European Federation of Animal Science (EAAP)

Dr. Shannon McLaughlin

Current prediction and authentication tools used and needed in EU livestock product chains

Aims and Objectives

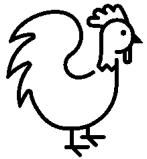
1. Overview of current prediction and authentication tools used to assess livestock product quality

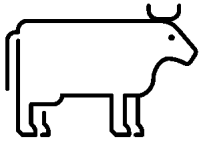
2. Explore expectations and constraints faced by actors using current tools and methods

3. Identify the priority quality attributes in which novel and/or rapid tools should be developed

4. Assess stakeholder concerns regarding the development of novel and/or rapid tools

Develop innovative tools to determine and predict the most relevant quality traits of chicken, beef, and dairy products





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Methodology

- Online survey sent to laboratories, processors, advisors and retailers in **France** (n=34), **Germany** (n=24), **Italy** (n=14), and **UK** (n=21)
- Covering professionals assessing the product quality of **chicken** (n=49), **beef** (n=51), and **dairy** (n=66) and a range of lab types (private, public, commercial, research)
- Mixed survey (closed and open-ended questionnaire)
- Survey outline:

  Section 1: Introductory questions about profession, lab, products

  Section 2: Current practices- Analytical and authentication tools

  Section 3: Future needs for analytical and authentication tools

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Results and Discussion

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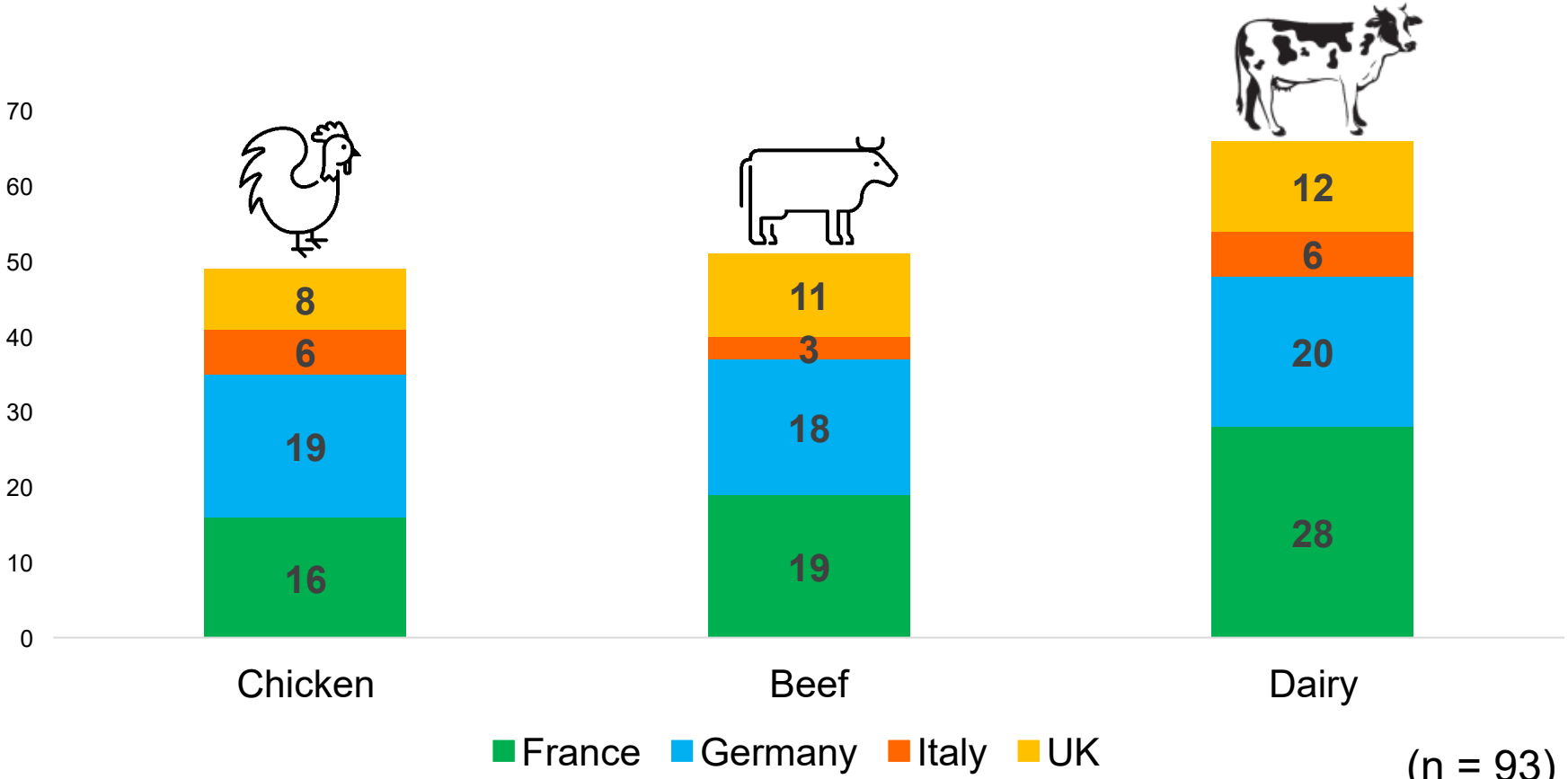
Responses by product & country



