



Cheese from Northern
Ireland –
Mapping the flavour

Topics

- What is flavour?
- Describing flavour
- Factors affecting flavour
- The proces of describing and mapping flavour
- Results and Maps
- How can Flavour Maps be used? – e.g. Food Pairing



Who am I...

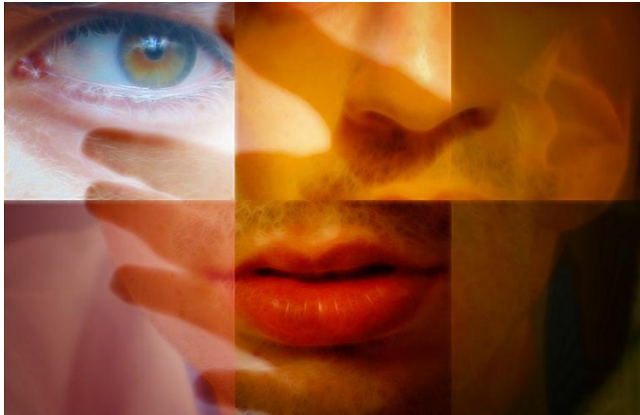
- Chemist, "foodie" and supertaster
- 20+ years evaluating, developing, optimizing and communicating flavour



FERRERO



The Experience of tasting



Chemistry & Physics



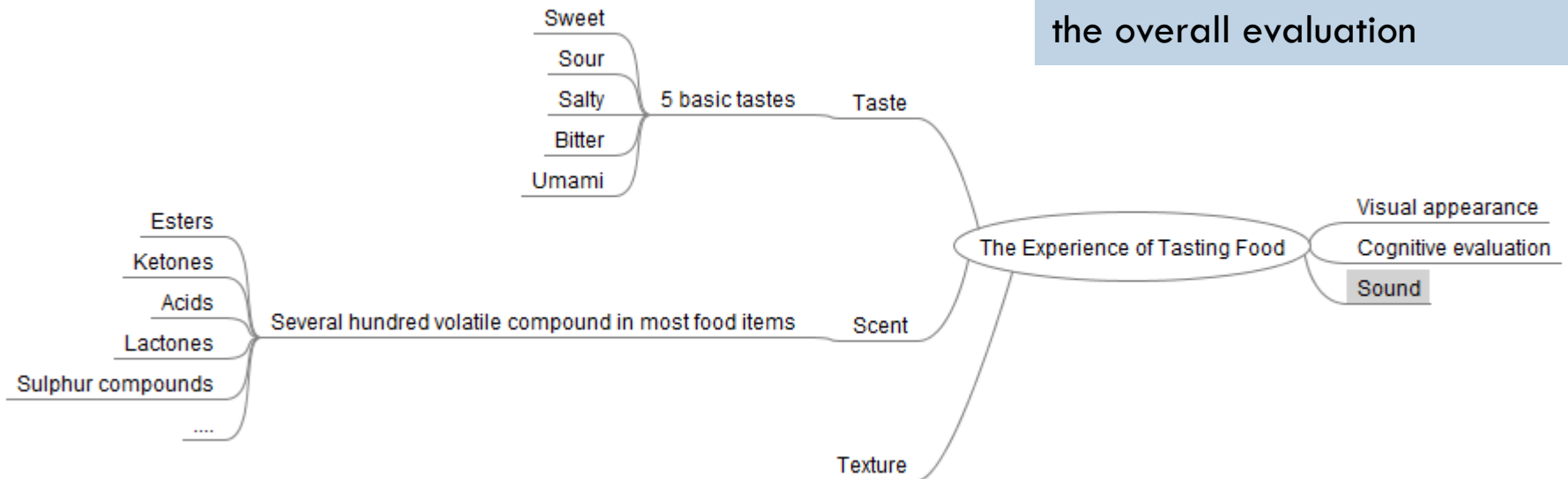
Waves & Energy

What is flavour – and how do we perceive it?

