

Free volatile carboxylic acids (FVCA)

Every cheese has its own character

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In the first 20 years of this millenium, various compounds of 10 raw milk cheese varieties from Switzerland were analysed, including free volatile carboxylic acids (FVCA). These are among the analyses that are most frequently carried out, as they say a lot about the properties and quality of cheese.

As a logical consequence, the goal of characterising these varieties by means of FVCA was soon envisaged; however, a direct comparison was not made. This is now to be done by means of machine learning techniques, focusing on the following question:
Can characteristic patterns be identified?



From the single values ...

The FVCA of 241 cheese samples of 10 different varieties were included in the investigation. Each horizontal bar represents one cheese sample.

90% of the cheese samples can be correctly classified With the help of the PyCaret library, several algorithms could be tested in parallel. The best results were achieved with tree-based algorithms – Extra Trees and Random Forest. After the 10 training runs with 70% of the data, over 90% of the test data (the remaining 30%) could be correctly classified, a promising result.

Formic acid is the most important carboxylic acid For a correct classification of the cheese samples, formic acid had the greatest impact. It is produced either by an added culture of facultative heterofermentative lactobacilli, as in Appenzeller® or Emmentaler AOP, or by the same bacteria originating from raw milk, as in Raclette du Valais AOP. In contrast, formic acid is less present in extra-hard cheeses, which in turn is characteristic of them. Carboxylic acids unimportant for classification were acetic acid and butyric acid.

Compared to other cheese varieties, Formaggio d'Alpe Ticinese has high levels of formic acid.

These are the sources of FVCA:

Formations: Fermentations Lipolysis Proteolysis

Formic acid butyric acid isobutyric acid

acetic acid caproic acid isovaleric acid

propionic acid

isocaproic acid