(n = 93)

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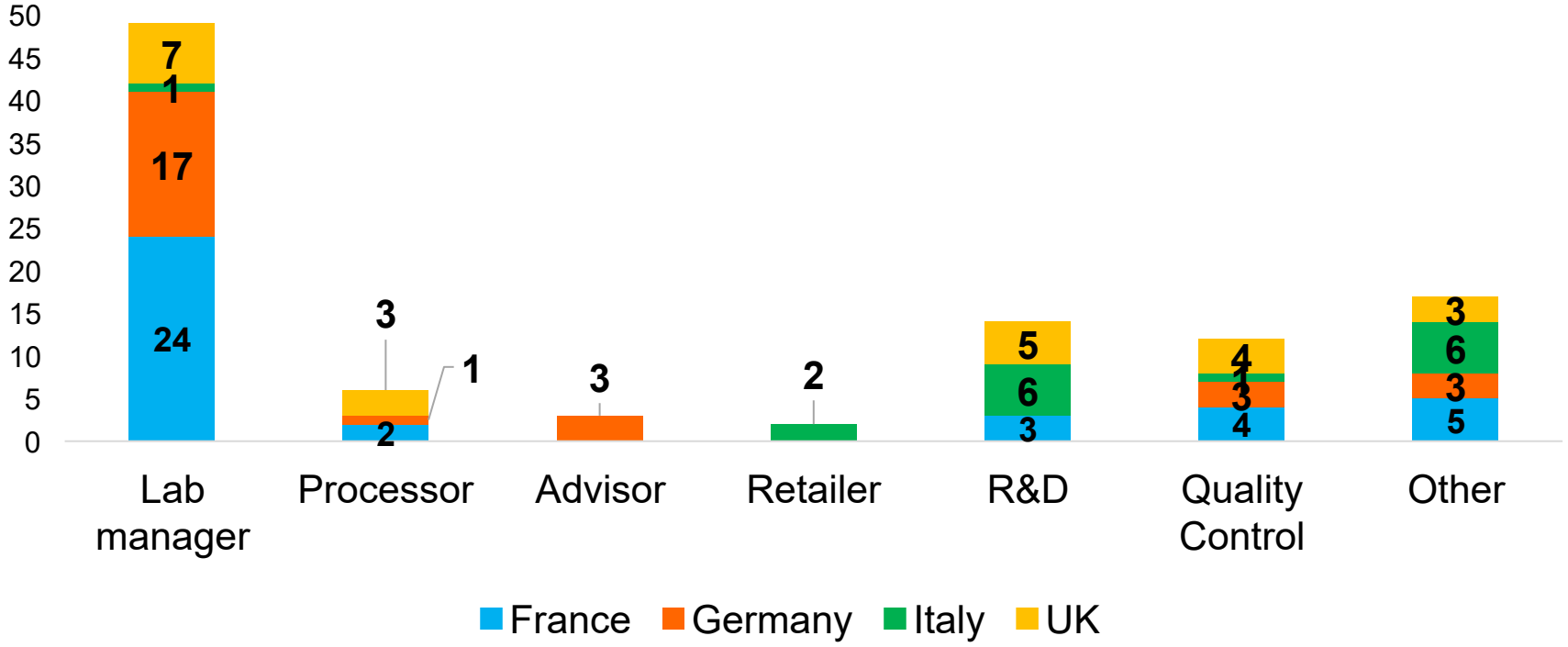
Profession of respondents



