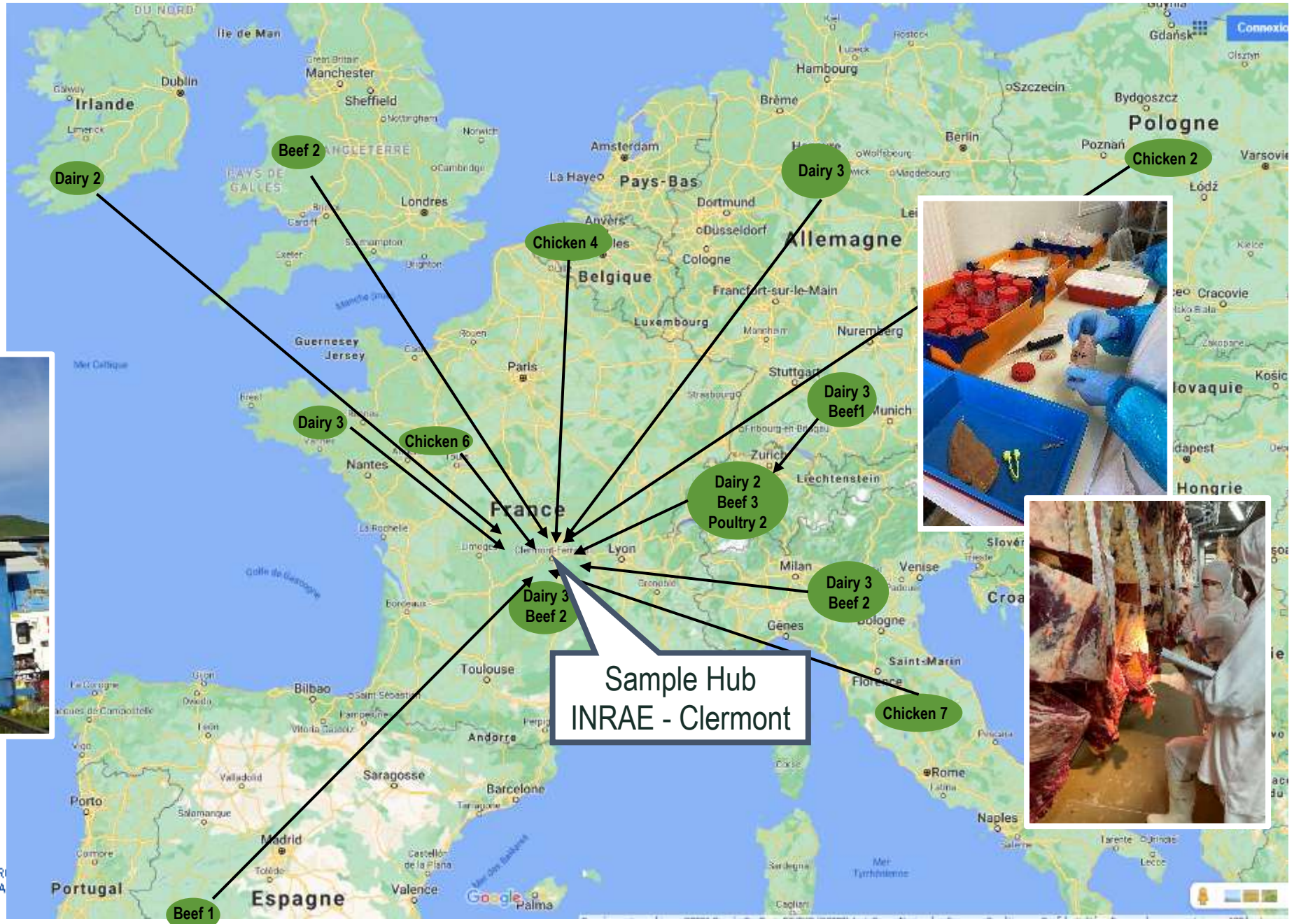
- Importance of the technological quality
- Primacy given to extrinsic quality (animal welfare, environment and socio-economy)

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01. Sample shipments

From the sampling regions to the sample **hub at INRAE** Clermont-Ferrand





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2020 RESEARCH AND INNOVATION PROGRA

01. Lab network



Analyses planned initially,
Analyses added after stakeholders' consultations

REIMS, dioxin-PCB-mycotoxins Milk VOCs (QUB)

Pollutants (dioxin-PCB-PFAS mycotoxins, plant , Vitamins A-D (BfR)

Consumer tests (Teagasc)

Consumer tests (IMR3GF)

Vitamin E, Dipeptides, Fatty Acids (beef + milk) Meat oxidation enzymes (UGent)

Consumer tests, beef fat (Acta)

Milk minerals (inrae)

Trained tests, texture chicken oxidation and processing yield (inrae)

Infra-red, Milk protein fractions (Unipd)

Vitamins B, milk phospholipids chicken AA, digestibility (inrae)

Microbial analyses consumer tests, shelf life antimicrobial resistance genes (Unibo)

Milk microbiota (inrae)

Sample Hub

Chicken Fatty Acids Beef proteins (Unipg)

Métabolomics, Heavy Metals

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2. Programme



2



Livestock survey → Practices, animal welfare, environmental impacts and services;
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Multi-criteria assessment of intrinsic product quality and analysis of synergies and trade-offs between quality and sustainability.



PROGRAMME

09:30 | Registration and welcome coffee

10:00 | Opening and welcome

10:10 | INTAQT in a nutshell
Bruno Martin & Cécile Berri, INRAE

10:25 | How production systems shape products' intrinsic quality?
- Chicken meat – **Cécile Berri, INRAE**
- Beef – **Jean-François Hocquette, INRAE**
- Dairy products – **Bruno Martin, INRAE**

11:10 | Is farm multiperformance achievable?
Eléa Caumette, INRAE

11:25 | From results to practice: practice abstracts and tools for farmers and advisors
Rennie Eppenstein, FiBL

11:40 | Panel discussion
What do the results mean for farmers, quality schemes & EU policy?

12:15 | Q&A and closing

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INTAQT One Quality

How do production systems shape the intrinsic quality of chicken meat?