Scent (retronasal) + Basic tastes (taste) =
Flavour

80% of the perceived flavour is in fact scent

Texture, temperature and mouthfeel, will affect the flavour
Visual appearance, sound and our cognitive evaluation (cultural and personal experience) will also affect the overall evaluation



Cheddar, Acids and Flavour

Acids

Definition: Molecules which can donate an H⁺ (proton donor)

Primary notes: Fruity, sour, acidic, sweat, fatty, rancid

Can be found in: Cheese, fruit, meat

VIP Acids: Acetic acid, Lactic acid, Butyric acid. Fatty acids like: Palmitic acid, Stearic acid, Linolenic acid...

formic acid

acetic acid

propanoic acid (=propionic acid)

2-methylpropanoic acid (=isobutyric acid)

2-hydroxypropanoic acid (=lactic acid)

2-oxopropanoic acid (=pyruvic acid, acetylformic acid)

butanoic acid (=butyric acid)

2-methylbutanoic acid

3-methylbutanoic acid (=isovaleric acid)

2-ethylbutanoic acid

2-hydroxy-3-methylbutanoic acid

pentanoic acid (=valeric acid)

2-hydroxy-3-methylpentanoic acid

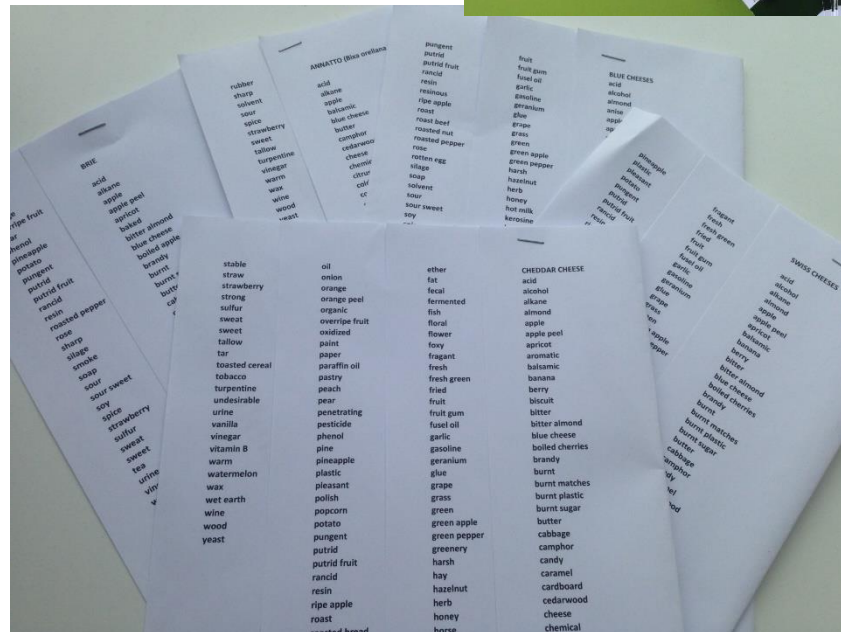
2-hydroxy-4-methylpentanoic acid

hexanoic acid (=caproic acid)