(n =89)

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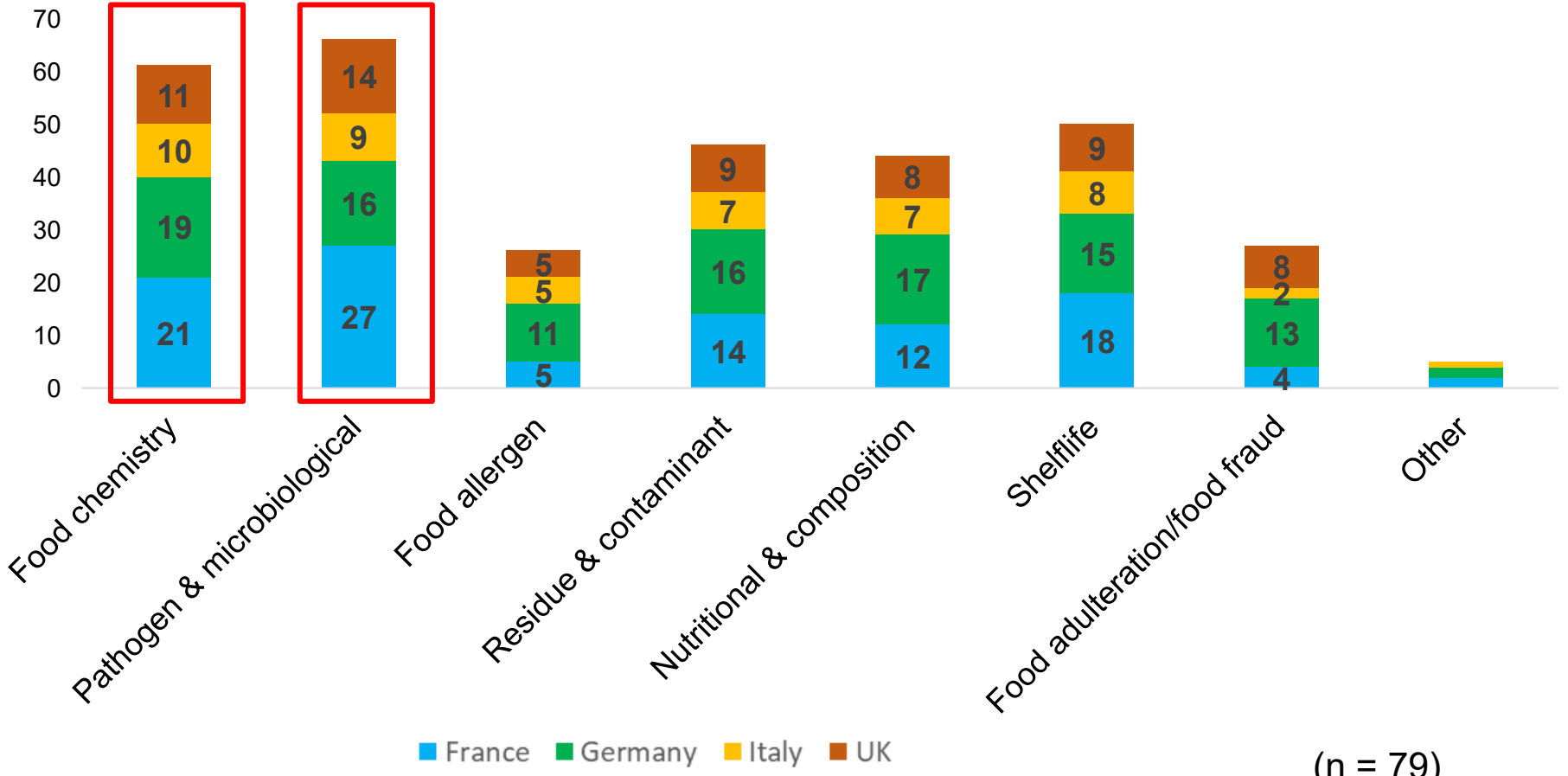
Current analytical methods



