



Consumer preferences for cheeses derived from the milk of goats reared under different farming systems

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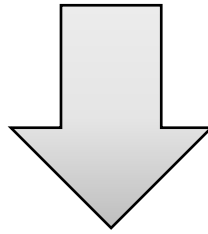
Introduction

- Goats are present throughout the world holding significant agroecological, socioeconomic and nutritional importance.
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- Intensive production practices can satisfy the increasing consumer demands for goat products, but they may also undermine animal health and welfare.
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- Extensive farming systems are considered less invasive, more sustainable, and capable of satisfying the physiological, ethological, and developmental demands of animals.



Introduction

There is the notion that products deriving from animals reared under extensive farming systems are better in quality.



The objective of this study was to investigate the consumers' possible preferences for cheeses made with milk from goats reared under either intensive or extensive farming systems.

Materials and Methods

Cheese A

- Semi-hard goat cheese with surface mould.
- Two types were produced using milk from Alpine goats reared under intensive and extensive farming systems in Italy and Switzerland, respectively. Same recipe was followed.
- Assessed in Italy, Switzerland, and the Netherlands.



Cheese B

- White goat cheese preserved in brine following a ripening period of 3 months
- Two types were made with milk from Skopelos goats reared under intensive and extensive farming systems in Greece. Same recipe was followed.
- Assessed at two different locations in Greece.



Materials and Methods



Extensive farm – Skopelos goats



Intensive farm – Skopelos goats



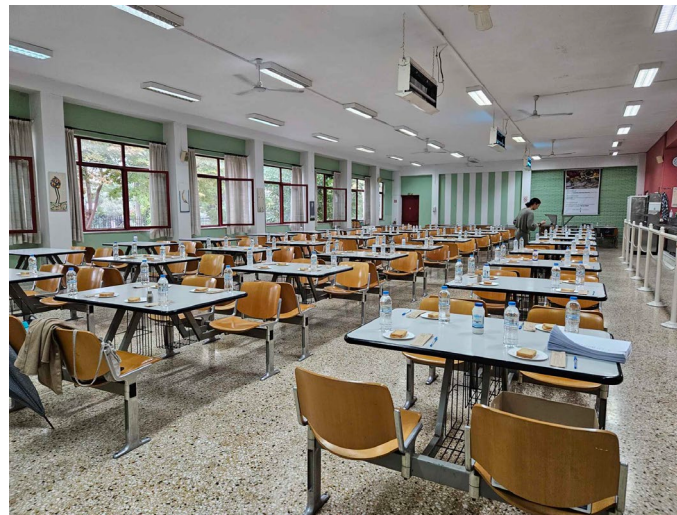
Extensive farm – Alpine goats



Intensive farm – Alpine goats

Materials and Methods

- At least 100 consumers participated in each panel site deriving from various backgrounds (age, ethnicity, gender). All assessors consumed goat cheese and had no health issues.
- The tasting sessions took place in the morning in well-lit areas isolated from noises and strange odours.
- Each panellist was served i) low-salt crackers, ii) plenty of water, and iii) 2 samples of the same cheese type (1 intensive and 1 extensive) identical in size, shape, temperature, and labelled with 3-digit random numbers.



Materials and Methods

A. Questionnaire:

- Age, gender, ethnicity, goat cheese consumption frequency, the most important factor when buying animal-derived products, perception on the link between the product quality and the farming system.

B. Scoring Cards (10 cm anchored line scale to evaluate the sample's traits)

- Appearance, elasticity, distinctive aroma, hardness, off-flavour, overall impression (common for Cheese A and Cheese B).
- Pastiness, creaminess, ammonia flavour intensity, mushroom flavour intensity (Cheese A).
- Crumbliness, distinctive flavour, saltiness, sourness, bitterness, overall taste impression (Cheese B).

C. Preference test

D. Participation consent and personal data protection

code: re-farm

SAMPLE CODE:

1. Observe the sample and rate its appearance:

0 _____ 10
Dislike extremely Like extremely

2. Gently squeeze the sample with your fingers and rate its elasticity:

0 _____ 10
Not at all Very

3. Smell the cheese and rate its distinctive aroma:

0 _____ 10
Not at all Very

4. Gently squeeze the sample with your teeth, then rate how hard they are:

0 _____ 10
Not at all Very

5. Chew the sample two or three times and then use the scale to rate how crumbly it is:

0 _____ 10
Not at all Very

6. Chew some cheese with your mouth closed for a few seconds, then breathe out through your nose, and assess how strong the distinctive flavour is:

0 _____ 10
Not at all Very

7. Chew the sample and rate its taste:

• Salty: 0 _____ 10
Not at all Very

• Sour: 0 _____ 10
Not at all Very

• Bitter: 0 _____ 10
Not at all Very

• Overall: 0 _____ 10
Not at all Very

8. Notice if there is any off-flavour (undesirable) left in your mouth. How strong is it?

0 _____ 10
Not at all Very

❖ Statistical analysis (SPSS v.26) → Descriptives, ANOVA, Chi-square test

Materials and Methods

Taste panels at different sites

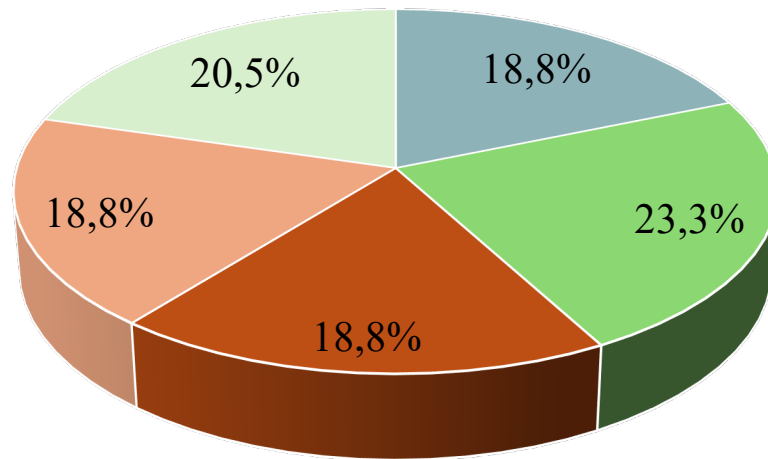




Results – Panellists’ Background I

- Totally 533 people were involved in the taste panels.

