

## The microbes, stowaways of the milk

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### 1. Microbes: a danger endangered

Avoidance of danger generates prevention practices, which lead to collateral damages: terroir microbes, crucial contributors to terroir cheese are killed.

They need therefore protection.

Since terroir microbes belong to terroir, they could benefit from the GI terroir protection.

Yet this requires to decide, which are the terroir microbes.

For the moment microbes are a bit like stowaways in the milk. Their identity as well as their status is quite elusive. Introducing microbes as part of the terroir will raise important questions.

Drawing from the recent debates about terroir in the wine GIs, I will try to present what could be at stake around cheese microbes.

We will engage a bit in science fiction, but science has to work a step in advance, hasn't it?

Back to our question: Which are the terroir microbes?

### 2. Which are the terroir microbes?

There is a first obvious answer, terroir microbes are the microbes inhabiting the local production place, the pasture, the feed... the dairy vessels, utensils and workshop, the cheese ageing caves etc.

Ecosystems are surely not stabilized systems in equilibrium, they vary with seasons, with climates; they suffer invasions... Therefore, the list of the microbes pertaining to the terroir might be difficult to draw.

Yet terroir microbes can still be designated as "The ones which are here, the indigenous microbial ecosystems".

Nice answer but some cheese-makers will answer WAIT, wait...!

### 3. Wait

All local microbes are not terroir microbes.

Terroir microbes do not include pathogens...

Terroir microbial ecosystems fluctuate, but not all the fluctuations are terroir fluctuations. Terroir excludes variations due to external causes namely.

Pathogens and external invasions are sources of health and quality hazard, which must be prevented.

One way to achieve this consists in resorting to selected terroir strains (STS).

- that is strains cultivated out of microbes selected in the terroir
- devoid of pathogens and deviant populations

STS are “pure” representatives of terroir, better than the mixed, contaminated terroir microbial populations

STS are the only able to produce the truly typical cheese and moreover a safe cheese.

### 4. Wait you too...!

Wait you too...! Other cheese makers for sure will not agree with this.

They will retort that:

- STS are man-made strains of microbes selected according to commercial and human aims
  - Safety
  - Customer expectancies

➔ For them, STS are perverted and adulterated terroir ecosystems

For these second cheese makers, STS are illegitimate human copies of terroir microbial ecosystems.

They will agree that not all fluctuations of the microbial ecosystems belong to terroir. But who can make the difference by saying these microbes belong to terroir and these others do not?

They will argue that the only way to proceed is to protect terroirs from undesirable fluctuations. If this protection is correctly applied, all remaining fluctuations can be seen as belonging to terroir.

## 5. How do you know that you are making a terroir cheese?

The introduction of the terroir microbial ecosystems into the GI regulation might lead to the emergence of two interpretations of terroir, which we can sum up as follows :

1. terroir quality is firmly tied to typicity conformity and the defense of the STS as a resource for the cheese-makers
2. terroir quality results from the microbes contribution to the cheese quality. STS are not seen as terroir microbes but as unacceptable human made substitutes to real terroir microbes.

The 1st one insists on the importance of typicity control.

The 2nd one on the protection of the microbial ecosystems, which should not be contaminated and not suffer undesirable drifts.

**\*\*\*CLIC This** second understanding of terroir quality emphasises its variability. For them, the opposite point of view it would lead to an excessively standardised quality, which would not mirror the terroir and its fluctuations.

Reversely, the supporters of the first interpretation could accuse their opponents to produce dangerous cheese and eliminate them for lack of typical taste.

## 6. Conclusion : Towards two statuses for microbes

I am sure you can link these two interpretations with field actors you already know. Our fiction might not be so fictitious. Let's move one more step forwards.

The introduction of the terroir microbial ecosystems in the GI regulation will not only exacerbate existent disputes. It will also lead to a controversy about the status of the microbes.

In interpretation 1, while entering the terroir, microbes will be awarded a status of « ressource ». → Resources do not act, they are bought, transformed... at will of humans. They are like slaves, no standing, no will, no voice...

In interpretation 2, microbes are partners in the process of cheese making. → As co-contributors to the cheese, they deserve respect and protection. They do not stand at the mercy of the humans.