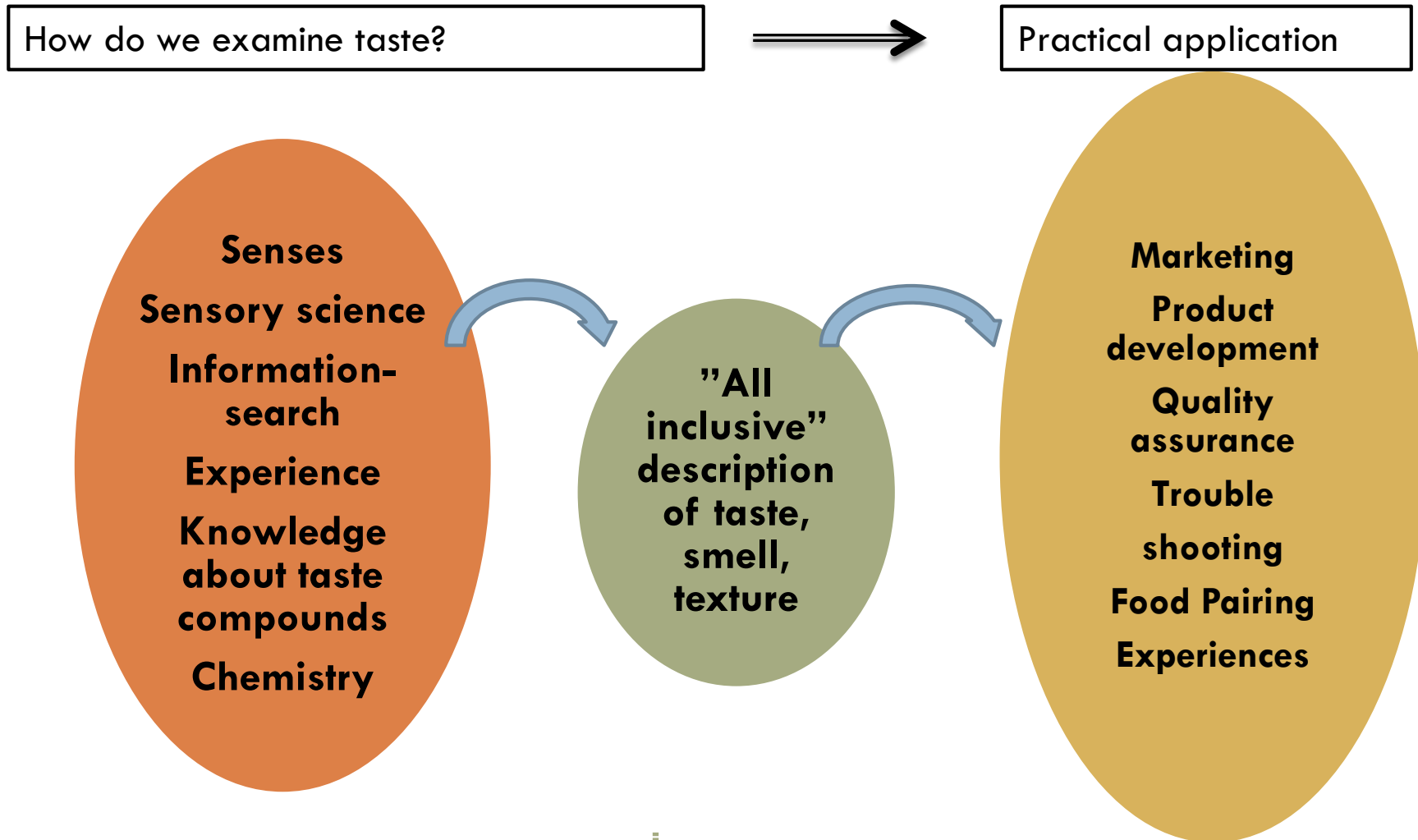
butter, cheese, rancid,
sour, sweat

Vocabularies + Visual appearance

- E.g. 260+ flavour compounds in cheddar cheese:
- Acetoin and diacetyl: butter
- 2-nonanone: fruit and hot milk
- Caproic acid: cheese and pungent
- Detailed, objective descriptions of the individual cheese (+ subjective, personal note)
- Selection of the most important flavour descriptors to include in the Map



How do we examine taste – and what can a good description of a product be used for?



Why does it taste like it does? **How** can we optimise the taste?

Processing



Milk (race, feeding) Other ingredients (microorganism/fermentation, rennet...)
Mechanical processing Storage/Affinage/Maturing

Sample overview;

Cheese from Northern Ireland

Sample #	Name
1	Northern Ireland brie
2	Northern Ireland soft blue cheese
3	White Medium Cheddar
4	Extra Mature White Cheddar
5	Vintage White Cheddar
(6)	White Mature Cheddar



Sample 1; Northern Ireland brie

Scent

Freshly baked French bread, a little earthy, grain, (slightly ammonia), forest floor/wet earth, fungi/mushrooms, fresh, a little butter, moldy, slightly nutty.