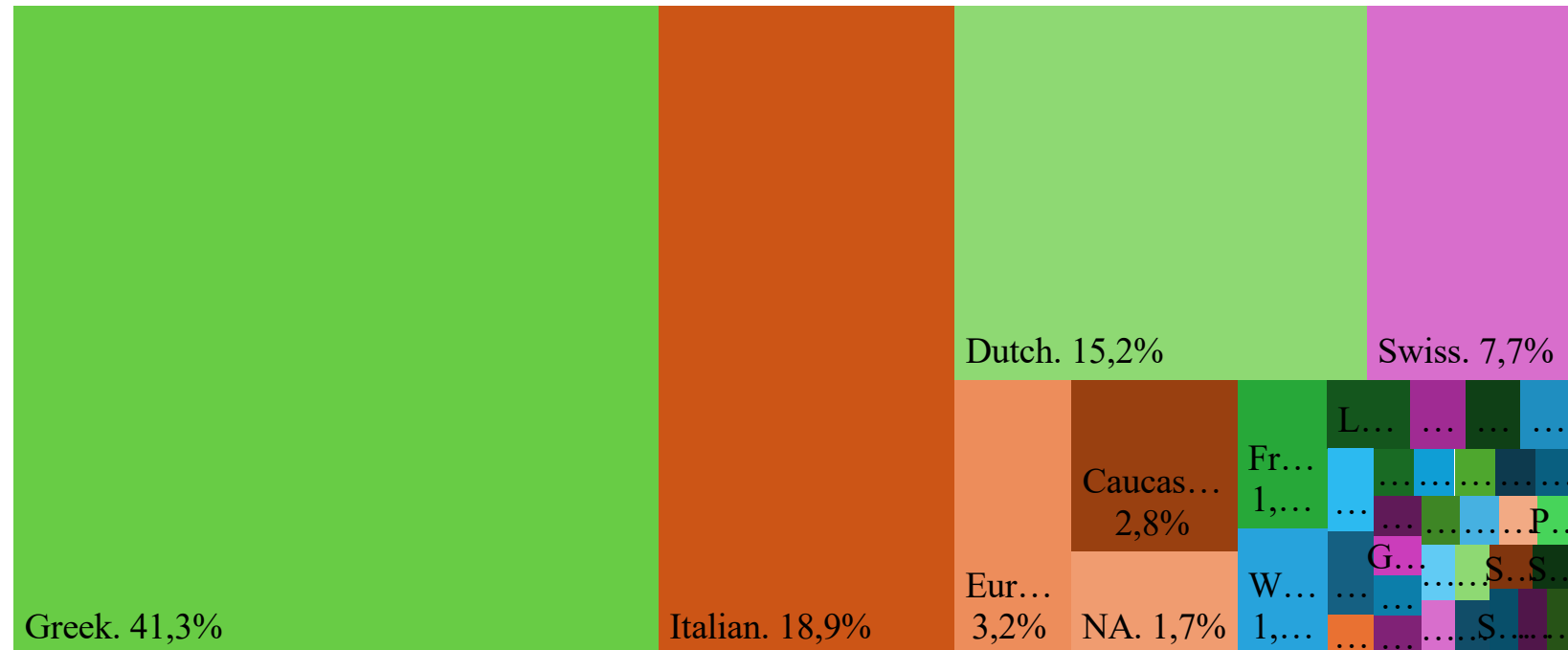
Participation per panel site



■ Greece (AUA) ■ Greece (AUTH)
■ Italy ■ Switzerland
■ The Netherlands

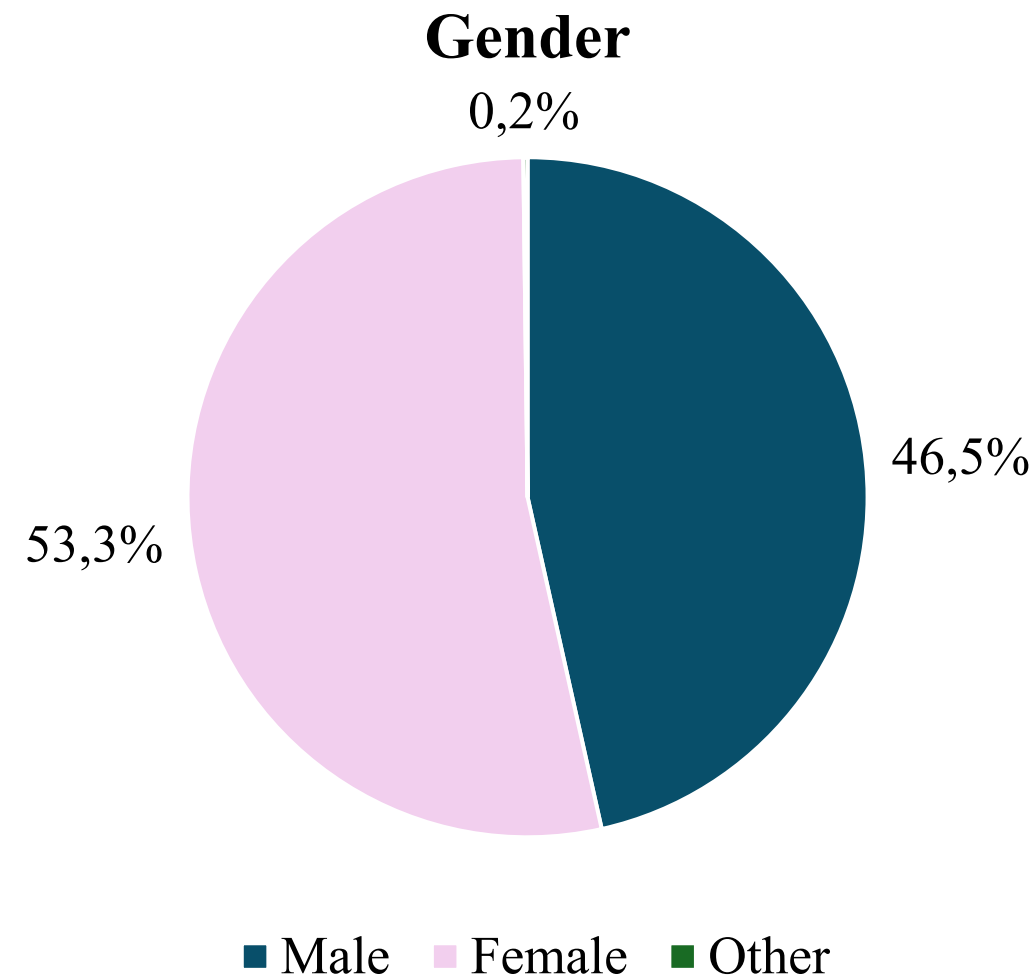
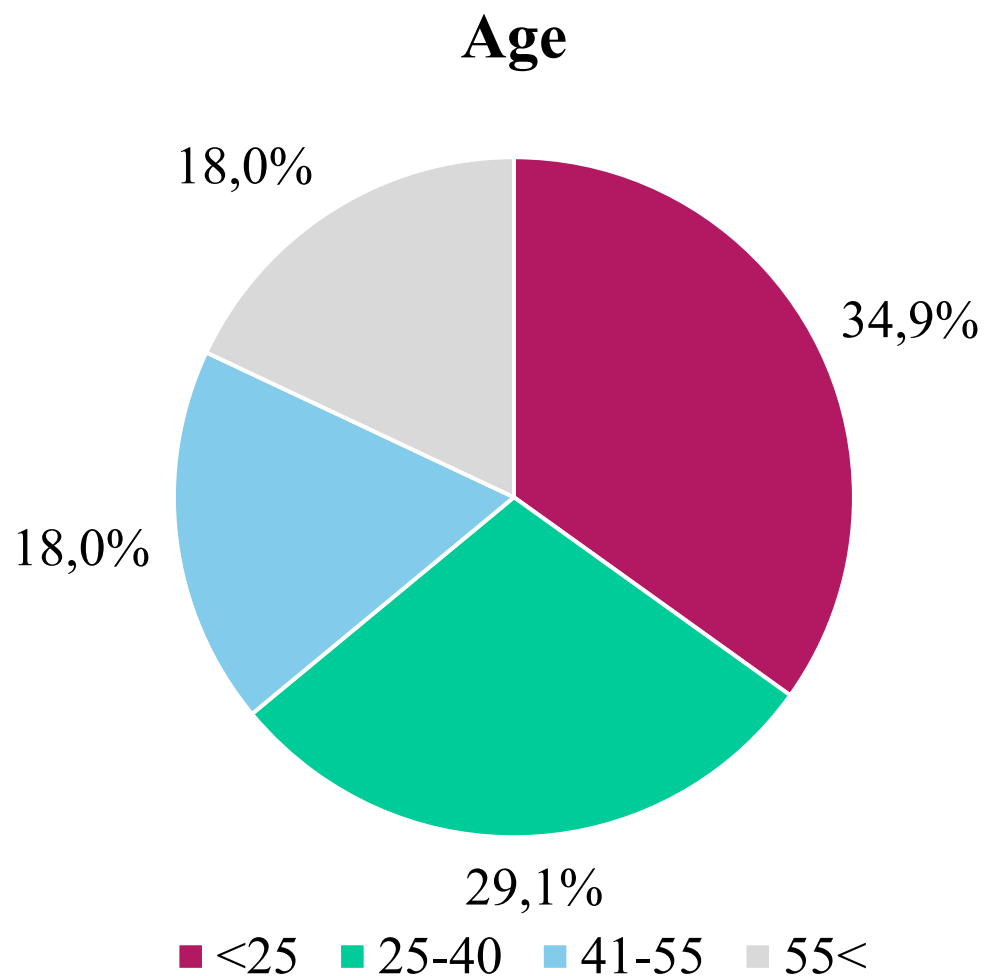
Ethnicity