Cécile Berri, INRAE

intaqt one quality

ONE QUALITY 1Q

1. Farm typology

01. Farm typology

Management

Genetics

Slaughter weight

Outdoor



Indoor





Laying males



Dual-purpose



slow-growing



Medium-growing



‘fast-medium’-growing



fast-growing





Intensification

+++

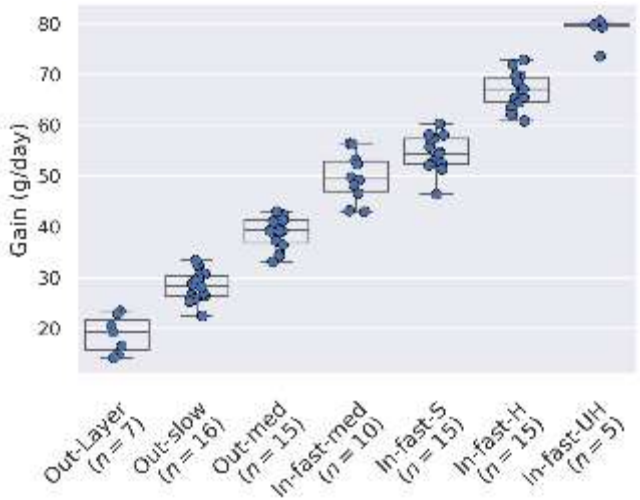
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01. Farm characteristics

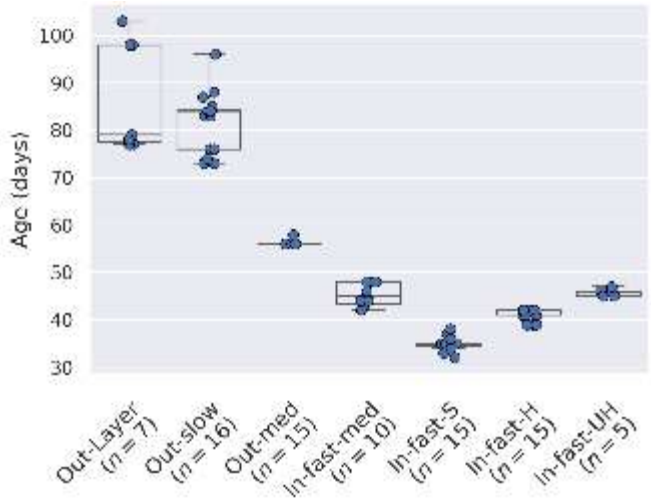
90 farms from 18 systems classified in 7 main categories

Typology	Indoor/outdoor	Slaughter age, day	Slaughter weight, kg	Genotype
Out-layer	Outdoor	87.1	1.66	Lohmann Brown, ÖTZ Coffee
Out-slow	Outdoor	82.1	2.31	Sasso XL451, Brown Nick, Hubbard S757N
Out-med	Outdoor	56.1	2.19	Hubbard JA757, JA957, RedJA57
In-fast-med	Indoor	45.4	2.27	Ranger Classic, Redbro
In-fast-S	Indoor	34.9	1.9	Ross 308
In-fast-H	Indoor	41.1	2.75	Ross 308
In-fast-UH	Indoor	45.8	3.60	Ross 308

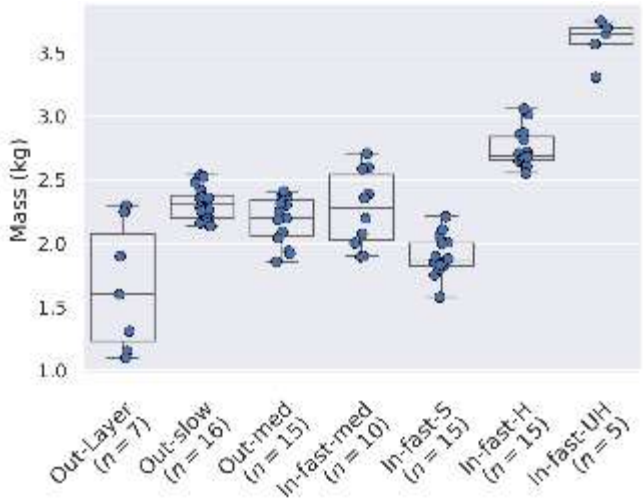
Average daily gain



Age at slaughter



Weight at slaughter



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2. Main results

02. Laboratory analyses

- Breast fillets, thighs
- Fresh and cooked meat (fillet)
- Shredded (25 fillets or 20 thighs)



Sensory/ technological properties

- Sensory test with trained jury (meat)
- Consumer test (processed product)
- Bacterial flora of spoilage in connection with shelf-life (processed product)
- pHu, color, water holding capacity, technological performance, tenderness
- Lipid oxidation in connection with discoloration
- Efficiency and capacity for transformation

Nutritional properties

- Protein, fatty acid and vitamin composition / fatty acid profiles
- Minerals and trace elements (including Se) / B vitamins, vitamins E, A, D
- Histidine dipeptides
- Collagen
- Heme iron
- Susceptibility to oxidation
- Essential Amino Acids / Protein Digestibility
- Water/protein ratio