Texture

Curd/center: fatty, creamy, soft, slightly more firm towards the edge.

Rind: dry, slightly crunchy/creaky, with bite.

Center: more butter, cream, sour than Outer part, which is more mushroom, earthy, moldy

Taste/Flavour

Center: butter, fatty, a little sour, rich, umami, cream, a little earthy, French bread, a little fungi/mushrooms

Outer part of curd: French bread, fatty, full-bodied, slightly sour, umami, salt, mushrooms, earthy, moldy (a little more than in the center)

Rind: slightly bitter, very moldy, fungi, earthy.

Sample 1; Northern Ireland brie

Visually

Colour:

Shape: Large, round cheese with inhomogeneously shaped small and large holes and fissures.

Colour: Silky smooth, white, matte, medium thick layer of mould on the surface. The curd is semi matte, yellowish white. The curd becomes darker, more yellowish brown towards the edge/rind.

Full bodied, intense flavour
– but mild



Sample 2; Northern Ireland soft blue cheese

Scent

Earthy, fruit (internal part), slightly pungent, a little ammonia, a little pungent in the nose/like horseradish (the surface). French bread, mold, sweet, grain, potato, complex, mild Blue cheese.

Texture

Blue: gritty/soft crunch, more firm

White: creamy, soft, fat, full – more firm and dry towards the rind

Rind: firm, more dry, hard

Taste/Flavour

Blue: Blue cheese, fruit, sweet, animalic/cowshed, dairy,

White: salt, slightly acidic/sour, very buttery, fatty, a little fruity, slightly flowery, French bread, mushroom, umami, a little earthy, nutty, a little moldy

Rind: white mold, earthy/moldy, mushroom, salt, intense, light ammonia

Good, mild “beginner” Blue cheese, with a complex taste

Sample 2; Northern Ireland soft blue cheese

Visually

Colour:

The curd is yellowish (darker than Ballybrie) and more yellowish brown towards the edge. The curd is threaded by green/blue/gray stripes of blue-mold. In some places there are white inner mold spots toward the edge.

Shape: Large, round cheese with a thin layer of white mold. One can see the stripes of the brown yellow curd through the mould layer.



Sample 3; White Medium Cheddar

Scent

Butter, French bread/yeast dough, mild, slightly tart/sour, grain loft, fatty, a little sweet, cheese/dairy, a little nutty.

Texture

Elastic, slightly soggy, fatty, quite firm.

Taste/Flavour

A little salt, a little tart/sour, nut, butter, melted butter, a little sweet, fatty, slightly fruit, cheese, mild, slightly umami.

Sample 3; White Medium Cheddar

Visually

Colour: Warm, Yellowish – white (F8.20.80).

Shape: Firm cheese.

Homogeneous curd with a few tiny edgy holes.

Matte surface.



Sample 4; White Extra Mature Cheddar

Scent

Sweet, butter, a little caramel, more intense than 3, fruit, slightly vanilla, slightly tangy, slightly pineapple, cream, a little cheese, a little hay/coumarin, nutty.

Texture

Firm, melts on the tongue, small crunchy crystals, slightly crumbly, slightly pungent on the tongue.

Taste/Flavour

More intense and tart than 3. More fruity than 3. Tart/sour, salt, cheese, fruit, a little pineapple, slightly hay/coumarin, a little caramel, sweet, slightly flower, slightly nutty, slightly vanilla, complex, umami.

Sample 4; White Extra Mature Cheddar

Visually

Colour: Similar to 5, but slightly more yellowish. A little less intensely yellow than 3.

Shape: More crumbly/flaky than 3, with small white crystals.



Sample 5; White Vintage Cheddar

Scent

Butter, sweet, fruit, a little caramel, cheese, slightly tart, pineapple, slightly nutty, hay/coumarin

Texture

Large crunchy crystals, more dry and crumbly than 3 and 4, but melts on the tongue quickly. A little astringent after taste. A little tingling on the tongue. Fatty.