■ African ■ Afro Venezuelan ■ Albanian ■ Arab ■ Armenian
■ Aruban ■ Bavarois ■ Caucasian ■ Chinese ■ Colombian
■ Corée ■ Dutch ■ Spanish ■ European ■ French
■ Friesian ■ German ■ Greek ■ Indian ■ Italian



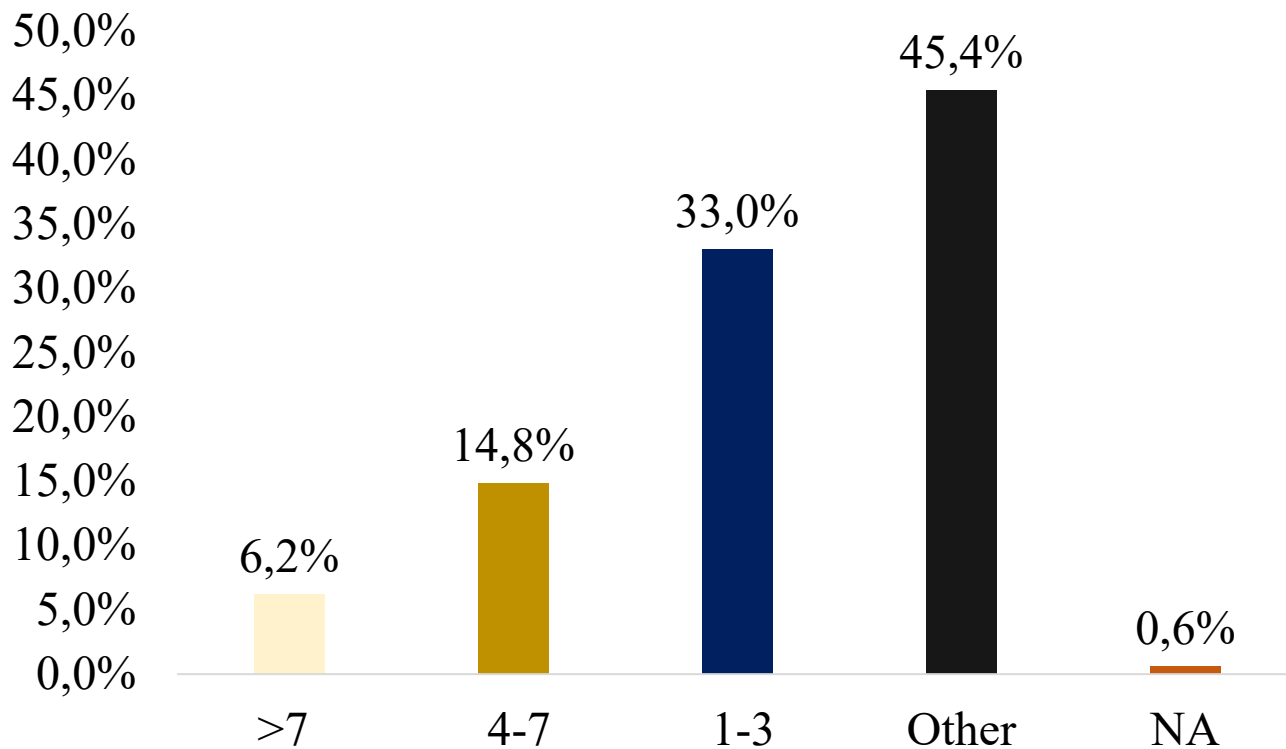


Results – Panellists’ Background II

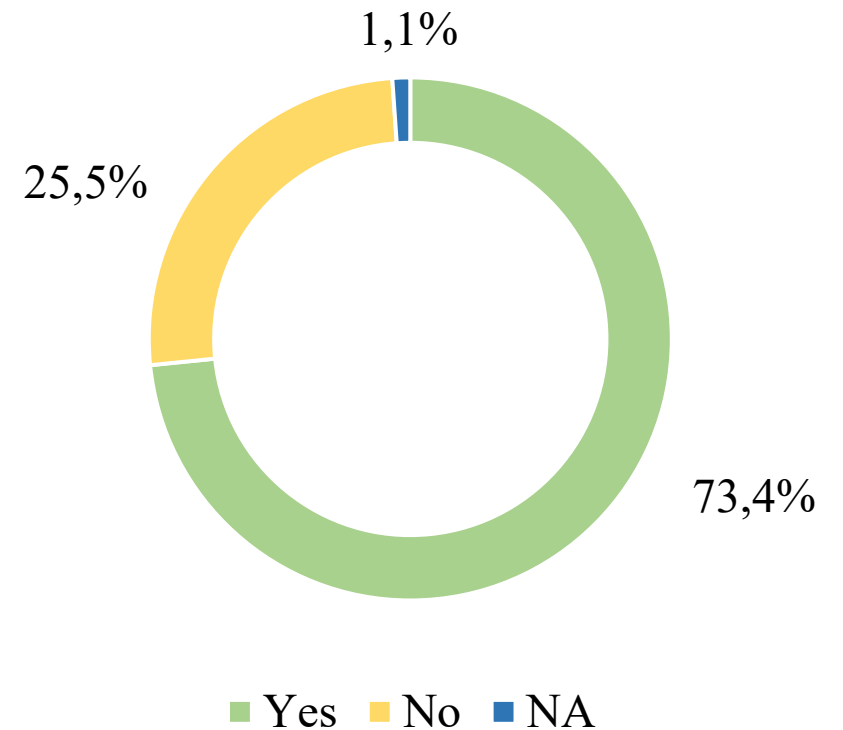