## 7. Towards conflicts regarding the standing of microbes?

Introducing microbes in the GI regulation could lead to an unexpected debate about the legal standing of microbes:

- Are they resources, like a coal mine, which can be exploited by the humans?
- Are they partners, deserving respect, attention and protection?

As a conclusive comment, I would like to emphasize one point : the microbiological research committed to describe and understand the microbial ecosystems cannot be said to be neutral : according to their results, they will support one or the other interpretation.

If one endeavours to make a finite list of the ecosystems inhabitants, she will support interpretation 1. If on the contrary, one insists on the impossibility to draw up such a list, he will support the second interpretation.

## Première présentation

### 1. Raw Milk microbes

Producers produce goods or commodities by using resources (technical equipment, natural resources or ingredients...); then they market them for customers.

Producers make things or deliver services. They are considered as individuals acting on the market and having therefore duties and responsibilities towards the customer namely.

The resources they resort to do not act. They are availabilities, like the coal of a mine, or the milk of a cow.

What is the place of microbes in such a casting?

It depends !!!

For some cheese makers, raw milk microbes are undesirable stowaways that is components of the milk resource which bring uncertainty and variability affecting the process of cheese making.

For others, they are on the contrary necessary immigrants those who see quality as the conformity to a certain type, raw milk microbes constitute an undesirable source of heterogeneity regarding for instance taste or as sanitary quality.

For the others, raw milk microbes are welcome immigrants contributing to the complexity of the cheese.

## 2. Two different understandings of cheese making

These two understandings of the usefulness of raw milk microbes resort to two different ways of cheese making.

For Way 1: raw milk microbes are a source of heterogeneity and must therefore be replaced by selected cultures

For Way 2: raw milk microbes are necessary to make cheese and must be protected.

- For way1, way 2 leads to health and quality hazard
- For way2, way 1 leads to the destruction of necessary microbes

They are fairly incompatible because the norms each one defends are damageable for the other.

How can we protect one from the other?

A common answer is “geographical indications” will protect microbes because they belong to terroir.

I would like to show you that the answer is a bit more complicated. Yet the GI wine producers who faced a similar situation, have proposed a new interpretation of terroir which allows to differentiate differentiate our two ways of understanding cheese making.

I will rapidly sum up the century long history of the French GI laws. I apologize in advance for the caricature.

### 3. Back to terroir protection and its last evolution for the wine IG

Terroir is a latecomer in the GI laws history. No-one spoke of terroir at the turn of the XXth century, when French deputies found necessary to protect the geographical names in order to protect their quality from unfair competition.

Let's take the example of the Nantes Carrot for instance.

The question was: could geographical names benefit from the same protection as collective commercial brands?

Conversely to other manufactured products benefiting from brand protection, goods designated by geographical names included in their production process some specific local natural ingredient.

Could the "Nantes carrot" name be protected thanks to a commercial brand?

A first answer to this question was:

- Carrots are fruits of nature; commercial brands protect manufactured goods that is, goods made by humans. So the farmer who grows them cannot benefit from a brand protection.
- ➔ nature has no standing and cannot therefore be protected by human laws.

A second answer to this question was:

- Without the care of the farmer, the carrots would not have the specific quality they have. The brand protects the work of the farmer under the condition that he cultivates the carrots in the Nantes area.
- ➔ nature is still not protected, yet the law imposes a specific raw material source, the place of his farm.

In the first case, carrots are considered as the production of nature and therefore not protected.

In the second case, nature is considered as a source of raw material. The commercial brand protects the work of the farmer, thanks to which Nantes carrots acquire their specific quality.

In the case of wine, the importance of the vintners contribution looked decisive so the second interpretation was adopted, which gave birth to the 1919 law giving the right of any farmer to use his geographic locality (plot name or larger area) as a personal or collective brand.

This law knew an remarkable success and fostered an incredible development of innovations in the wine making.

Yet this was not the expected result.

Authorities thought that the quality of the French wines was disappearing. They tried to restore the quality of before, before de phylloxera crisis namely and all the innovations that flourished by that time of fresh grapes shortage.