Taste/Flavour

Tart/sour, fruit, pineapple, sweet, caramel, butter, cheese, umami, nutty, slightly barn/animalic, slightly wine/fermented, slightly sharp, full-bodied, fatty, complex. A little more intense nutty, pineapple, barn and wine/fermented than 4.

Sample 5; White Vintage Cheddar

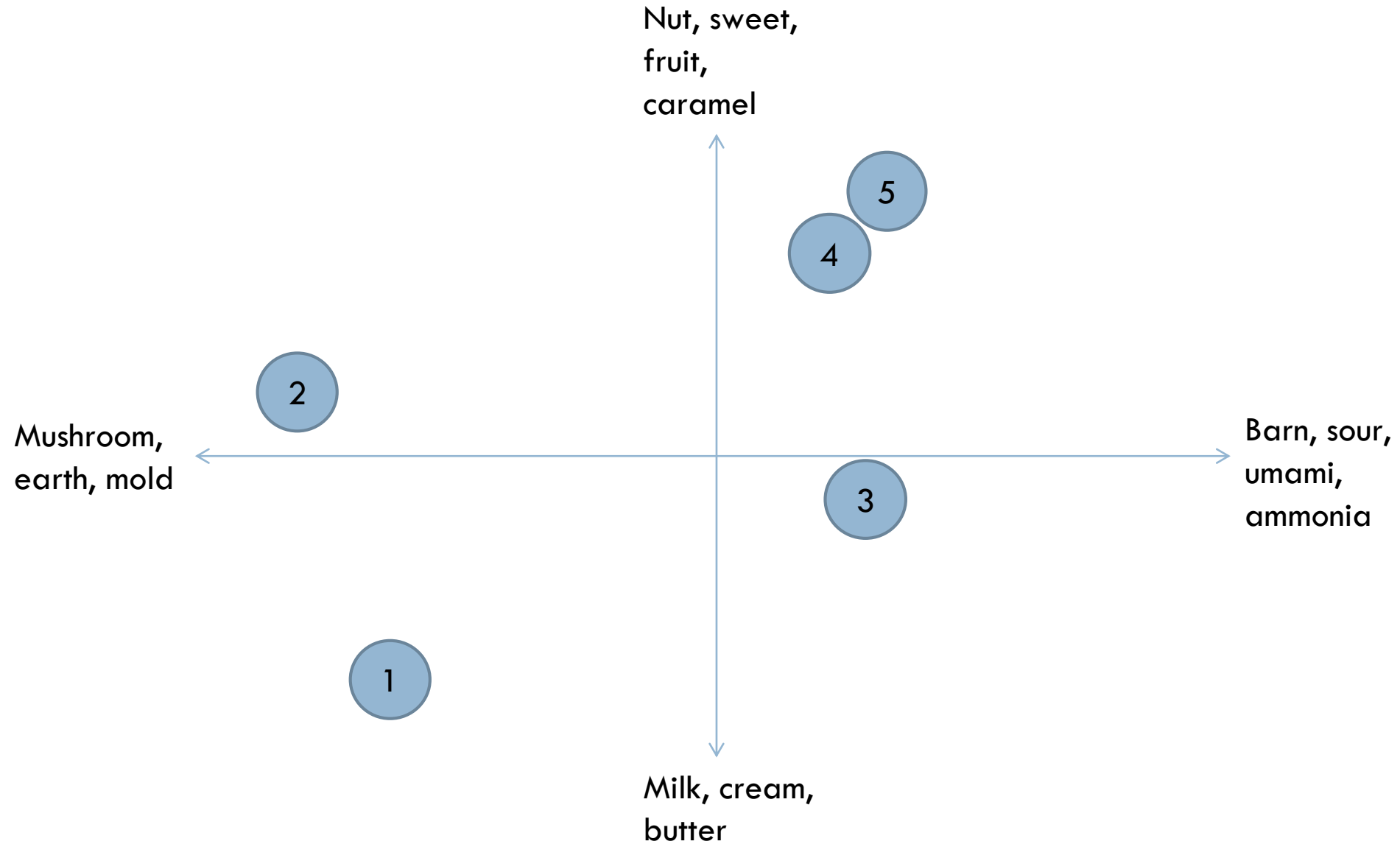
Visually

Colour: A little less yellow than 3 (F6.15.80 +F6.69.86).