Results – Panellists’ Background III

**Goat cheese consumption frequency
(times/week)**



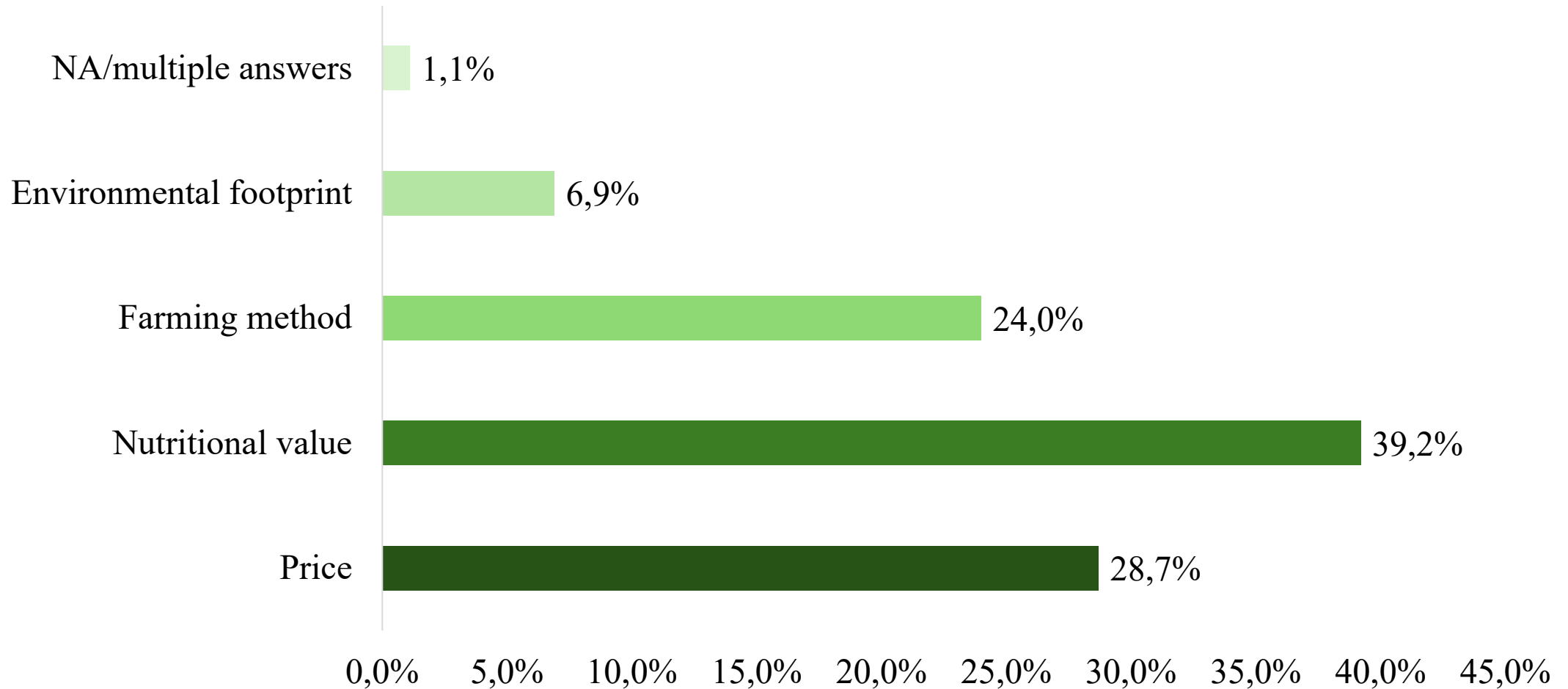
**Do you think that the production method is
linked with the product quality?**





Results – Panellists’ Background IV

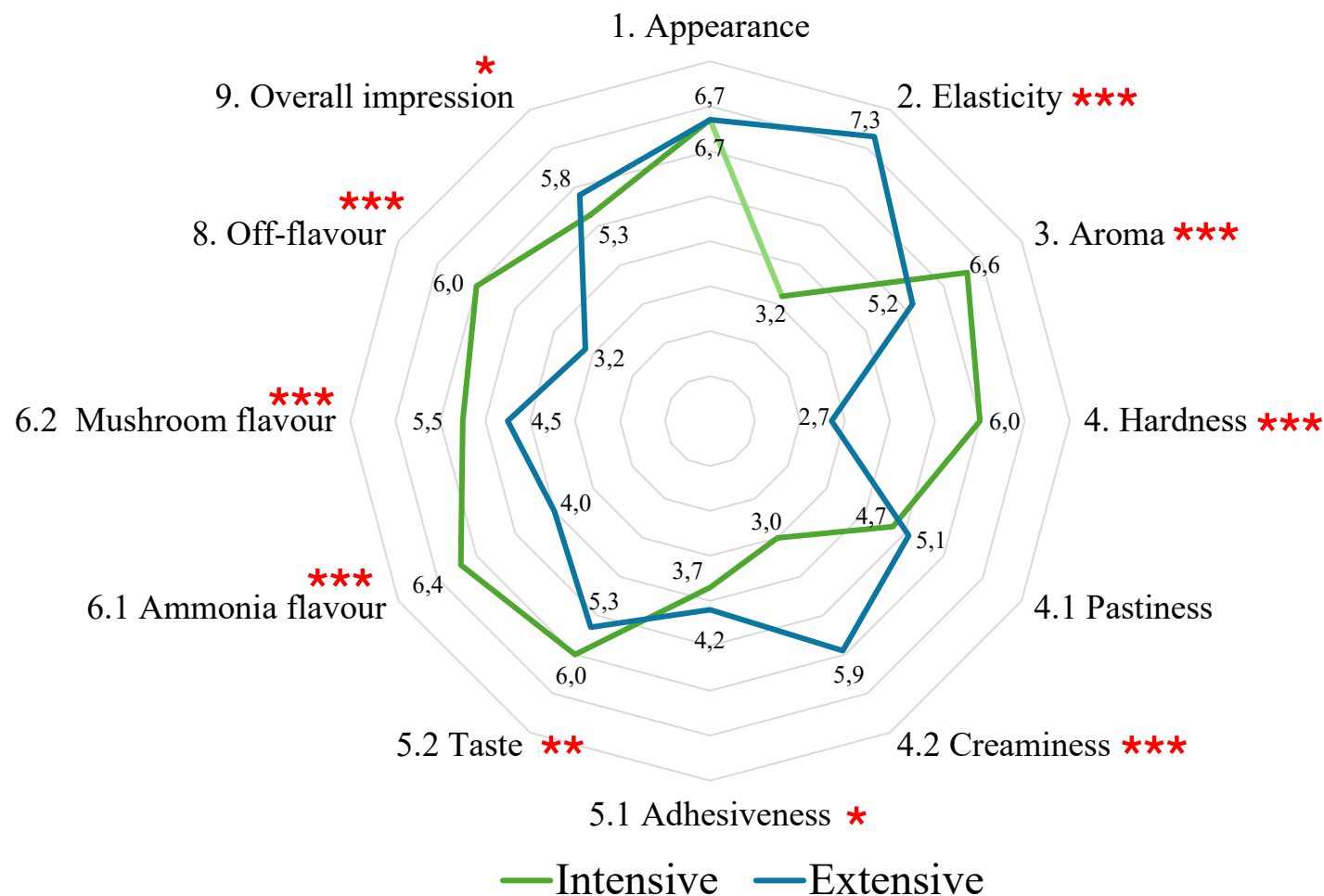
Most important factor when buying cheese



