

STUDY OF PUBLIC PERCEPTION IN FRANCE ABOUT A POTENTIAL FORTUITOUS IMPORT OF GENETICALLY MODIFIED FISH

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ABSTRACT

DOGMATIS is a multidisciplinary research project funded by the French Research Agency (ANR, programme ANR-OGM 2007-2010). The transgenic technologies have been applied to fish since more than 20 years now and some strains are at the premarket or market stage in countries outside Europe. In Europe the main risk is a fortuitous import. Any rumour of uncontrolled arrival of GM fish on the European market may have strong impacts on the market chain, the research and innovation system and the trust in public regulation. The aim of DOGMATIS is to anticipate the answers. This programme is presented in another communication in IIFET 2010.

As for socio-economic aspects, we studied the risk of fortuitous imports, as mentioned in the other communication, and we studied the perception of the public through two methodologies : (i) consumers focus groups organised twice (2007 and 2010); (ii) some comprehensive interviews with economic actors (wholesalers, retailers, supermarkets, fish farmers) and NGO. We propose to present the main points of our results about public perception, showing a complex set of perceptions linked with a multi-faceted image of transgenetic animals, as a potential technical innovation and/or a potential source of questions and debates by numerous ways.

Keywords: GMO, GM Fish, perception, consumers, focus group

INTRODUCTION

After 20 years of research, transgenic fish is becoming a reality: Atlantic salmon with improved growth rate is at the pre-market stage in the United States, and an ornamental fish, a zebra-fish expressing fluorescence, is already commercialised in Singapore, Taiwan and USA. Among farmed species, the scientific literature shows that transgenic lines considered as close to commercial consideration exist for several species.

The French market is widely supplied by imports from all over the World. If we refer to the crisis provoked by plant GMO production there is no doubt that rumour of effective unauthorized import of Genetically Modified Fish (GMF), even fortuitous, would have detrimental effects on public confidence, and consequently on fish market and innovation systems.

In order to anticipate such a situation, the DOGMATIS project (2007-2010), funded by the French Research Agency (ANR), has proposed to develop dedicated strategies through multidisciplinary approaches, and to deliver:

A critical analysis of the technical reality and expected evolution by characterizing the impact of the transgene and transgenesis technique on transgene stability and flow,
Some methodologies and possible routes of GMF detection, using the basis of the detection strategies for plants, and setting specific methods for GM fish,

- An assessments of the risk of fortuitous presence in our market, by crossing the data from scientific literature data and an expert analysis of filtered statistics of international trade,
- An assessment of public perception levels, using focus groups for analysing the rationalities of citizens and performing some interviews with economic actors and NGO,
- Some drafts for dedicated regulations and laws, issued from an analysis of the present regulation on GM organisms and of the gaps existing with the reality of GM fish and fish market chain.
- A description of GMF representations and ethical implications, beyond the very classical -theory driven- representation of science used in the GMO debate up to now.

DOGMATIS is a network of scientists in various fields: fish genetics and transgenesis, GMO detection, fish markets economy, consumer's sociology, law, philosophy and epistemology. We propose to unravel the multiple dimensions of GMF with progressive interdisciplinary approaches that will deliver results to be exploited both by experts of the different disciplines involved and by the overall network.

The Work Package « socio-economics » has two main objectives:

- 1. An assessment of public perception
 - using consumers focus-groups
 - performing face-to-face interviews with economic actors and NGO
- 2. An assessment of the risk of fortuitous imports of GM Fish in France
(which results presented in the IIFET 2010 conference in a poster and a paper in the proceedings, Mariojouis et al. 2010)

The present communication aims to present preliminary results about public perception. We are close to the end of the programme but still our analysis is not completed. In the present communication, we shall mainly give the results of the consumers' focus-groups, and some common key-findings issued from the interviews with the economic actors of the aquatic products supply chain.

FIRST PART: THE CONSUMERS FOCUS-GROUPS

Methodology

Two rounds of focus-groups have been organised:

- in Toulouse (South of France) in 2007: 6 focus-groups, 38 participants in total,
- in Paris in 2010: 5 focus-groups, 32 participants in total.

The focus-groups have been conducted following a script including the following items:

- Presentation of the programme and its objectives
- Fish consumption habits
- Perception of aquaculture production modes

Illustrated by 3 slides, showing earth ponds for freshwater polyculture, trout farm with raceways, salmon farm in floating cages.