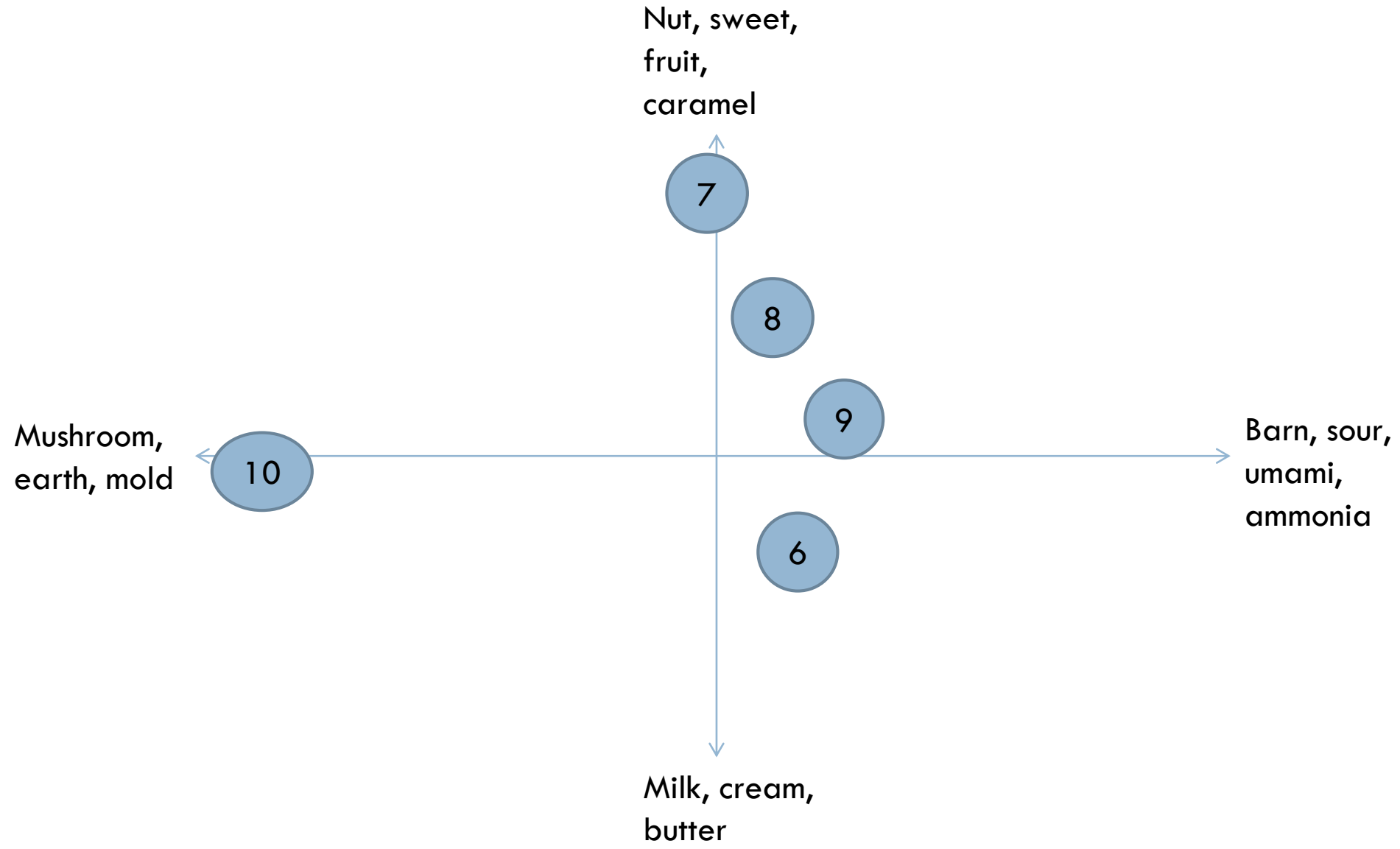
Shape: A little more crumbly/flaky than 4. Slightly larger, white crystals than in 4.