Results – Quality trait comparison

Cheese A – Semi-hard cheese

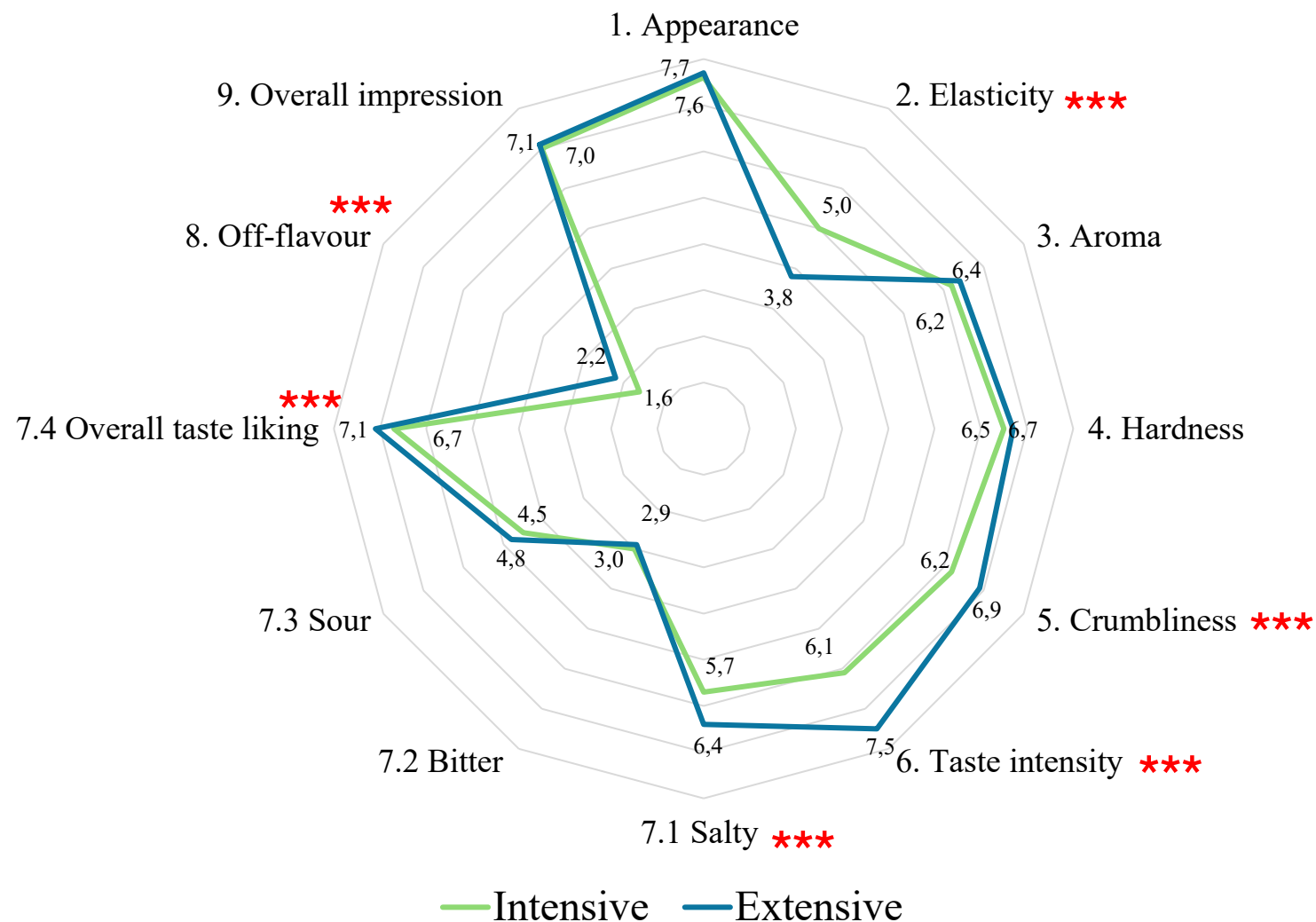
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$