(n = 79)

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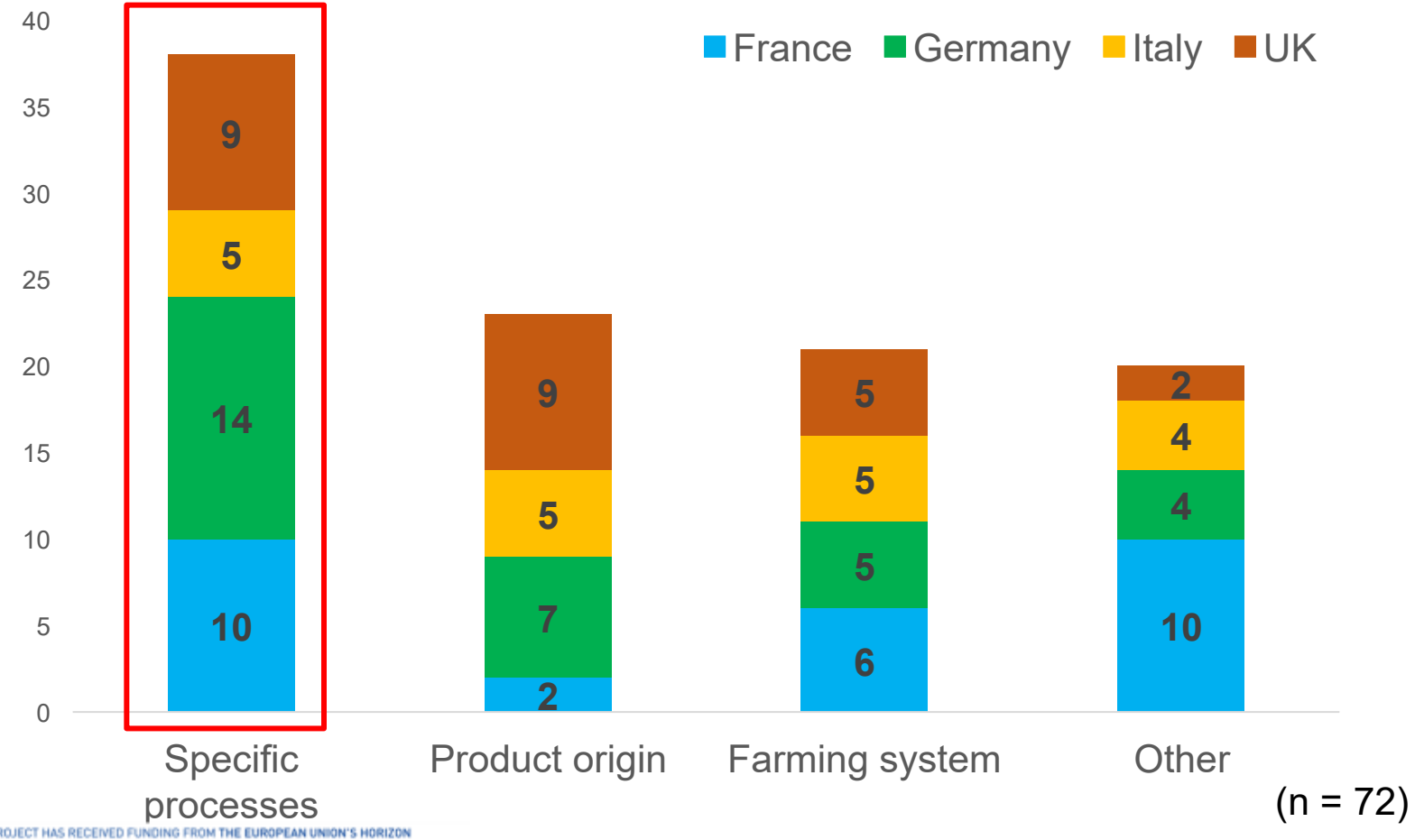
Current authentication methods