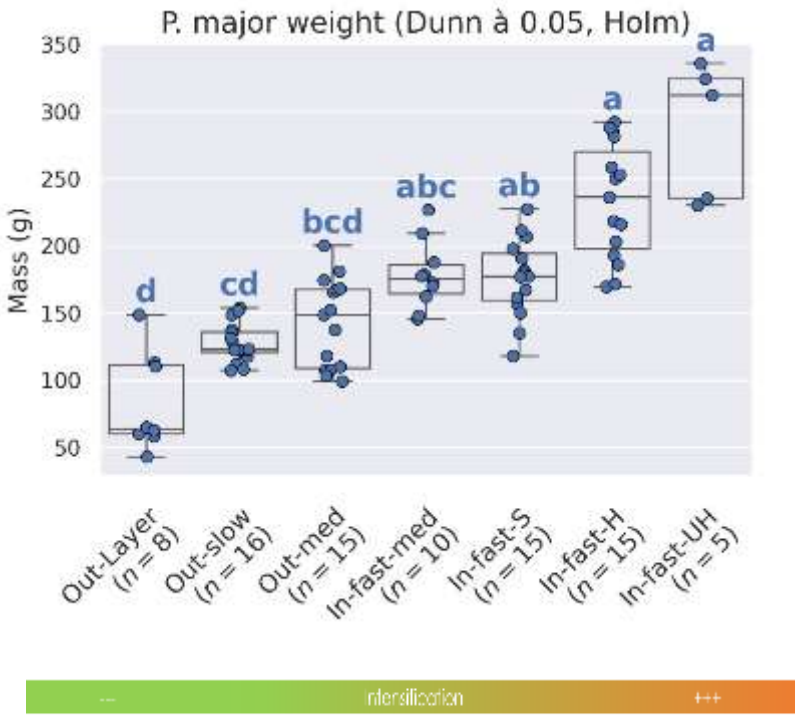
Health properties

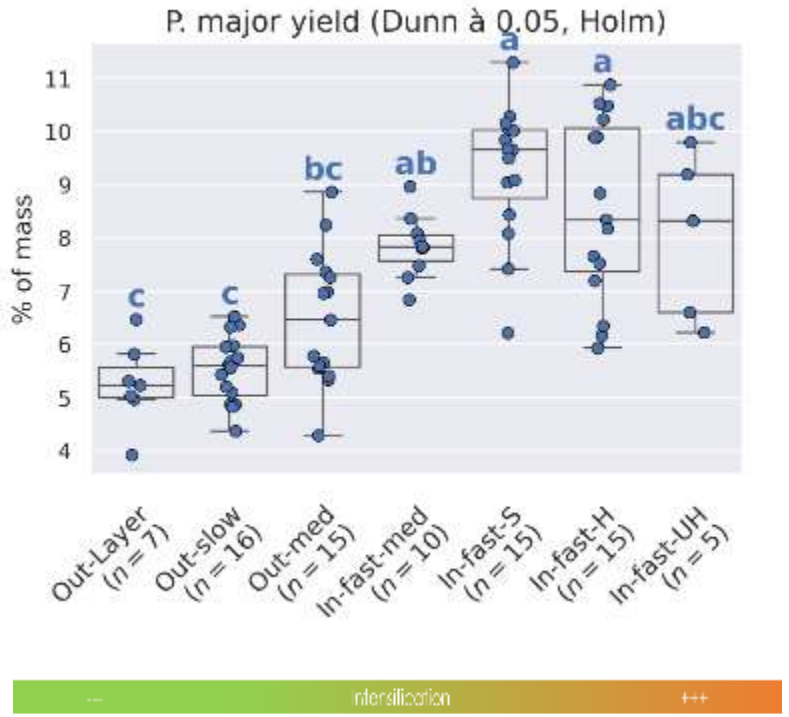
- Organic pollutants (dioxins/PCBs/PFAS)
- Heavy metals
- Mycotoxins
- Microbial pathogens (feces)
- Alteration flora
- Antimicrobial resistance (AMR)



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02. Breast meat production

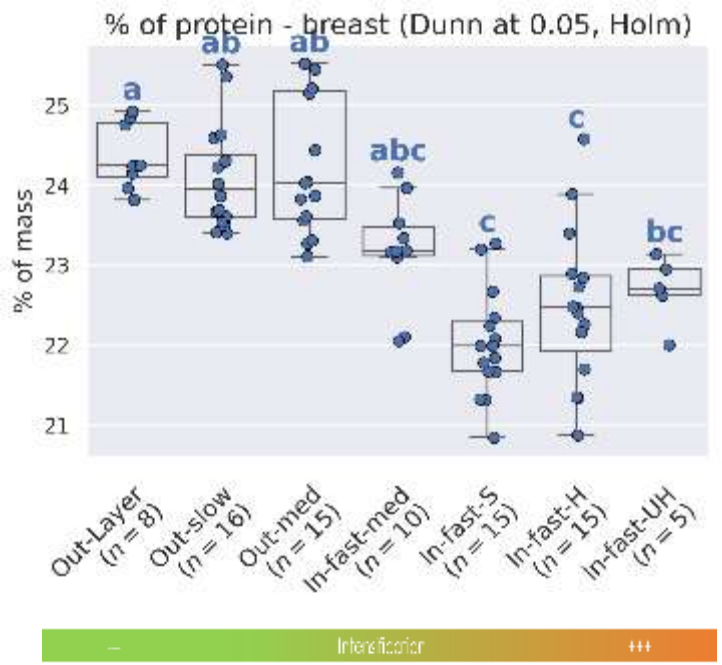


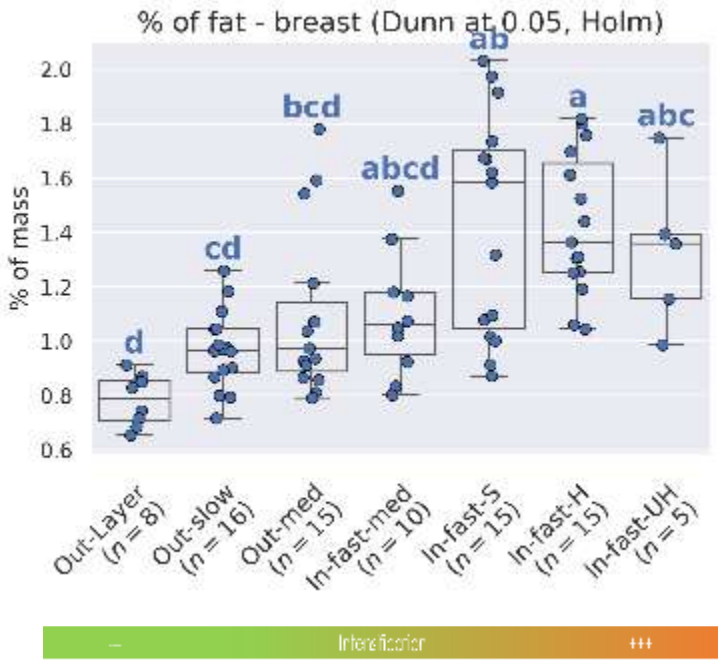


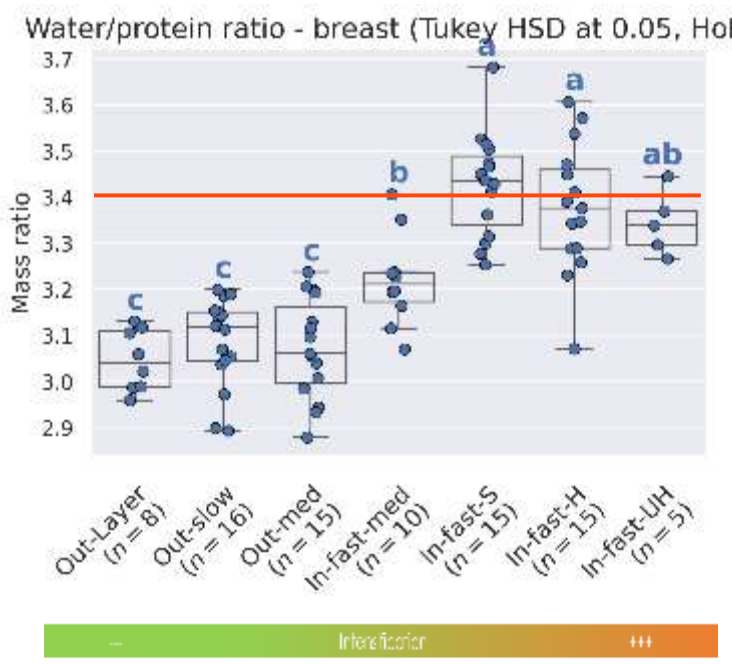
P. major weight and yield are higher in the most performant systems, with yield stabilizing in heavy fast-growing strains.