Results – Quality trait comparison

Cheese B – White brine cheese

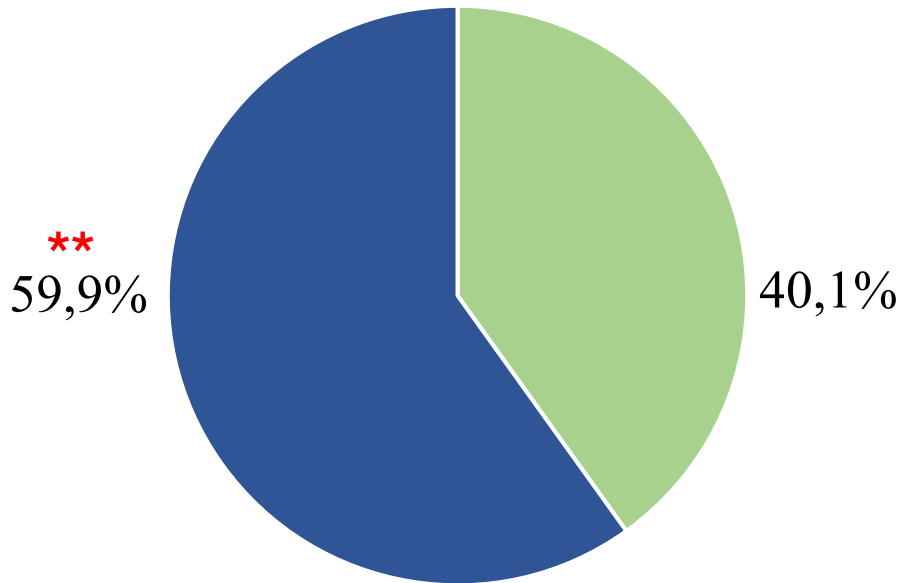
*** $p < 0.001$



Results - Overall Preference

****p < 0.01**

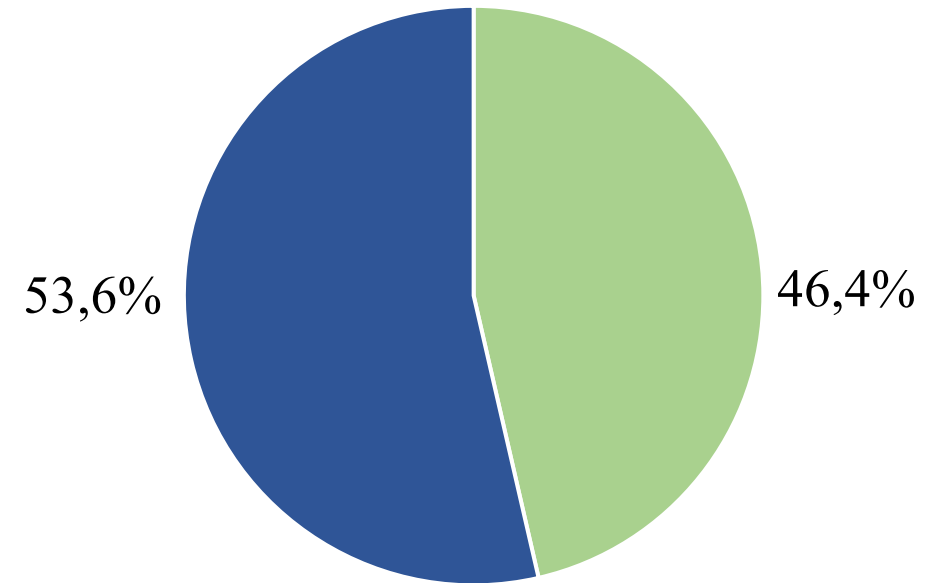
Cheese A – Semi-hard cheese



■ Intensive ■ Extensive

N = 297

Cheese B – White brine cheese



■ Intensive ■ Extensive

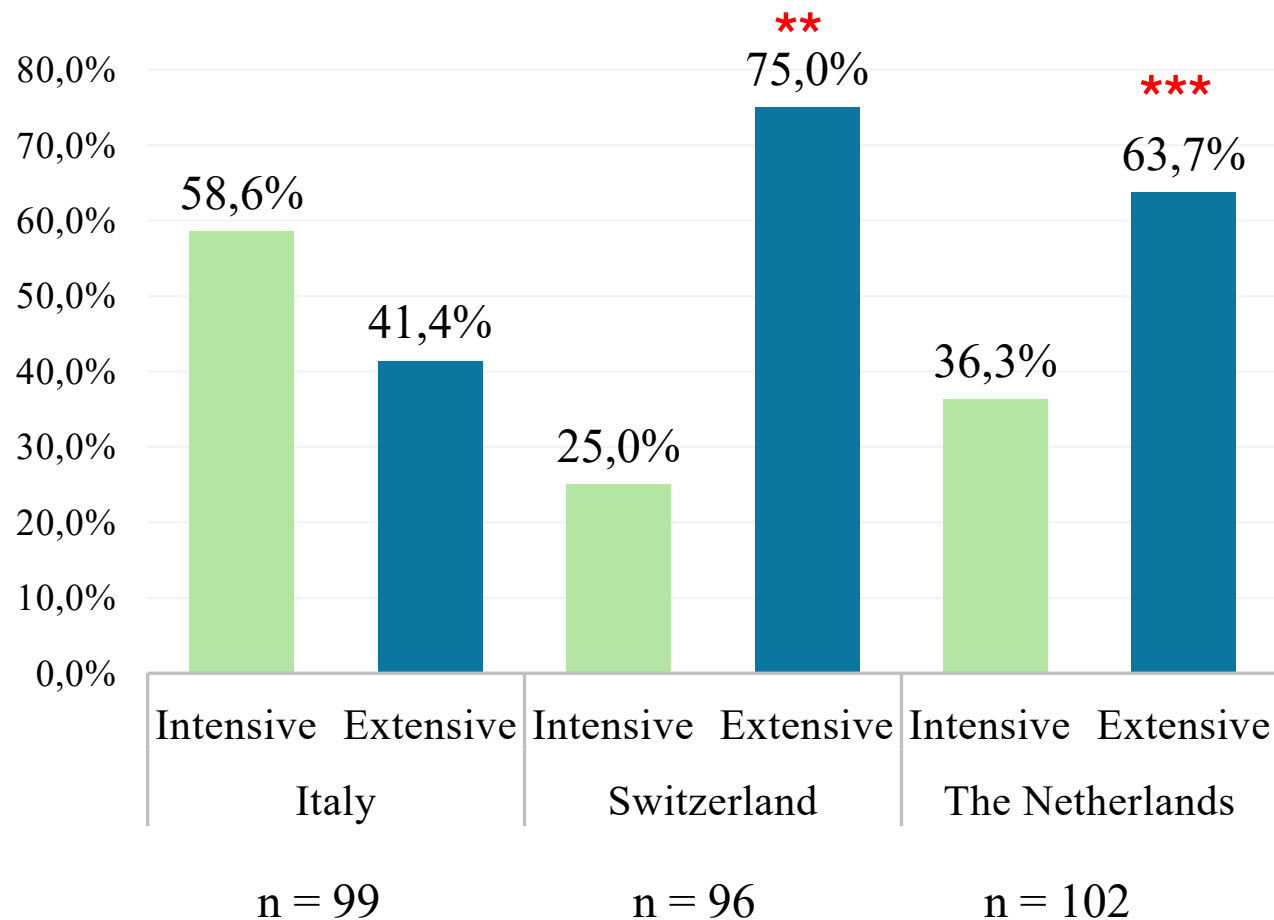
N = 194

Only 491 out of the 533 participants declared preference. The rest either preferred both or none and were not included in the final count.