- The question of GM Fish

Illustrated by slides showing the types of GM Fish that could be a commercial reality in the future: salmon for human consumption with improved growth (case of AquaAdvantage produced by AquaBounty Technologies, presently applying for approval at FDA, USA), fishes for human consumption resistant to diseases, fluorescent ornamental fish (case of GmoFish, already marketed in Taiwan, Singapore, USA), fish used as models in research laboratories.

- GMF and markets, including questions about labelling

Each focus-group lasted two hours and a half, and was moderated by a sociologist.

All the participants were fish consumers except 3 vegans.

In the first part of the focus-groups, we invited the participants to speak about their fish consumption. We found that their perception of fish is “usual” for French consumers: while fish is an appreciated food with a good image, fisheries and aquaculture are generally not well known, especially aquaculture, with some questions and doubts.

Thus our focus-groups invited people to speak about a remote object, for two reasons:

Fish is present but little known
GM Fish is absent....

The two rounds of focus-groups gave convergent results, so we can give an overall analysis.

Results : main features

Faced with a phenomenon still imperceptible, about which uncertainties are important, the consumers elaborated their thoughts taking their bearings in existing fields: their knowledge of farming, terrestrial or aquatic (personal experiences or medias information), and the domain of plant GMO.

The focus-groups have been the place of real debates where participants articulated their thoughts, expressed doubts, asked questions, around the positive or negative aspects of a potential use of GMF, and related topics.

Our results show that it is not possible to simply classify consumers in two categories: the PRO GMF and ANTI GMF. The debates during the focus-groups were not the place for a permanent controversy between two groups. Most of the people expressed mixed opinions according to the presented situations and aims of genetic modifications, and this is in accordance with the findings of the PABE programme (Marris et al., 2002).

Indeed, people arrived in the focus-groups with their own opinions, often inspired by the ones they have about plant GMO. We could identify three groups: some people were in the state of mind to refuse GMF, on the opposite some people very open to new technologies showed an openness to GMF, and the rest of the participants were in an intermediate position, marked by cautiousness and sometimes reluctance.

But what must be noticed is that the organization of the focus groups, inviting participants to consider successively several questions, including different objectives for making GMF, had for consequence that people elaborated argumentation, practiced reflexivity and finally showed nuanced opinions, or changed opinions, on emergent questions.

A transversal analysis of the FOCUS GROUPS contents shows that the reasoning of consumers is built on two main axis of thoughts:

1/ the GM Fish as a biological object and a technical innovation, with regard to their visions of nature and of man-induced changes

2/ some socio-economical and political stakes

Axis 1 : the perception of GMF is related to some differentiated visions of nature and of man-induced changes

We found two opposite perceptions of GMF, linked with differentiated perceptions of the changes induced by that technical innovation on nature, in comparison with the techniques already used.

1. The visions based on the perception of a threshold: making GMF is “passing a threshold”

For a part of the consumers, transgenesis, compared to the genetic improvement based on selection of reproductive animals, represents a threshold beyond which there is a space with unknown limits and characterized by non-reversible consequences.

That feeling of “threshold” can be related to:

- the extent of the induced genetic modification,

or/and

- the short time needed for it, compared to the time period needed for genetic improvement by selection.

The extent or the nature of modification

Transgenesis modifies what basically makes nature and life: the genome.

It allows to mix species and thus to go beyond the laws of nature, which is not possible with selection.

« The GMF is a bit like playing with fire, it is fiddling with the essential, well, for me the genome is something essential »

« what was done before took into account the natural parameters, so you could reproduce animals only inside the same species. Now you can introduce a gene which has nothing to do with the species »

Accelerating time lapse

Based on the fact that the natural equilibrium has needed a long time to be built and to evolve, and that the changes have been validated by that long time.

Same idea for farm selection.

The GM creates too quick a change for the species and nature.

« there are genetic modifications on the long term, and in a way I think it is less scary because one feels that it is like natural evolution, on tens or hundreds of years, but there, it is too brutal »

The consequences of passing the thresholds

What is said about the consequences refer to a global view:

- for nature: all the natural equilibrium will be broken or altered,

- for social times: the consequences are considered on the long term,
- for populations: the consequences for the coming generations,
- for all the concerned fields: health, environment, economic repercussions.

Moreover, for the consumers, if the GMF threshold is passed through, the consequences will be irreversible.

