

# Aquaphotomics as a tool for the study of the accelerated shelf life of PDO Taleggio cheese

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#### Introduction

Taleggio is a smear-ripened Italian cheese: its name comes from the Taleggio Valley in the province of Bergamo. The cheese is aged for about 40 days in traditional caves or aging rooms with similar temperature and humidity. During aging, the wheels are often cleaned of excess mold and sponged with water and salt, giving them their characteristic rosy color. The cheese has a strong smell, but its taste is relatively mild with an unusual fruity tang. This cheese has been granted a PDO designation.

The aim of this study was the evaluation of the decay of cheese quality during shelf-life.



During the prolonged shelf life, even if they were packed, cheese samples became drier with a consequent increasing of DM%; the exception were the samples provided by producer E.

As expected, water absorption bands are among the major variables involved in DM% calibration, as supported by the values of VIP (Variables Importance in Prediction) scores, highlighting four wavelengths ascribable to:

1382: dehydration (WAMACS C<sub>4</sub>)

1398-1410: free water

1518: WAMACS C<sub>12</sub> (v1, v2).



Data processing for building up the specific Aquagram showed a correlation between water absorption, dry matter and shelf life duration. Aquagram pointed out a significant decreasing of water absorption bands at 130 days of shelf life, ascribable to significant loss of free water molecules.

## Materials and methods

36 Taleggio cheeses, ready for the market, were collected after packaging from 6 producers (named from A to F) and stored at  $7^{\circ}$ C for three months



Every month, cheeses were sampled and their quality was evaluated for: color, texture, chemical composition, etc..

Dry matter (DM%) was determined according to ISO 5534:2004 (IDF 4: 2004) method: Cheese and processed cheese -Determination of the total solids content

Spectra were acquired in reflectance mode on the surface, over the NIR range from 1000 to 2500 nm, at room temperature using a FT-NIR (NIRFlex N500, Büchi, Italy) equipped with a fibre probe. Only the range from 1300 to 1700 nm was considered.

#### **Results and discussion**





### **Conclusions**

Although it may seem obvious that a correlation between moisture loss and water absorption intensity can be visible in NIR range, few scientific data have been produced supporting this theory, in particular in complex matrices such as cheese.

Furthermore, information collected in this study suggested the possibility to investigate the possibility to identify, by using AQUAPHOTOMICS, differences among cheese-making plants and firm, and the influence of technology flow-sheet on the cheese final quality.



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