(n = 72)

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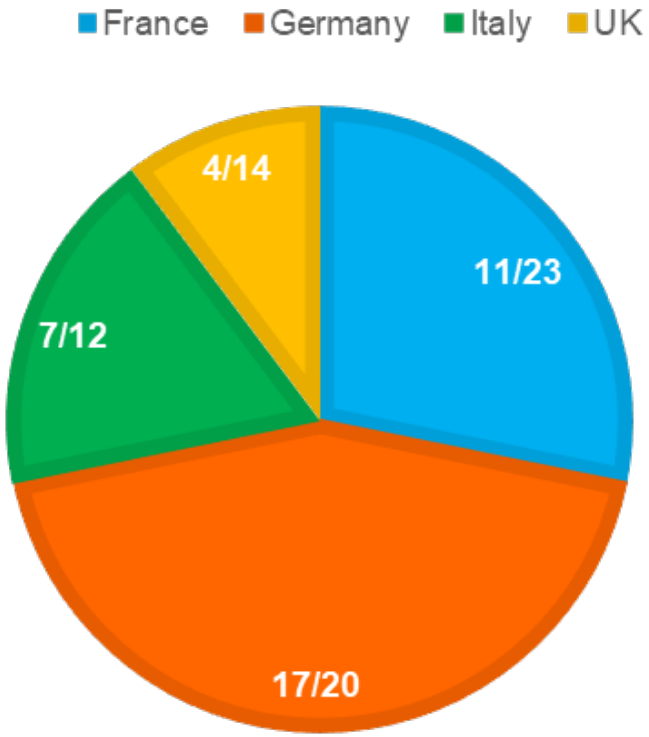
Use of NIR/MIR devices



- 56% using NIR/MIR devices
- Milkoscan, MPA NIR Solid, NIR Flex N-500, NIRFoodScan common devices being used
- **France**: Milk and dairy products, Animal feed, Chicken, Grains
- **Germany**: Meat and meat products, e.g., sausages, fish, Milk and dairy products, Feed, Honey, Juice
- **Italy**: Milk and dairy products, Feed
- **UK**: Milk and dairy products, Herbs and spices

(n = 69)