« I would first be concerned by the GM Fish escaping in the sea and that there will not be any wild fish left, and that will not be possibly changed once it happens »

“we know what happened for plants, I don't see why it would not happen for animals, an animal precisely is more autonomous, so it is obvious that it will escape”

« All the ecosystem will be bowled over »

“we are talking about trophic chains, if a bird eats the GM Fish it will induce some changes in the bird, and at the end it is us who eat”

« terrestrial or aquatic animals, anyway there are interferences between the two, and the aquatic environment is enormous, much more than the terrestrial environment, and for me it is almost the same”

« when we'll eat the fish, will that transmit something to our body as the fish is resistant to some things ? If the fish is resistant, isn't that going to modify something in us too ?”

“If biology has been changed for fish, and we eat it, why wouldn't it change our biology too ? You can say no, everything is alright during 10 years, but if you see that after 50 years, it may be different”

*“I feel that food is something special, well our body is what we eat (...)
it is not that I am especially afraid, no, it is something more collective, that sounds like science-fiction”*

The limits of innovation

Passing the threshold would open a space the limits of which are unknown: after animals it will be the turn of human beings, all sorts of abuses due to that innovation are possible:

“And then the fish, the mammals, and then it will be us, for sure, for me it is really the beginning of going along that way »

“I find that this raises the question of the limits, and who control the limits, and on which criteria the limits are set up”

Animal selection and farming is already a questionable use of the intervention of man on nature, or not

In that group considering that GM creates the passing of a threshold, 2 perceptions of the animal selection have been observed:

- **those considering that farming and animal selection already altered nature, and a solution would be to change for alternative techniques, closer to natural balance**

« the true question is why the fish in farms have disease, and how it is possible to solve that. It is intensive and I think that the fish does not feel well »

“ you could have strains with slow growth, a low fish density , and then you would have less pressure from diseases ”

○ **those considering that the genetic selection is issued from nature and therefore natural**

The selection is present in the nature, man has just taken it and uses it as a continuous process. The intervention of man is not a factor that makes a difference between what is natural and what is not. Only genetic modification is a non-natural method.

« for me, the selection of reproductive animals, it is a bit like enforcing the natural selection »

2. The continuous vision : man has always intervened on nature, and “pristine nature” does not exist any more

The GMF represents an innovation not different from those developed before. There is a logical continuation in the technical progress, used by man for his own needs. GMF is one more step in the technical progress.

“If our ancestors had thought along the same lines as some French people now regarding GMOs, when they began genetic selection, we would not be 6 billions on Earth today because we could not have fed 6 billion people”

« there are plenty of things that we eat and which are not natural, and we too change along. I say that we eat modified things, because of the pesticides on the crops, we eat them, so why not modify organisms? »

In this group, we observed 2 different perceptions of the technique that we can characterize under these expressions: the “technophiles” and the “technophobes”:

For the « technophiles », GM Fish will complete existing techniques, and the questions raised by this innovation are not new:

“Is there more risk to modify a gene than having several medicines ingested by the fish that we then consume ?”

“the objections are related to the impact on the environment, but that has always existed. It is not because you make the process shorter that it will change”

For the « technophobes », the problem is a bad utilization of technique:

- bringing a standardization of food that would continue with the GMF, with a risk to lose the identity and the pleasure linked with gastronomy :

« the major risk of GM would be to lose the quality of the meat, the gustative quality »

- giving priority to an evaluation based on efficiency, instead of taking into account the public good: health and environment:

« it means to allow oneself to modify nature and not even aiming to the common good »

« What I think is that I am not anxious about the product itself, but I am very worried for biodiversity, I think it is a huge problem if we make species disappear »

The discussion about the risk associated to GM Fish as a biological object and technological innovation is not all the viewpoints, which also take into account other dimensions, economical, social, political. In that, the controversy about GMF concerns as much their socio-economical attributes as their intrinsic qualities.

Axis 2: The apprehension of the production and the market of GM Fish

We found here a debate about the social role that GM Fish could play, setting in opposition:

- a critical and skeptical view, through the critic of marketisation associated with the creation of a GM Fish industry,
- some positive arguments presenting the capacity of GM Fish to create a market that would compensate some socio-economical and natural imbalances.

GM Fish could allow to « feed the Planet » and help to protect over-exploited fish stocks

« if that can feed more people, if effectively in the countries where there is a lack of food, it is a solution to feed some people, then it has to be done »

BUT may create a “two-speed market”: cheap GMF for the poor, good fish for the rich

« in the fish shop, we are going to have some wild fish, but those will decrease, we know that and the price will increase. And who will be able to afford that? the rich, of course, and GM Fish will be for the poor, for the deprived »

GMF could create a dependence for farmers, and put at risk some existing industries: conventional aquaculture, fisheries

“I think all these companies, it is like for cereals, they produce GM cereals which they have the seeds of, but that you cannot reproduce... and then the farmers are obliged to buy seeds each time. So it means that it aims at controlling the world food supply, and that will be a resource detained by some people”

« In Canada they have an industry based on salmon fisheries...(…)... you should not go against another industry, it is important to keep the fisheries also »

No-choice OR choice for the consumers and the society ?