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02. Proximal composition (breast meat)



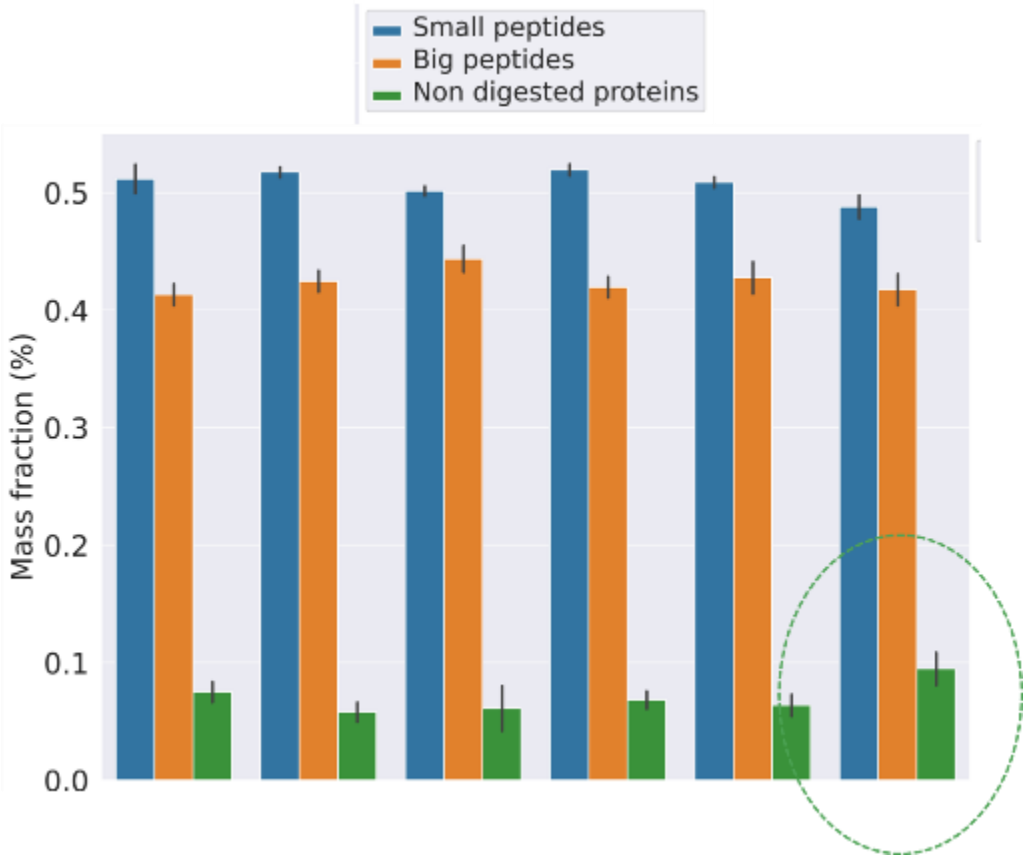


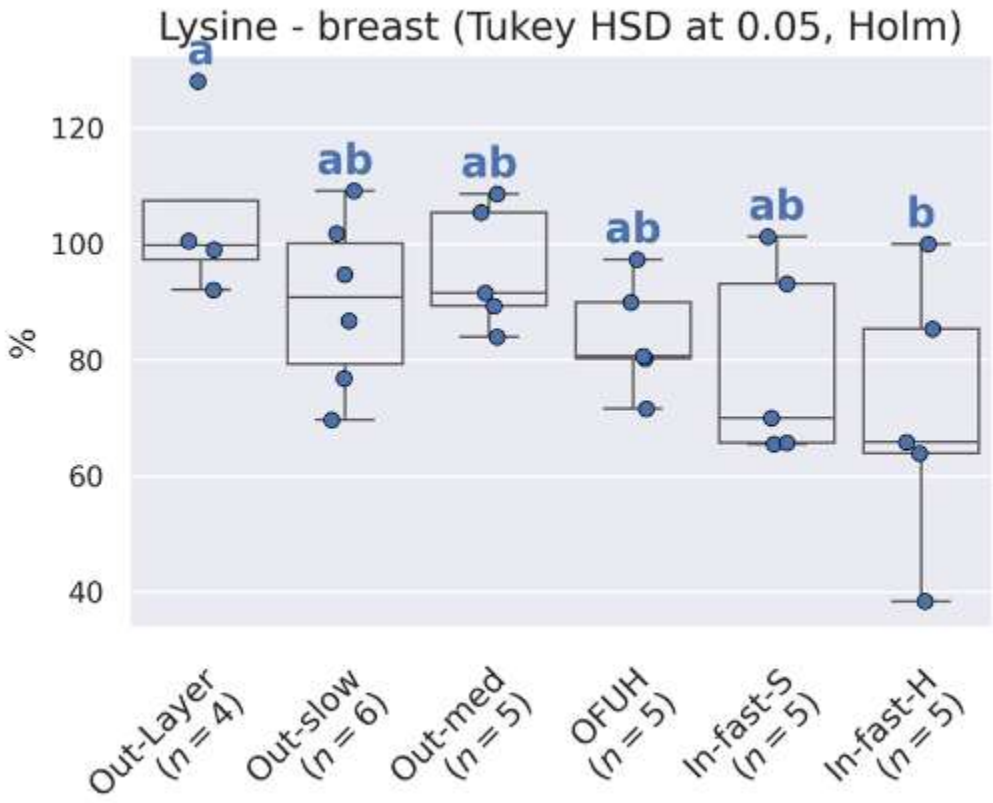


Fast-growing chickens produce meat with lower protein and higher water and fat contents, increasing the risk of exceeding the regulatory water/protein limit, with the greatest impact observed in standard chickens (1.9 kg).

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02. Amino acid digestibility of cooked breast meat