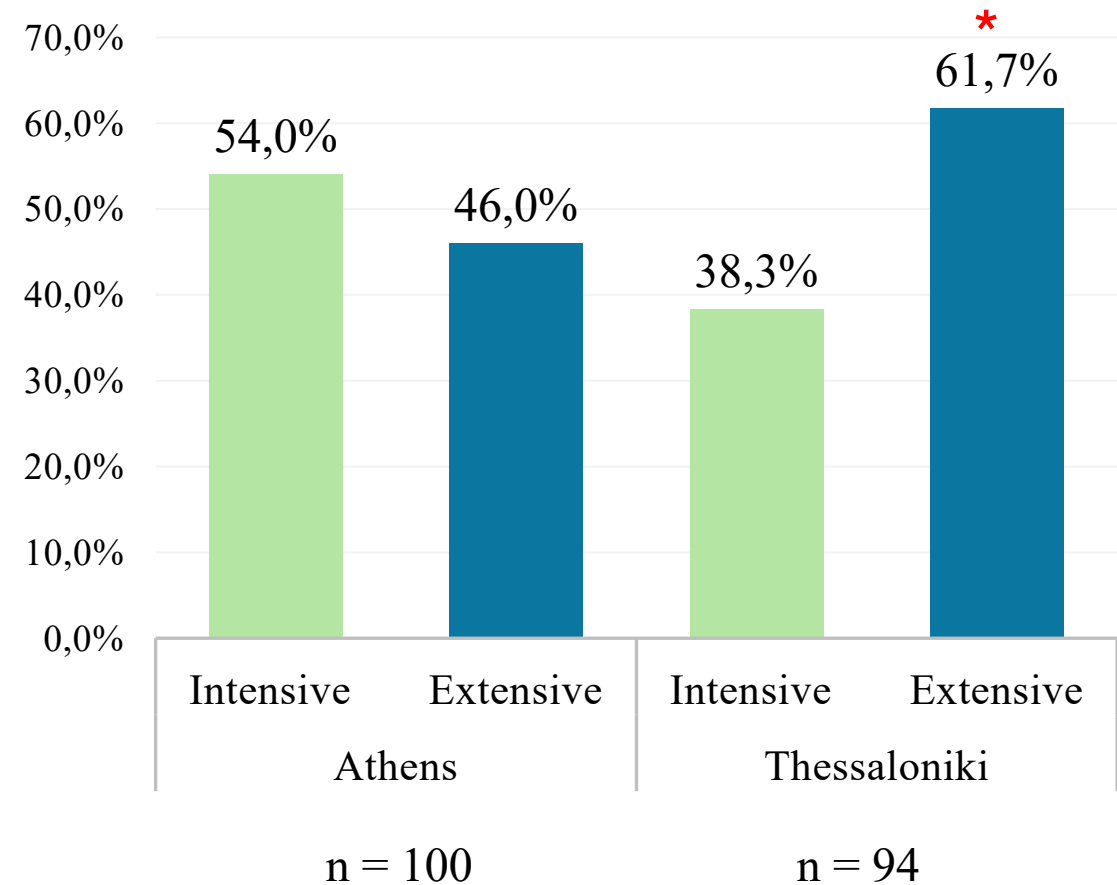
Results - Preference by Location

p < 0.01, *p < 0.001

Cheese A – Semi-hard cheese



Cheese B - White brine cheese

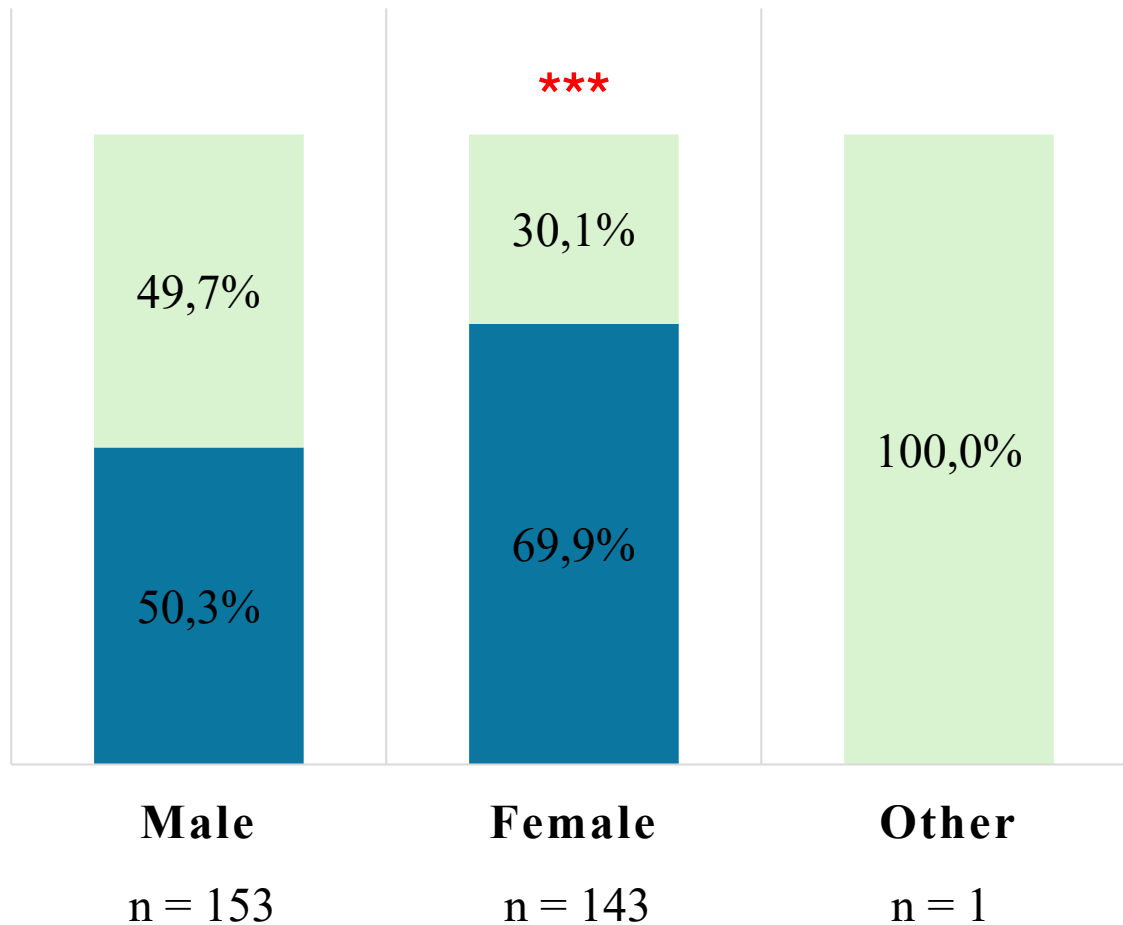


Results - Preference by Gender

p < 0.01, *p < 0.001

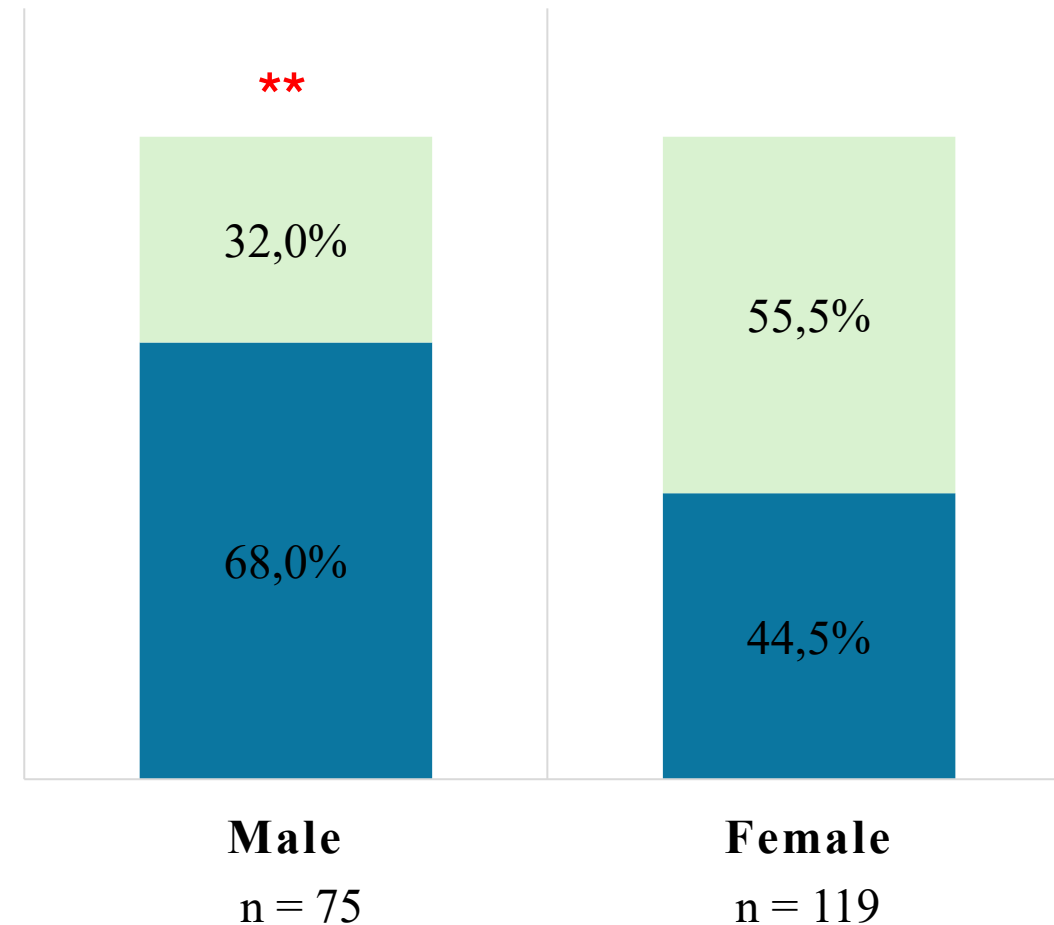
Cheese A - Semi-hard cheese

■ Extensive ■ Intensive



Cheese B – White brine cheese

■ Extensive ■ Intensive

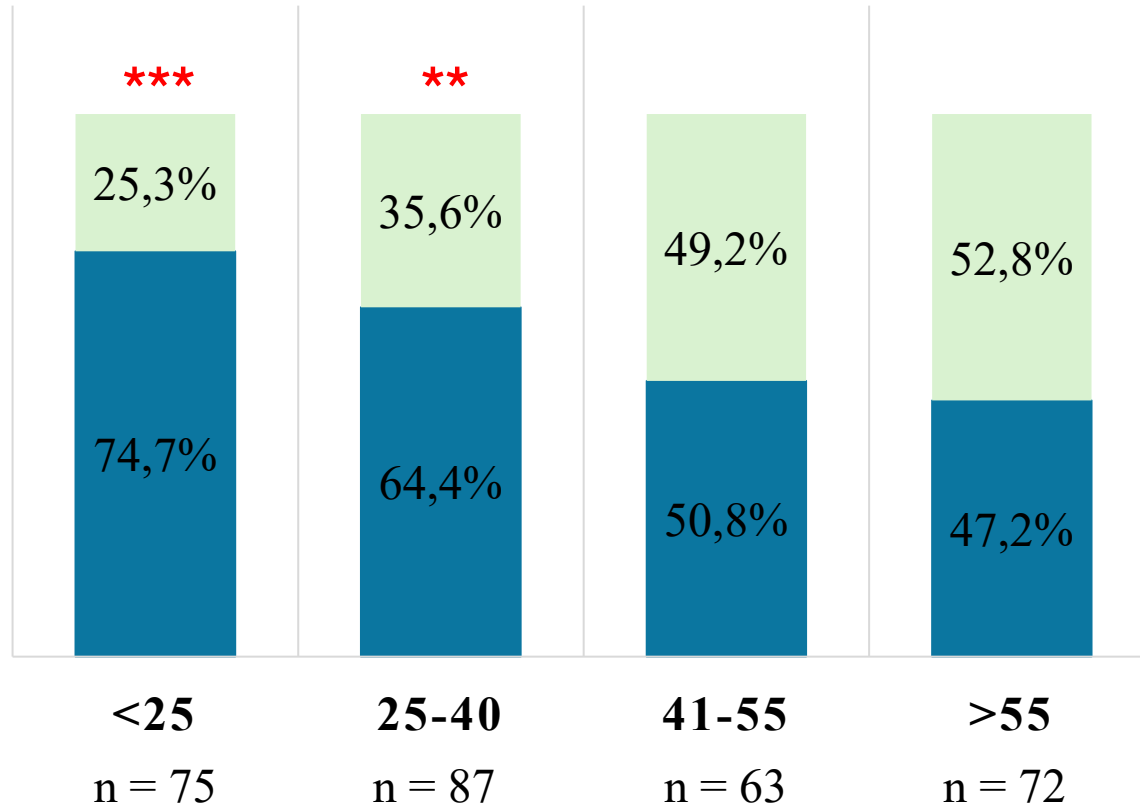


Results – Preference by Age

p < 0.01, *p < 0.001

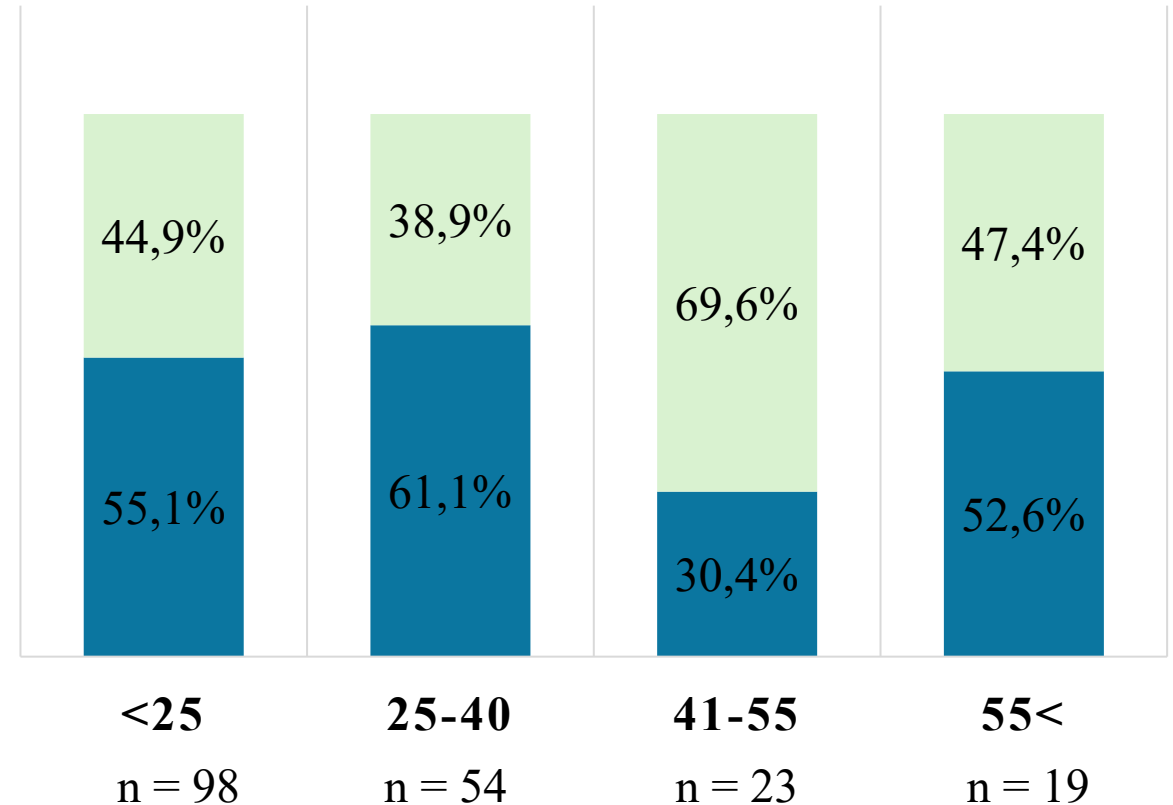
Cheese A – Semi-hard cheese

■ Extensive ■ Intensive



Cheese B – White brine cheese

■ Extensive ■ Intensive





Conclusion



Cheeses produced with milk of intensively and extensively reared goats had the same appearance in both cheese types (A and B), but differences were noticed in almost all quality traits.

Overall, consumers displayed a slightly higher preference for cheese from goats raised under extensive farming systems.

Consumers' preferences displayed remarkable variations with regard to the cheese type, the geographical location, the farming system, and the consumer's gender and age.

Additional studies to investigate the underlying reasons for the variations in consumer preferences, including a deeper analysis of how physicochemical variances in milk are correlated with the cheese quality traits and which are the leading factors affecting consumers' choices.



Acknowledgments

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Thank you for your attention!