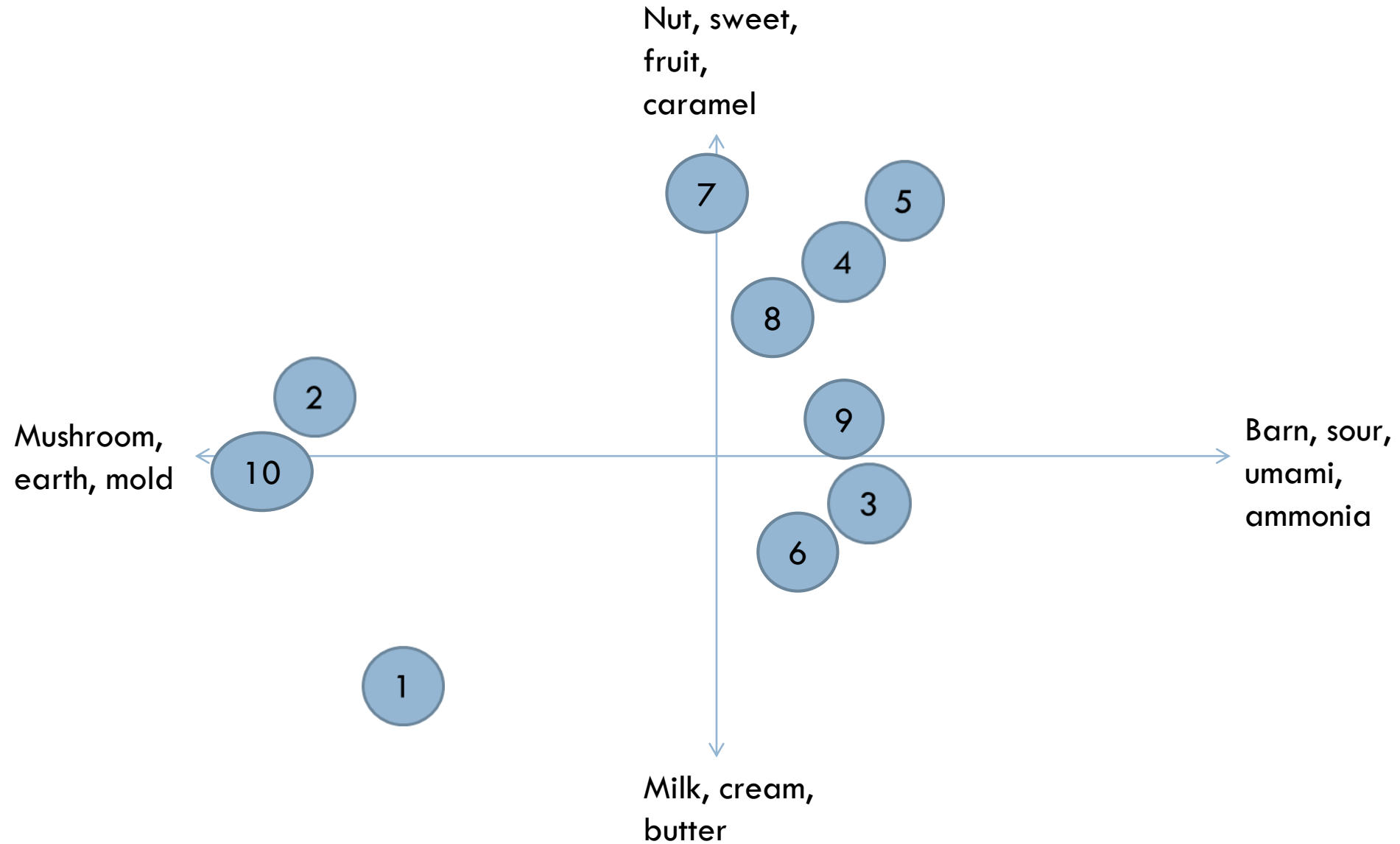
Flavour Map, Cheese from Northern Ireland, 2016