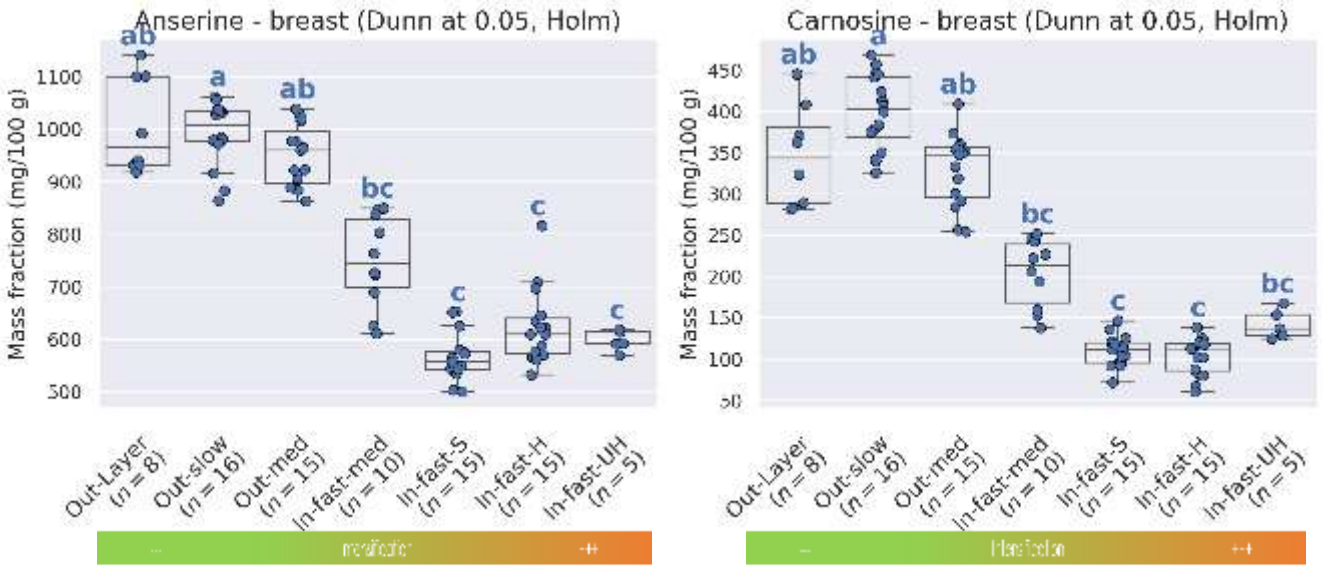


More non-digested protein in the heavy-fast-growing system

Higher levels of undigested protein and lower amino acid absorption by the end of the small intestine.

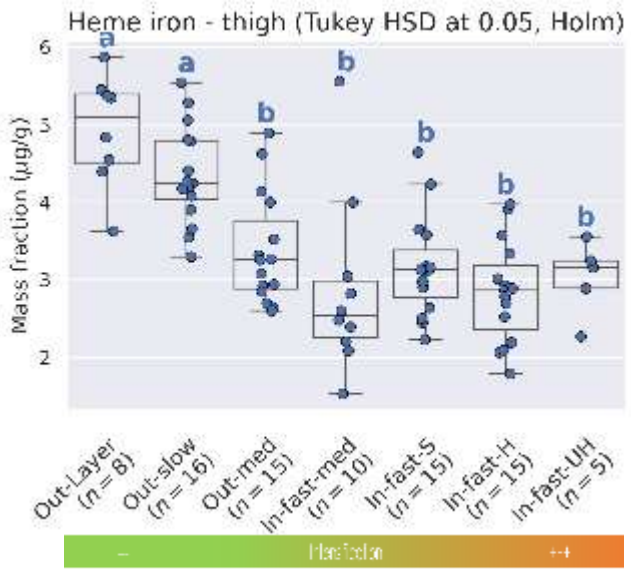
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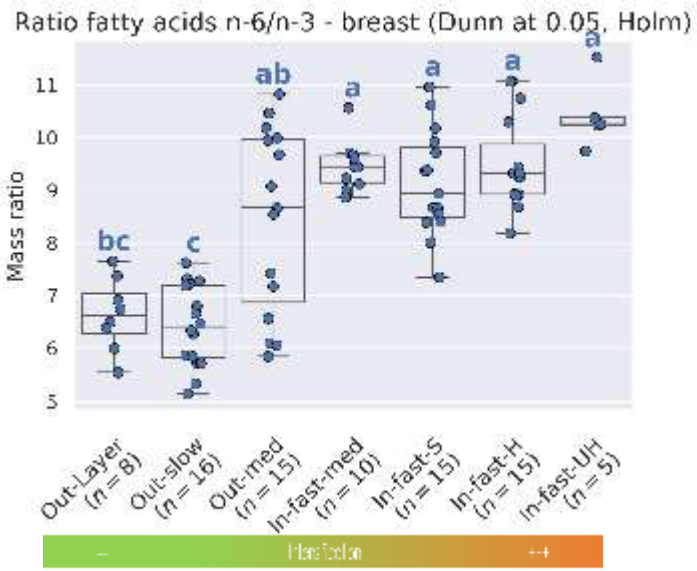
02. Health Value



Bioactive dipeptides (anserine and carnosine), with antioxidant benefits for aging, muscle function and cognition, decrease markedly in systems using fast-growing strains.

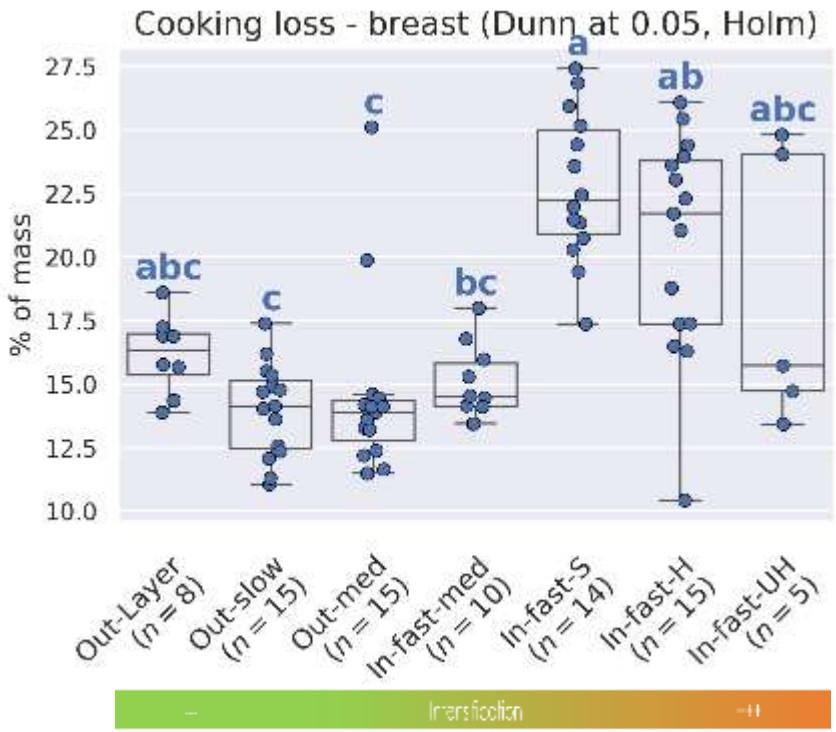
Heme iron content in thigh meat is higher in systems using the slowest-growing strains, whereas their ratio n-3/n-6 is lower in breast meat

