

Lexicon Development for Cheddar-Type Enzyme-modified Cheeses (EMCs) and the Relationship between Sensory and Compositional Properties.

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INTRODUCTION:

How are the sensory attributes of enzyme-modified cheeses (EMCs) impacted by the cheeses' chemical composition? While the sensory and chemical composition of many cheeses have been extensively investigated, those of EMCs have not. This means EMC manufacturers lack the information they need to make more consistent and desirable products. Characterizing the relationships among the sensory attributes and chemical components of EMCs, would help these manufacturers take a more targeted approach to EMC flavor development.

OBJECTIVES:

1. Characterize the relationships among the intensity of sensory attributes that vary among the cheeses and the cheeses' chemical compositions.

RESULTS:

1. The intensities of 26 attributes (15 aroma, 2 taste, 8 flavour, and astringency) varied significantly among the nine cheeses.
2. Astringency and more pungent, aged flavors were positively related to titratable acidity and to products of fat and protein breakdown (Figure).
3. Fat content was positively associated with unfermented, high-fat dairy product flavors and aromas (e.g. butter and cream) and negatively associated with more pungent flavors and aromas. (Figure).

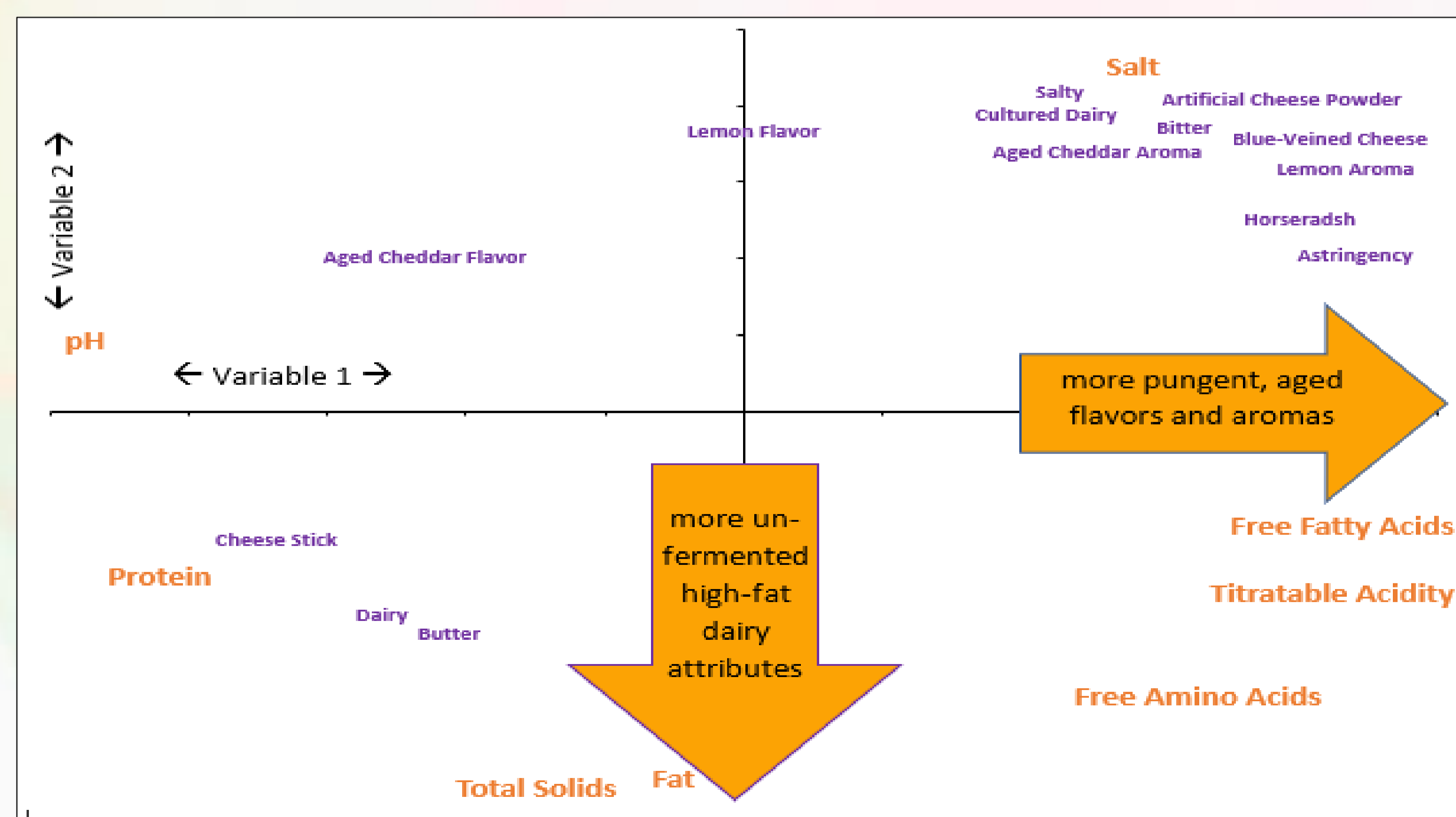


Figure. The loadings of the chemical components and sensory attributes for the first two variables generated during partial least squares analysis. Sensory attributes are in purple and chemical components are in orange.

LESS INTENSE AGED CHEESE AROMAS WERE ASSOCIATED WITH A HIGHER FAT CONTENT.



METHODS:

SAMPLES:

- **Nine cheeses:** Seven Cheddar EMCs and two naturally-aged Cheddar cheeses.

CHEMICAL ANALYSES:

- The following chemical components were measured: fat, protein, moisture, total solids, non-protein nitrogen, salt, pH, titratable acidity, acid degree value, and the concentrations of 17 free amino acids and 15 free fatty acids.

DESCRIPTIVE ANALYSIS TRAINING:

- Panelists (N = 11) attended between 10 and 17 one-hour training sessions.
- Panelists generated a lexicon for the aromas, flavors, and tastes of the nine cheeses.
- Panelists used the lexicon to practice rating the intensity of the sensory attributes in the cheeses.

CHEESE EVALUATION:

- Each panelist evaluated all nine cheeses monadically and in duplicate with presentation order being based on a William's Latin square across panellists.
- Panelists rated the intensity of each attribute in the cheeses using the finalized lexicon, which contained 44 attributes (25 aroma, 5 taste, 13 flavor, and astringency).
- Panelists rated flavor and taste attributes on a 20-point calibrated citric acid scale and aroma attributes on a 12-point calibrated butanol scale.

DATA ANALYSIS:

- Analyses of variance were used to identify sensory attributes that varied significantly in intensity among the cheeses.
- Partial least squares analysis was conducted with the chemical data and the average intensities of the sensory attributes that varied significantly among the cheeses.

ACKNOWLEDGEMENTS:

- This project was supported by Land O' Lakes, Inc. and by the Minnesota Agricultural Experiment Station project # MN 18-081.
- All chemical data were provided by Land O' Lakes.
- Aaron Rendahl, Ph.D., assisted with statistical analyses.

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