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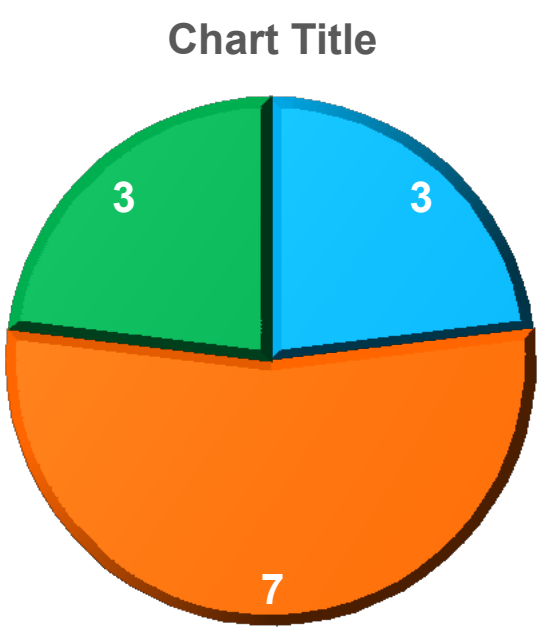
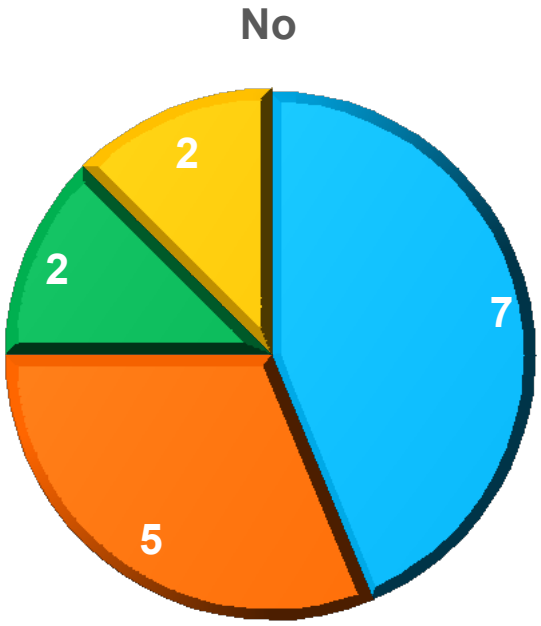
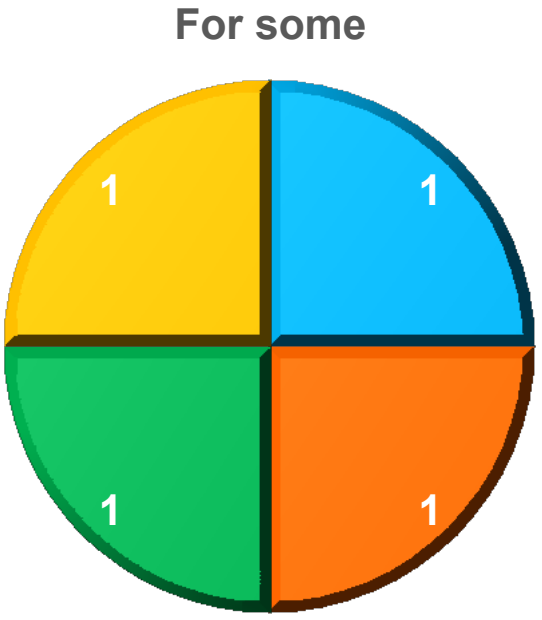
Does use of NIR/MIR involve sample destruction?



n = 13



n = 16



n = 4

France Germany Italy UK

(n = 62)

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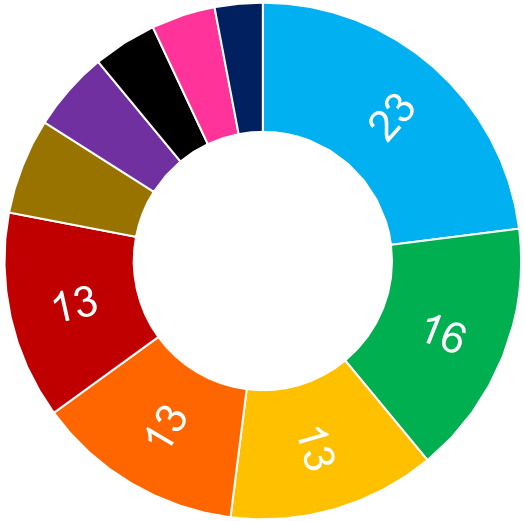
Non-routine analytical methods



- Gas chromatography
- Stereoisomeric analysis
- Metabolomics
- Genomics
- Physico-chemical methods
- None of the above
- High-performance liquid chromatography
- Isotope ratio
- Proteomics
- Spectroscopic methods
- Non-target Liquid chromatography