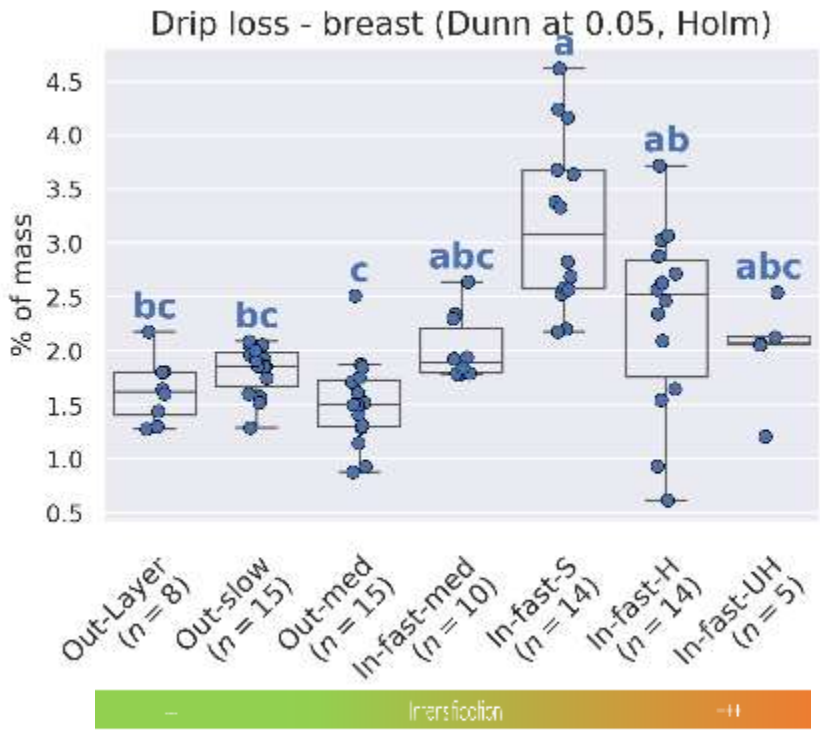




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02. Storage and processing ability





Water losses are highest in standard chickens, particularly after cooking, with substantial variability among fast-growing systems.

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02. Breast muscle defects



White striping

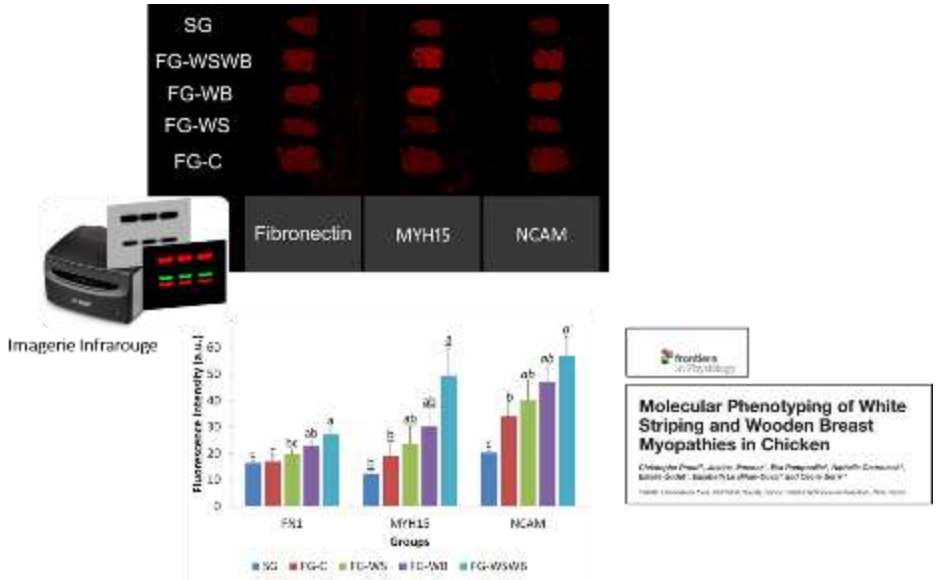


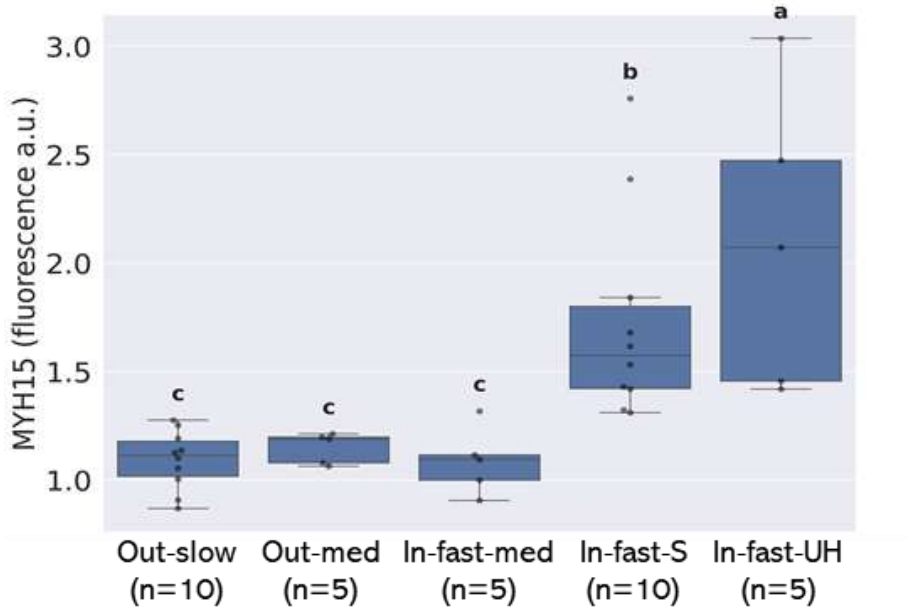
Wooden breast



Spaghetti meat

Visual scoring confirmed a higher prevalence and severity of myopathies in fast-growing strains, further supported by increased MyH15 levels, a regenerative myosin marker of WS and WB.