Therefore they argued that the aim of the geographical branding was to protect the superior quality that made the geographical names famous. A new law was published, the 1935 law, known as the law for the Controlled denominations of origin, including process specifications in order to guarantee a minimum level of quality.

The producer was still the only actor responsible for quality and nature was considered as a compulsory source of raw material, the grapes.

This new 1935 law also met a large success and extended to other European countries.

The law which impeded all non burgundian producers to produce burgundy was also accused to introduce commercial barriers in the international trade.

In order to answer this accusation, GI explained that they protected a particular wine quality resulting from the combination of local natural and human factors, the terroir.

The opponents retorted, if this is true, you must control not only the good practices but also the resulting quality. In the 70's, the quality taste agreement became compulsory in all the French wine GIs.

After 30 years, the taste agreement gives birth to a huge controversy: famous terroir vintners wines are denied the AOC label for lack of typical quality<sup>1</sup>.

What is at stake?

- for some, terroir quality must be predefined and controlled.
  - o The role of vintners is to frame and depurate the grapes from their yearly variations so as to achieve the typical quality fo their terroir
- for others, terroir quality resulting from the contribution of both man and nature is not predictable and its result cannot therefore be controlled.
  - o The role of vintners is to enhance the yearly renewed expression of terroir

Again the contributions of humans and nature stand at the core of the dispute.

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<sup>1</sup> They answer that technical evolution has caused the panelists to lose their gustatory references, leaving them incapable, or unwilling, to recognize an authentic terroir quality. It is the judges' taste that has been distorted by their incompetence rather than the taste of their wines through good practices, and therefore it is the judges' tastes, which need to be revised and not the new terroir wines, which uphold the true meaning of AOCs.

#### 4. The RESPECT owed to the terroir

The banned vintners defend the respect due to terroir and its essential contribution to the wine quality

In their view, the vineyard and the vintner form a couple similar to the music composer and its performer. As an artist, the performer must produce a creative interpretation of the music. Yet his interpretation should not denature the music of the composer. The performer must respect the composer and enhance his expression.

Back to wine, in the same way, each year the vintner has to convey the vintage expression of his terroir. Terroir as well as vintners are creative and innovative.

Any test trying to assess the conformity of the vintage wine constitutes an impediment to their creativity.

They ask GIs to protect their two contributions and make sure that the vintner does not denature the terroir expression.

Of course this demand is unacceptable for their opponents who rest upon the conformity of their wines for their commercialisation.

Finally what is the difference between the two views on terroir wines?

One insists on the conformity of the result while the specifications should be relaxed so as to allow vintners to achieve their predetermined quality aim in spite of the variations of the vintage.

The second conversely insists on the limitation of the acceptable practices allowing to express the yearly changing nuances of the grapes.

As you have surely already noticed, this situation is very similar to that of the raw milk microbes.

## 5. Conclusion

For GIs to protect the place of microbes in the cheese production, the specifications should differentiate the ways of making cheese not through the use of raw milk versus pasteurised milk. This will always lead to clashes on excessive hygiene practices.

Cheese GIs should differentiate between conform and creative interpretations of the GI typical quality.

In conformity to typicality GI, milk is a resource which is transformed in the hands of the cheese makers so as to meet the typical quality they commit themselves to produce.

In terroir partnership GI, terroir and microbes are a partner of the production. They must specify the good or unacceptable practices necessary for cheese makers to respect the terroir and microbes.

This last understanding of terroir emphasizes the know how of the cheesemaker and his knowledge of the microbial ecosystems required to listen and express terroir, which includes to prevent pathogens to disturb these ecosystems. It is absolutely not a "laissez faire". It's a "know how not to do" allowing the partner to do its part of the work.

A main difference between this understanding of terroir and the conformity to a standard interpretation is of course the variability of the production. While a certain standardisation is a marketing clue for the ones, it is just the opposite and the variability which is at the core of the others commercialisation.

The variability of their cheese would be a drawback in the first way; it is an asset in the second because it supports the curiosity of the customers.

By emphasizing the difference between both interpretations of terroir, GI could help their co-development.

For sure, none of them could survive one without the other. Standardised terroir fosters lower prices and new customers while innovative terroir brings prestige and invents the reproduction of terroir in a constantly changing world.