28th Workshop on the Developments in the Italian Ph.D research on Food Science, Technology and Biotechnology

Catania, 18-20 September 2024

PROGETTO ALMA IDEA 2022
INDAGINI ANALITICHE RAPIDE DELL'AROMA E DI IMMAGINE SU PRODOTTI ALIMENTARI DI ORIGINE ANIMALE - INARIM

Funded by the European Union NextGenerationEU

COMBINING INSTRUMENTAL AND SENSORY METHODS TO ASSESS THE QUALITY AND AUTHENTICITY OF FOOD PRODUCTS OF ANIMAL ORIGIN

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State of the art

Human sense perception can be combined with "**artificial senses**" based instruments, which have been applied for e.g. quality control, freshness monitoring, shelf-life study and authenticity **evaluation of food products**[1]

AIM

Investigating the **effects** of farming systems and origin on the **quality** of animal-derived food products by applying **multi-analytical techniques**

The **electronic / chromatographic noses** → sensors / detectors to investigate volatile profiles
The **computer vision systems** (CVS) → analyzes visual properties of food

Materials and methods

1 *A multi-analytical instrumental and sensory approach to investigate the effect of the farming system (in terms of cows' feeding) in cheese products*

10 samples of **Parmigiano Reggiano PDO cheese** obtained from **different farming systems**

24 months

- Volatile profile (HS- Flash GC-FID)
- **Visual quality** (electronic eye)
- **Sensory analyses** (QDA® and consumer test)
- Microbiological analyses

n=6 **DH** → *milk obtained from cows fed **dry hay***

n=4 **FF** → *milk obtained from cows fed with **fresh herbage supplementation***

Principal component analysis (**PCA**)

2 *Honeys aroma analyses to investigate the effect of botanical and geographical origin*

50 **honey** samples with **different botanical** and **geographical** origin

n= 40 from Iran
n= 10 from Europe → Italy, Hungary and Spain

Volatile profile (HS- Flash GC-FID)

Principal component analysis (**PCA**)

Results and discussion

1

- **No statistical differences** were found among the samples in terms of **intensity of the aroma, taste and texture attributes** (**QDA®**), considering the different feeding of the cows
- A **greater intensity** of yellow color was observed in the **FF group** by both **sensory** and **instrumental** methods (image analysis, Fig. 1)

Cheeses made from **milk** of dairy cows that are fed **fresh herbage** supplementation appear **yellower** compared to cheeses from cows fed **silage** and **dry hay**[2]

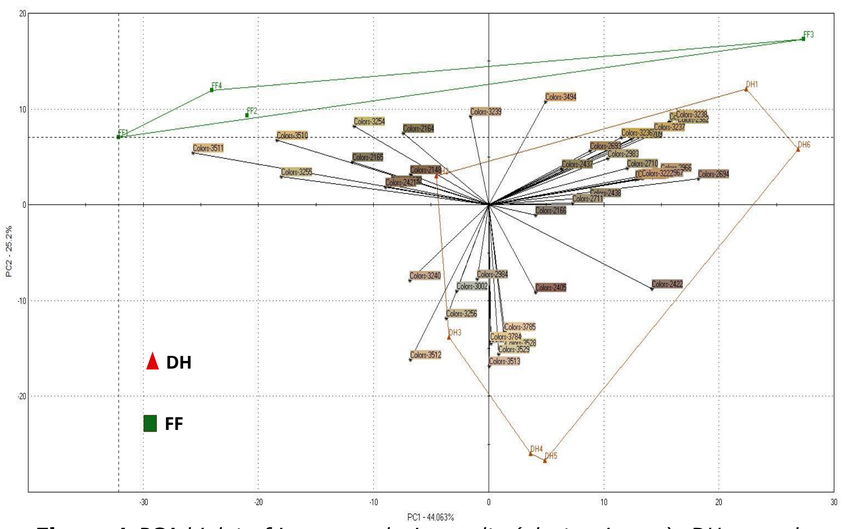

Figure 1 *PCA biplot of image analysis results (electronic eye); DH: samples from milk obtained from cows fed dry hay; FF: samples from milk obtained from cows fed with fresh herbage supplementation.*

2 A **discrimination** of the samples based on their aromatic profile was showed

A **clustering** of the honey samples was observed, considering their botanical origin, especially for ***Astragalus***, ***Thymus***, ***Eucalyptus*** and ***Coriandrum sativum***(Fig. 2)

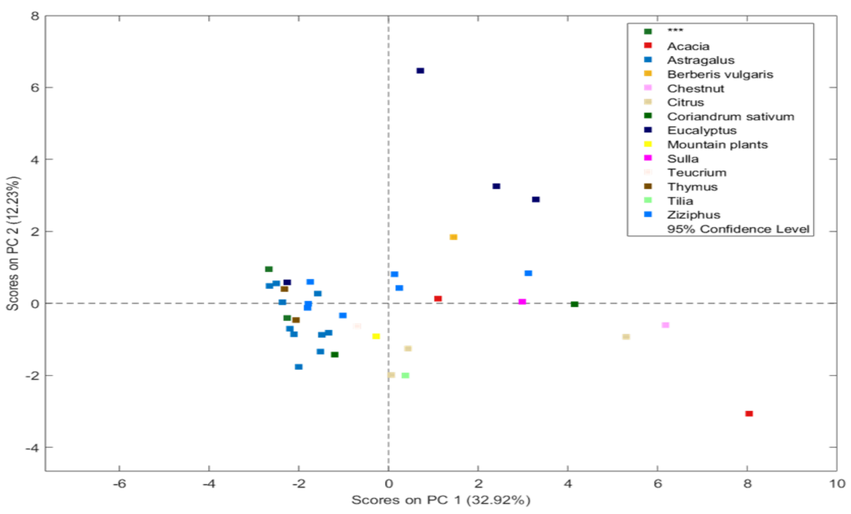

Figure 2. *Biplot of HS-Flash GC-FID results. This elaboration was made considering the honey samples volatile compounds (peak areas) determined by HS-Flash GC-FID.*

Next research activities

- **The combined analysis** of results from instrumental and sensory (Napping+ UFP and emotional response) assessments on cheese samples
- **Volatile compounds** in milk and beef samples from different farming systems as well as more honey samples will be evaluated by **instrumental** and **sensory tests**

Ensuring and controlling the **quality** and **authenticity** of the animal derived of food products

References

Ali MM, Hashim N, Abd Aziz S, Lasekan O (2020) Principles and recent advances in electronic nose for quality inspection of agricultural and food products, Trends Food Sci. Technol. 99: 1-10
Tura M, Gagliano MA, Soglia F, Bendini A, Patrignani F, Petracci M, Gallina Toschi T, Valli E (2024) Consumer Perception and Liking of Parmigiano Reggiano Protected Designation of Origin (PDO) Cheese Produced with Milk from Cows Fed Fresh Forage vs. Dry Hay, Foods, 13:1-17

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THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION'S HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N°101000250

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