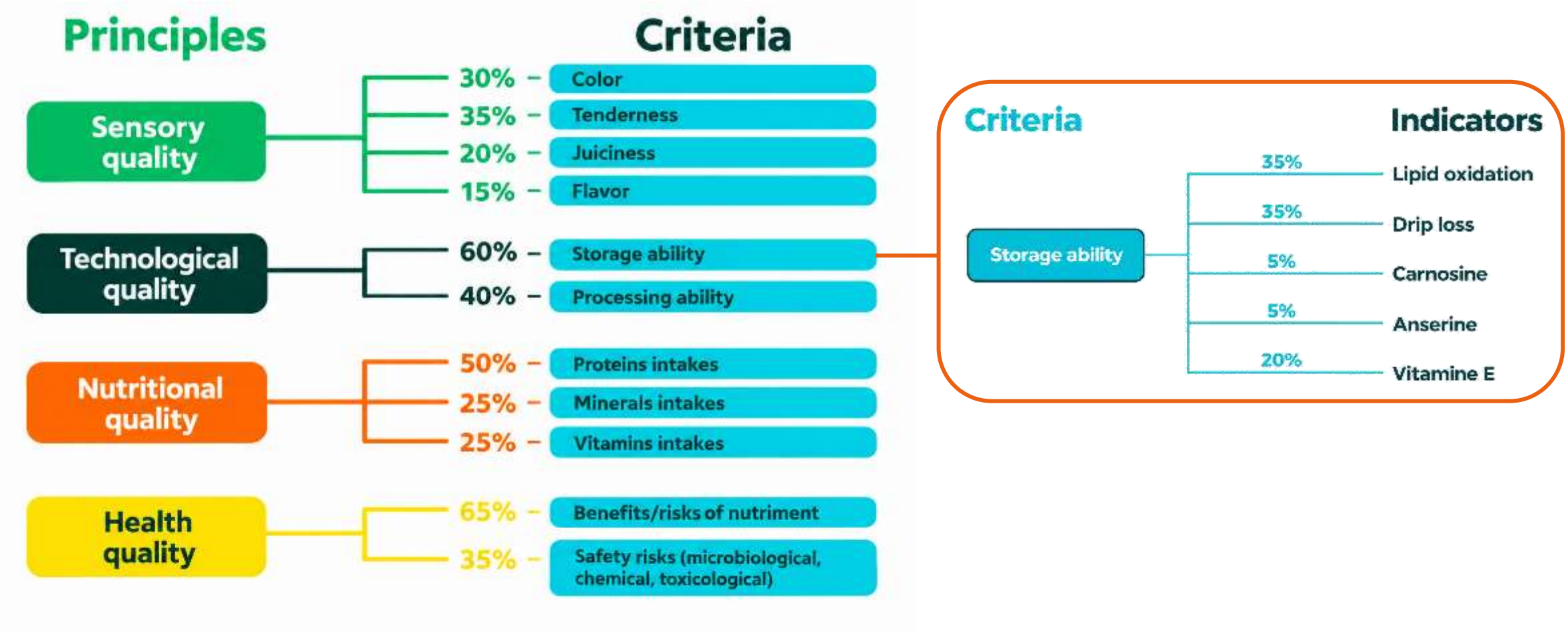
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3. Tools

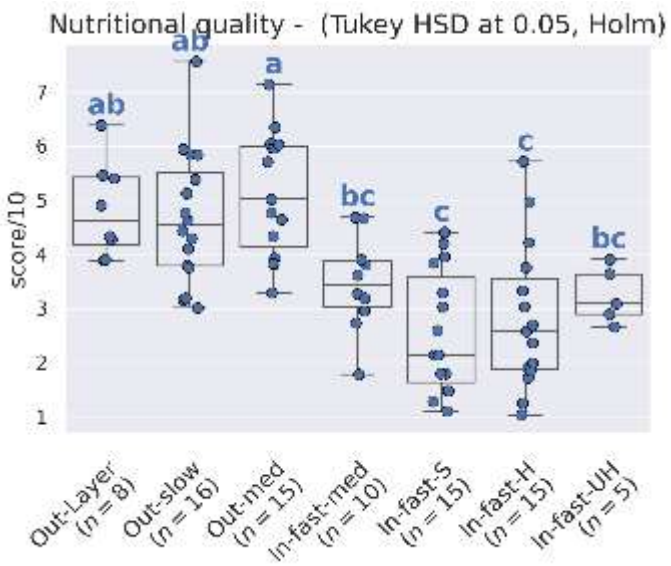


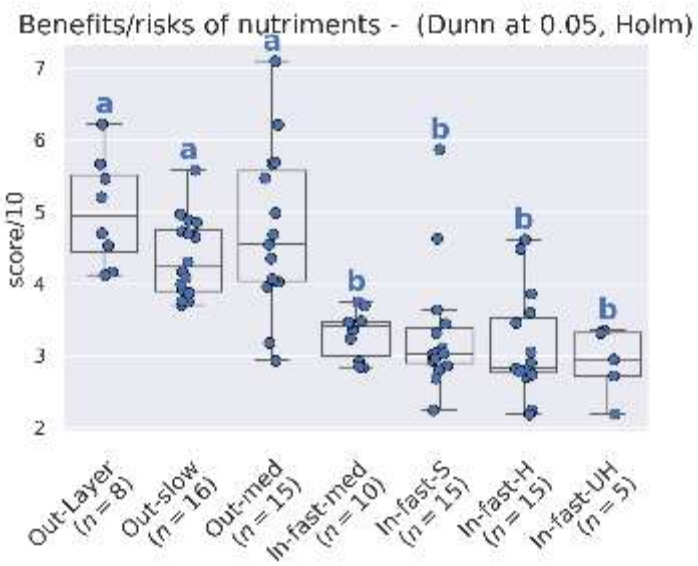
03. Multicriteria assessment of breast meat quality



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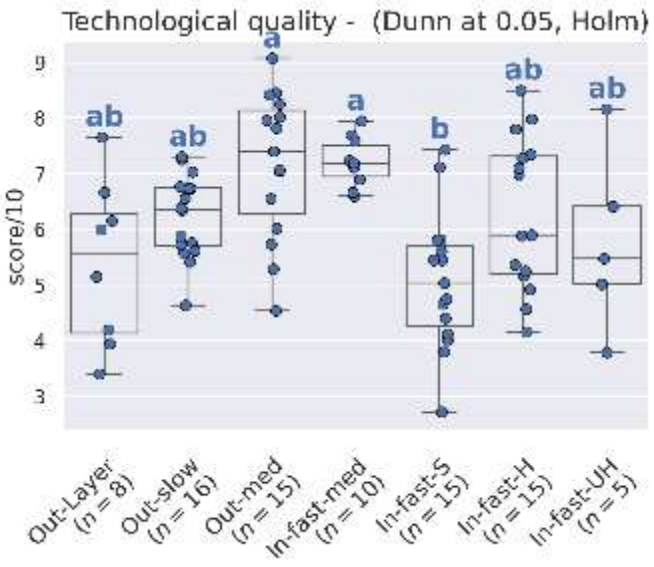
03. Multicriteria scores

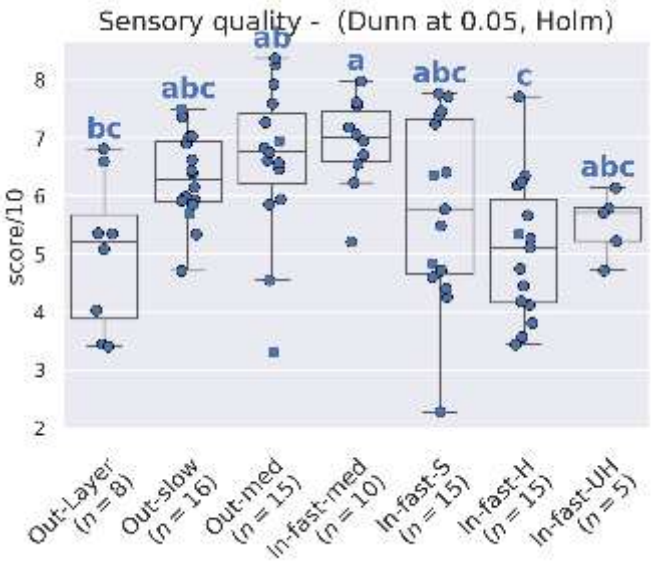




Better nutritional and health value in the slowest-growing production systems

Medium- and fast-medium growing systems perform well in terms of technological and sensory quality