(n = 55)

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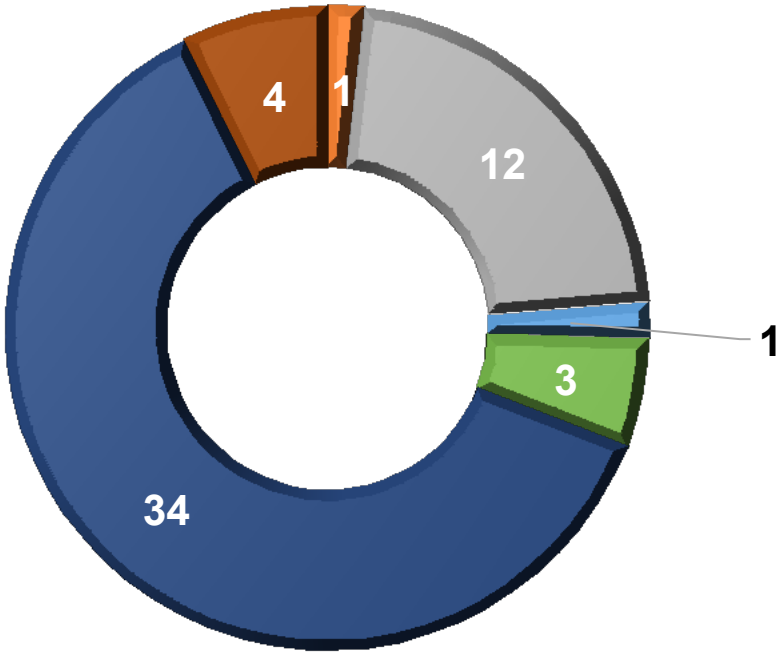
Non-routine authentication methods



- Comet assay
- Real time Polymerase Chain Reaction (qPCR)
- Genotyping of repetitive sequences
- None of the above
- Single nucleotide polymorphisms
- Amplified fragment length polymorphism
- Isotope ratios MS
- Other

(n = 52)