Flavour Map, Irish cheese, 2016



Flavour Map, Irish and Northern Irish cheese, 2016



Taste Map, Danish and International cheese



Nut, sweet,
fruit,
caramel



Mushroom,
earth, mold



Barn, sour,
umami,
ammonia

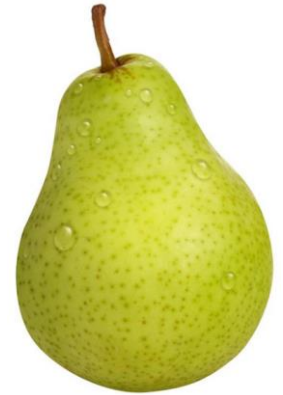
Mild, cream,
butter



The basic principle of Food Pairing

The more taste compounds food items have in common, the better they are likely to taste when you combine them

- Development of recipes, suggestions for use, product development



Food Pairing Ingredient suggestions:

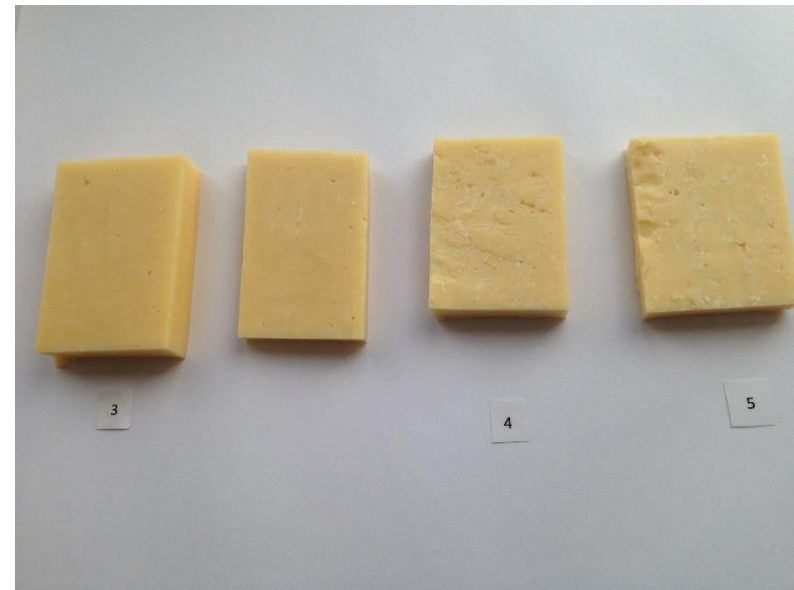
Brie

Beverages	Meat	Nuts	Fruits	Herbs	Condiments	Bakery
Apple juice	Bayonne ham	Cashew	Apple	Rosemary	Fish sauce	Ciabatta
Coffee	Roasted lamb	Walnut	Banana	Thyme	Soy sauce	Toast
Calvados	Raw beef		Black currant	Dill	Olive oil	Rye bread



Food Pairing Ingredient suggestions: Cheddar

Beverages	Meat	Nuts	Fruits	Herbs	Condiments	Bakery
Cider	Bacon	Cashew	Guava	Sage	Sherry vinegar	Baguette
Whisky	Salami	Walnut	Coconut	Pepper mint	Olive oil	Brioche
Black tea	Ham	Hazelnut	Pear	Chives	Balsamic vinegar	Wheat bread



Food Pairing Ingredient suggestions: Blue cheese

Beverages	Meat	Nuts	Fruits	Herbs	Condiments	Bakery
Port	Raw beef	Cashew	Banana	Nasturtium	Olive oil	Baguette
Vodka	Ribeye steak	Roasted hazelnut	Pineapple	Cress	Fermented bean curd	Brioche
Chardonnay	Hare/Rabbit	Peanuts	Pear	Lemongrass	Blueberry vinegar	Bagel



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