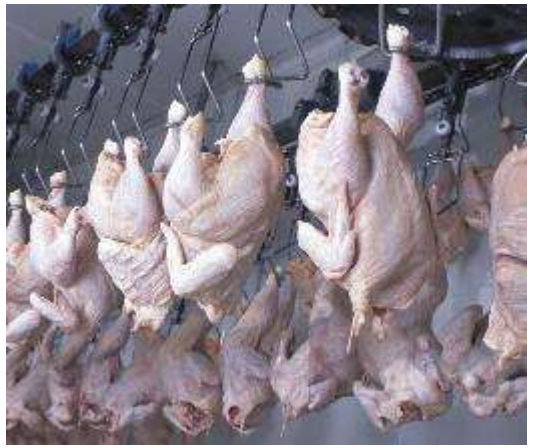


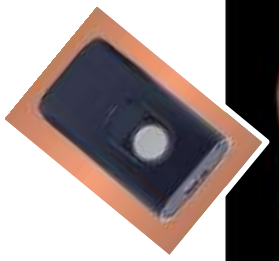


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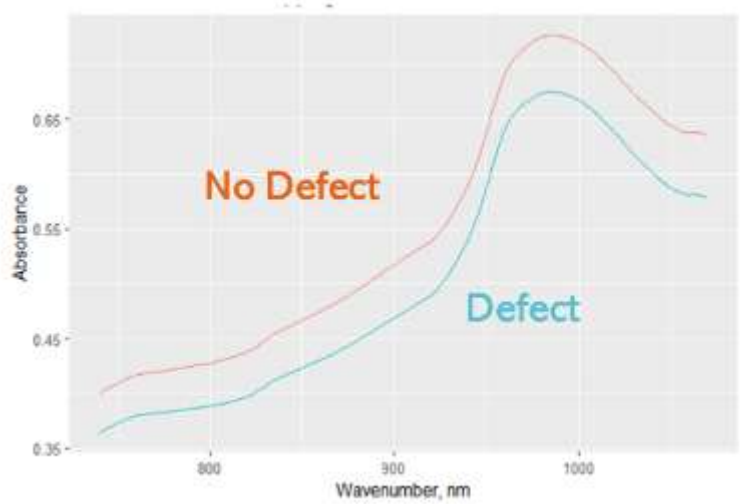
03. Near-infrared Scio pocket tool

Scoring of breast muscle myopathies at slaughter plant









Category	Accuracy
No Defect vs. Defect (WS and/or WB and/or SB)	74%
SM (No Defect vs. SB and other)	51%
WS (No Defect vs. WS and other)	80%
WB (No Defect vs. WB and other)	75%

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03. Genetic authentication of meat produced under Label Rouge



46 slow-growing crosses are approved for **outdoor Label Rouge chicken production**, of which 21 are currently used in practice.

The genetic test developed makes it possible to **authenticate Label Rouge** chicken meat and verify that it comes from one of these **approved genetic crosses**.

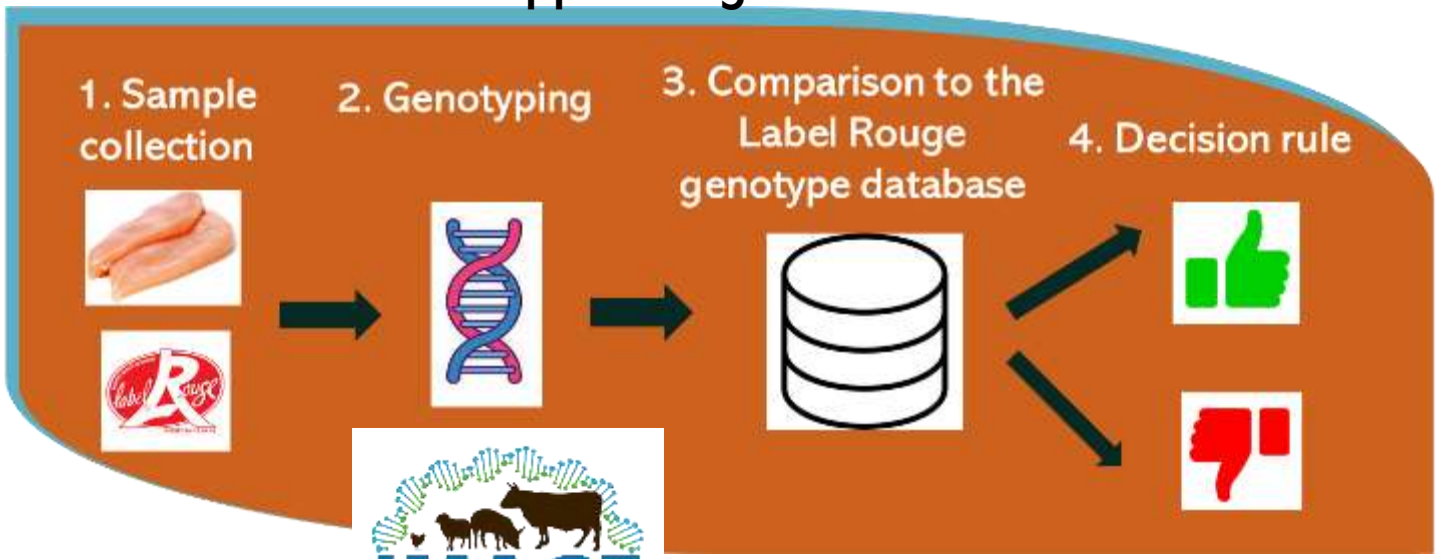


IMAGE
Innovative Management of Animal Genetic Resources

Genotyping using the multispecies IMAGE SNP chip (8583 SNPs)

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04. Take-home messages

- **No single production system delivers the best quality across all criteria.** Genetics, growth rate and production practices shape the intrinsic quality of chicken meat.
- **Faster growth increases breast meat yield but involves trade-offs:** lower protein content and amino acid digestibility, reduced levels of bioactive dipeptides and more muscle defects.
- **Different systems offer different quality benefits:** the slowest-growing systems generally perform better for nutritional and health-related traits, while medium- and fast-medium-growing systems achieve good technological and sensory quality.
- However, regardless of the production system, **chicken meat remains a highly nutritious and safe food**, with no potentially harmful substances detected on any of the farms studied.
- **Objective tools can support progress:** muscle-defect scoring at slaughter and genetic authentication can improve quality monitoring and verify product claims.

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