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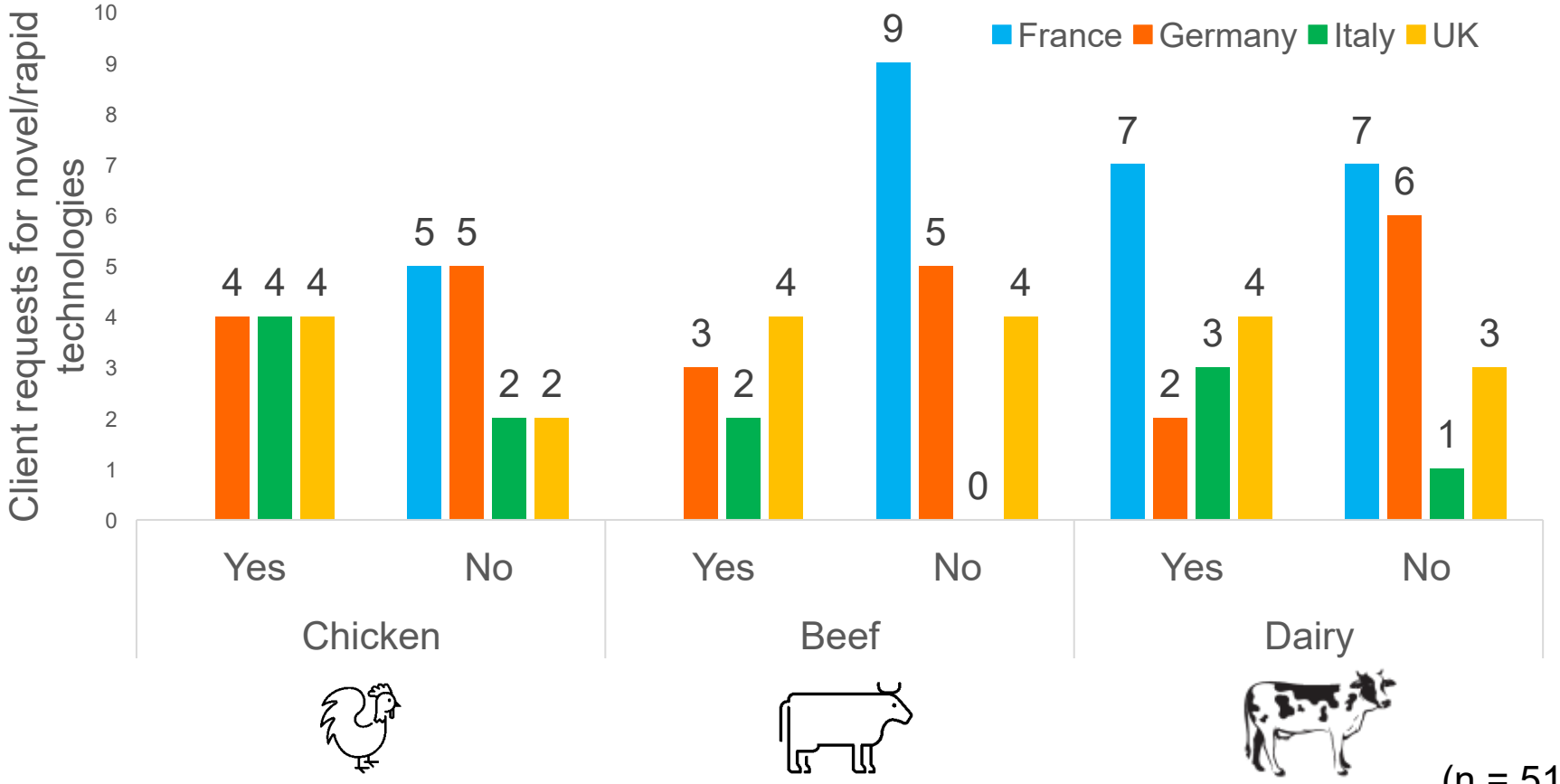
Future needs for analytical and authentication tools



(n = 51)

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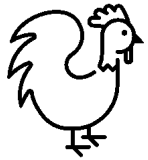
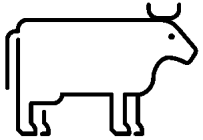
Need for rapid/novel methods to assess quality

Key quality traits listed as being very important to have rapid or novel methods

	France	Germany	Italy	UK
	Pathogens	Antibiotic residues, antibiotic resistance, pathogens	Tenderness, taste, overal liking, shelf life, antibiotic resistance	Shelflife, pathogens
	Shelflife, pathogens	Farming system	Colour, tenderness, taste, overall liking, acceptability, antibiotic residues,	Tenderness, pathogens
	Pathogens, antibiotic residues	Process, farming system	Shelf life, antibiotic residues, pathogens	Antibiotic residues

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Concerns about rapid/novel methods

Top concerns listed by country

n = 18

- Devices have correct software/calibration models
- Lack of demand

n = 10

- Devices have correct software/calibration models
- Cost of equipment

n = 9

- Cost of equipment

n = 7

- Devices have correct software/calibration models

(n = 44)

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Conclusions

- Labs in the sample most commonly using:
  - Analytical methods to determine shelf life/microbiology and food chemistry
  - Authentication methods to assess specific processes, e.g., meat cuts, ageing of meat, heat treatment (milk)
- Respondents stating there is a need to develop novel, rapid methods in relation to:
  - Shelf life/microbiological, antibiotic residues and resistance, pathogens
- Top concerns regarding novel, rapid methods:
  - Ensuring devices have correct software/calibration models
  - Cost of equipment

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Thank you
Any questions?

INovative Tools for Assessment and Authentication of chicken meat, beef and dairy products' QualiTies

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