



« **Would you like to taste the *Campylobacter*...?** » –

Should the lawyer be afraid of bacteria?

Questions to Max Bugnicourt, Academic – Author of the Dictionnaire de Microbiologie Générale (Ed. Ellipses, 1995);

Interview by Jean-Philippe Bugnicourt, Engineer and Researcher Lascaux;

English translation by Lise Rihouey, PhD student, Lascaux.

A [study by the European Food Safety Authority](#) (EFSA) - published in January 2010 - shows that on average, 75.8% and 15.7% of chicken carcasses are contaminated with *Campylobacter* and *Salmonella spp.*

For anyone who knows neither the bacterial world nor its language, the Latin names could sound repulsive or like a joke. Like the figures. But when it concerns our dishes or our stomachs, it becomes more serious and the fun can quickly turn to anxiety. What about the real situation?

[Lascaux](#) asked a series of questions to Max Bugnicourt in order to better understand the findings of this study and to translate the discourse of food microbiology experts. The author taught for twenty years food microbiology.

Here are some exchanges between a scientist and a lawyer, for a better understanding by the latter of a world so familiar for the first one.

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Lascaux: Should we be surprised by the presence of *Campylobacter* or *Salmonella spp* in European slaughterhouses?

Max Bugnicourt: Absolutely not. *Campylobacter* bacteria are common in the digestive tract of animals. They are also found in humans. Most species are, for the moment, harmless, even if some are of greatest concern (like from neighboring groups, e.g. *Escherichia coli*). *Salmonella spp* are extremely diverse (there are over 2000 references). They are mobile, rather fragile and dependent on their host. Highly pathogenic, they can reach enormous densities in animals; therefore, healthy carriers (including human) are still rare.

Lascaux: What about the published percentages (75.8% for *Campylobacter*, 15.7% for *Salmonella spp*)?

MB: It is quite « normal » to find a high percentage of *Campylobacter* in carcasses in slaughterhouses and less *Salmonella spp*. The first bacteria can easily survive outside its strict environment while the second, quantitatively more dense and more frequent in the digestive tracts of animals, survives less well outside of its environment. However, we have to take care of the results interpretation. The figures are sometimes misleading. From my point of view, the percentage of *Campylobacter* presents less risk than the smaller – but high – percentage of *Salmonella spp*. There is also a good bet that the percentages vary significantly from one institution to another...

Lascaux: The EFSA study mainly draws results country by country ...

MB: The European authority publishes an average that does not have much explanatory value. A better solution would be to present tables identified by institutions, which would designate « the best and the worst students ». The average is always a solution to reassure lazy and unscrupulous people about hygiene.

Lascaux: Beyond the methodological question, should we worry about the results themselves?

MB: I prefer to speak of vigilance rather than concern, knowing that it would be ideal to have measures before and after. The values of the study seem « high », but tolerable. We can imagine that they were previously above: we are now in a context of declining bacterial populations present on carcasses, and everyone applauds. But, paradoxically, the more the values fall, the greater the risk grows as the industry has wrongly tended to consider these figures as tolerable.

Similarly, the succession of anti-bacterial treatments leads ultimately to the selection of robust and dangerous bacterial populations. It is infinitely more disturbing to see 5% of carcasses carrying salmonella after heavy treatments than 15% spontaneously measured: salmonella have not the same profile in both cases.

Lascaux: What are the risks caused by *Campylobacter* and *Salmonella spp* to human health?

MB: « Purely digestive salmonellosis » gives gastroenteritis that doctors often refer to seasonal viral gastroenteritis. The products under investigation are often poultry, eggs, beef products and preparations involving milk, cream, sauces, dirty water, etc. Salmonellosis are often related to a serious lack of hygiene. The chickens are indirectly involved.

The « campylobacteriosis » are common in places that lack good hygiene. Children are the main victims. Gastroenteritis results of a consumption of contaminated milk (raw milk), water or food (like undercooked food). It is usually related to an incident appeared at the end of the food chain, and not in slaughterhouses. Therefore, we have to be careful to not consider the European poultry as a « scapegoat ».

Lascaux: EFSA also published a [report](#) indicating that dioxins – which number in the environment has decreased overall since the 1970s – are present « at low levels in many foods ». What relationship do you establish between the two studies?

MB: We need to monitor transportation, storage, distribution, retail, cutting, but also the way we use water and air. There is a population of silent germs, ready to be important tomorrow if we are not vigilant on some details today. We can also expect unwanted molecules of chemical or microbial (toxic algae) origin tucking into food (poisons, toxins, etc..). We cannot assume their impacts or effects regarding the precautionary principle. Chemical threats (organic and inorganic molecules, elements, DNA fragments, mimetics, etc.) such as « dioxins » are important because they are discrete, and the risks to come to our plates and / or in our environment (the water, etc.) are high.

Lascaux: Concerning the first EFSA study and the bacterial risks to consumers, do you think we are ready to detect and eliminate them?

MB: For the detection, yes. The most reliable sampling, culture and identification procedures are those of veterinary microbiology and food bacteriology. There is *a priori* no risk that an experienced microbiologist misses the detection of a dangerous germ in a sector that involve a « quality manager » and / or is placed under the responsibility of a State body (such as veterinary laboratories) or an independent third party.

Consider to « eliminate » the risk results of the profound ignorance of the biological biology. It is better to train operators to strict hygiene or to the automation of operations (e.g. for chopped steaks or yogurts). Tackling against suspected dangerous germs is like leaving the space occupied by “innocents” and opens the door for germs that have resisted our means of extermination. This is the opposite of the "zero risk" policy and the certainty of the "danger". Basically, the reassured man is also a threatened man.

Lascaux: What are the weaknesses of control systems according to you?

MB: The worst enemy of hygiene is the routine that creates habits. It requires monitoring procedures, blind-testing, expensive flash tests, continuous training of operators and systematic introduction of advanced techniques in food chains ... But we must not forget that the vast majority of gastroenteritis are from domestic or artisanal origins (e.g. poor hygiene conditions). The downstream fault is very common.

Lascaux: Therefore, there is no "zero risk" ...

MB: It is unrealistic to imagine that there are ways to eradicate these bacteria. The key element is to determine whether the procedures for producing and processing food are safe or expose the « trustful » consumer at risk. That is the problem: the consumer no longer prepares his own food; when the industrial cannot consider eradicating such bacteria. The solution could be compliance with written procedures, quality mechanisms, some vigilance and surveillance, and audits.

Lascaux: Something to add?

MB: Europe should consider the use of tested methods for anti-microbial struggle along the food chain (electromagnetism, additives, radiation, vacuum), when canning, pasteurization or refrigeration show their limits.

Finally, no one can regulate and decide what is good or not for human consumption without a good knowledge of the microbial world - even not lawyers. The earthly life is born with bacteria and will eventually end with bacteria: they will ultimately have the last word. The men have everything to gain (including for their health) to interact with the most experienced Earthlings. Anyone who is interested in microbiology and who wants to learn more should comply with its requirements or waive.

