AN EXAMPLE OF DEVELOPING A MULTI-COUNTRY REFERENCE SYSTEM USING CHEESE

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Graph 1. Selected dairy attribute scores for two products available in USA and Estonia.

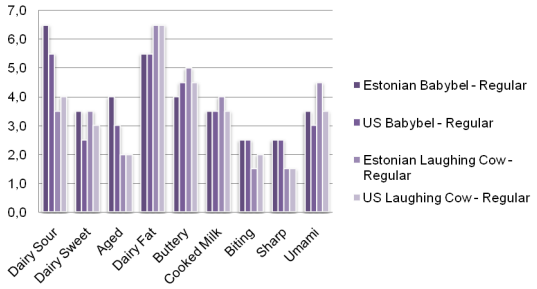

Table 1. Selected attributes with chemical reference materials.

Attribute	Chemical	Published
Ammonia	Ammonia 200 ppm	Martin et al 2000
Animalic	1 -Phenyl-2-thiourea 5,000 ppm in PG	Heisserer and Chambers 1993
Banana	Isoamyl acetate 15 ppb	Martin et al 2000
Bell pepper	Methoxy pyrazines, 5 ppb	Drake et al 2001
Brothy	Methional, 20 ppm	Drake et al 2001
Butyric	Butyric acid 2500 ppm in vaseline oil	Heisserer and Chambers 1993
Cabbage	Dimethyl disulfide 200 ppb	Martin et al 2000
Catty	2 Mercapto-2 methyl-pentan-4-one, 20 ppm	Drake et al 2001
Chocolate	Ovomaltine 150 ppm	Martin et al 2000
Cowy	P-cresol, 160 ppm	Drake et al 2001
Decaying Animal	Dimethyl disulfidel 10,000 ppm in PG	Heisserer and Chambers 1993
Diacetyl	Diacetyl, 20 ppm	Drake et al 2001
Fecal	Indole, skatole, 20 ppm	Drake et al 2001
Floral	Oil of geranium, citronella, linalool	Retiveau et al 2005
Foul	1,5-Diaminopentane 100 ppm	Martin et al 2000
Free fatty acid	Butyric acid, 20 ppm	Drake et al 2001
Fruity	Ethyl hexanoate, 20 ppm	Drake et al 2001
	Trans-2-hexenal. 10.000 ppm in PG	Heisserer and Chambers 1993
Garlic	Allyl disulfide 150 ppb	Martin et al 2000
Goaty	Hexanoic acid 5,000 ppm in PG	Heisserer and Chambers 1993
Methyl Ketone	2-Octanone, 40 ppm	Drake et al 2001
Milkfat	δ-dodecalactone, 40 ppm	Drake et al 2001
Moldy	2-Ethyl-I-hexanol 10,000 ppm in PG	Drake et al 2001, Heisserer and Chambers 1993
Munster	Methylthiobutyrate 100 ppb	Martin et al 2000
Mushroom	3-Octanol 10000 ppm in PG	Heisserer and Chambers 1993
Musty/dry	2,4,6-Trimethoxy benzaldehyde = 10.0	Retiveau et al 2005
Oxidized	2,4 Decadienal, 20 ppm	Drake et al 2001
Pineapple	4-Pentenoic acid 10,000 ppm in PG	Heisserer and Chambers 1993
Rosy/Floral	2-Phenethylamine, 20 ppm	Drake et al 2001
Sauerkraut	Dimethyl disulfide 10,000 ppm in PG	Heisserer and Chambers 1993
Sharp	Propionic acid 100.000 ppm in PG	Heisserer and Chambers 1993
Solvent	Ethyl acetate 5 ppm	Martin et al 2000
Surimi	Dimethylsulfide 20 ppb	Martin et al 2000
Sweaty	Isovaleric acid 10,000 ppm in PG	Heisserer and Chambers 1993
Waxy	Capric acid, lauric acid or decanoic acid, 100 mg/mL	Drake et al 2001
	Decanoic acid	Heisserer and Chambers 1993

PG=propylene glycol

Euroopa Liit
Euroopa Regionaalarengu Fond

Eesti tuleviku heaks

Introduction

Several authors have published lexicons for sensory evaluation of cheese flavor and odor (Heisserer and Chambers, 1993, Drake et al 2001, Martin et al 2000, Retiveau et al 2005). Most of the lexicons published include dairy products as reference materials as well as chemical solutions. The dairy reference materials usually are available locally and often are not useful in other countries. The objective of this study was to determine whether product reference standard could be used internationally.

Materials and methods

Two samples, one semi-soft cheese manufactured from cow's milk (Mini Babybel, Regular fat content), and one soft cheese product (Laughing Cow, Regular fat content), that were available in both the US and Estonia, were tested. Samples were bought both from Estonia and from the U.S. A highly trained sensory panel in the U.S. evaluated the samples for selected dairy attributes on a 0-15 point scale with 0.5 increments.

Results

The descriptive panel found slight, but non-significant differences, in several attributes between control/reference products from the U.S. and from Estonia (Graph1). None of the differences exceeded 1 point. The Mini Babybel samples purchased from Estonia were 0.5-1 point higher in the dairy sour, dairy sweet, aged, and umami attributes and for Laughing Cow the Estonian intensities were 0.5-1 point higher for dairy sweet, buttery, and umami. The intensities of dairy fat and sharp were the same for both of the Babybel cheeses and the Laughing Cow cheeses. However, reference materials should be checked for intensities prior to testing as cheese flavor may change during the shelf life of the product.

Chemicals may be used as reference materials for several different attributes (Table 1) because those references are universally available.

The cheese control reference standards and chemical references will be used for training descriptive panelists in Estonia.





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References

Drake, M, McIngvale, S, Gerard P, Cadwallader, K , Civille,G. 2001. Development of a Descriptive Language for Cheddar Cheese. J Food Sci—Vol. 66, No. 9.

Heisserer, D and Chambers, E IV. 1993. Determination of the sensory flavor attributes of aged natural cheese. J Sens Stud. 8. 121-132.

Martin, N, Molimard, P, Spinnler , H, Schlich, P. 2000. Comparison of odour sensory profiles performed by two independent trained panels following the same descriptive analysis procedures. Food Qual and Pref 11. 487-495

Retiveau, A, Chambers, D, Esteve, E. 2005. Developing a lexicon for the flavor description of French cheeses. Food Qual and Pref 16. 517–527

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