There is a risk of GM Fish entering markets without the public being aware of it...

If there is labelling, the consumer will have choice to buy or not to buy, but it does not solve all the problems, as shown in the following quotation, because of the difficulties for a segregation of supply chains (conventional / GM), and because labelling hardly allows a total guarantee for non-GM products.

“and overall, we see for plants that the segregation between market chains is not possible, today in most of the products in supermarkets there is... well when there is less than 1% GMO, it is not even labelled, and nobody takes the risk to say there is 0% in a product... so if we let GM Fish be authorized, probably the segregation of market chains will meet the same problems. And there we speak only about whole fish, but what about preparations and the preparations with a very small amount...clearly, individually it will not be possible to decide not to eat it”

Scientific information is indispensable to evaluate the potential risks, and the necessary time for those studies should be allocated

“there should be time for scientific studies of the long term consequences, and time for thinking about ethics, before authorization of commercialization”

But scientific information may not give sufficient response

« when discussing with a scientist about GMO, he said : I could speak one hour and a half in favour of GMO, and one hour and a half against GMO, so the uncertainty is shared by everybody. ”

“It seems to me that the researchers working on that subject are not able to say with certainty what the consequences will be”

And it may be necessary to decide to have a strong position like a boycott or demonstrations

« we know very well that now, we cannot think in terms of one country, what happens is planetary, this is why we have to be vigilant, and even we'll resort to boycott as it was said before”

Making GMF will create false needs

Following the demand coming from whimsical consumers in a consumer society

« it is always mass consumption, OK you have to eat fish, and this, and that, you don't think about that consumption, about what it can induce, so some companies set up the means to satisfy the demand”

Making GMF will create new needs while existing products and techniques could satisfy the needs

- for GM seeds (fingerlings) and associated technologies
- for “gimmicks” (for GloFish)

« (about GloFish) : these are gimmicks, it is useless, nature makes beautiful things, we don't need to improve all that »

Conclusion of the focus groups:

Although GMF is a remote object today, consumers are not indifferent to the question of GMF, on the opposite it raises a lot of questions and opinions are voiced, which proves that a public debate would be of great interest, if the GMF production turns to an economic reality.

If GMF raised some elaborate arguments about the potential pros and cons, a great part of the participants declared they were against a commercialization of GMF in the present state of available knowledge; the question of the needed time to study and to think before a decision was often put forward

Our results show that the genetic modification applied to fish brings a supplementary dimension to the perception of GMO by consumers, because they are animals, and as such perceived as closer to human beings, and because the aquatic environment is viewed as a continuum with all environments.

SECOND PART: PRELIMINARY RESULTS OF THE INTERVIEWS WITH STAKEHOLDERS IN THE AQUATIC PRODUCTS SUPPLY CHAIN:

We studied the public perception of GMF in three interest groups: fishfarmers, NGO, and economic actors in the aquatic products supply chain. As our analysis is still on-going, we cannot present here our results. Nevertheless, we shall here present the common key-findings concerning the third group, as it gives a useful complement to the focus-groups results.

We performed 19 interviews with different types of economic actors:

- wholesalers for fishmongers and restaurants,
- wholesalers for collective catering and chained restaurants,
- supermarkets,
- processors.

We observed some common key-points when analysing the interviews contents of the different groups:

1/ GMF is a remote subject

GMF is almost unknown for most of them, and the main source of information has been the media. GMF is not a studied subject because *“today it is not necessary, the question is not present”*.

2/ BUT on another hand, the question of GMO is already present in many specification lists of supermarkets, wholesalers for collective catering and chained restaurants, processors, that specify:

- fish feed should not include GMO (quoted in specification lists of supermarkets, some wholesalers, some processors),
- fish should not be GM (quoted in all the specification lists we had access to).

More generally, in all the interviews the actors declared that today, they do not want to use GMF as they are rejected by consumers, in addition to some other un-answered questions regarding GMF.

3/ For all: in the present state of the markets, it is impossible to bring GMF on the markets, as consumers would react very negatively, and not buy them

- A rumour of fortuitous import today would create a crisis situation.
- Many of the interviewees were sceptical regarding a future acceptance by consumers.
- Nevertheless, supplying GMF on markets cannot be viewed as a simple introduction of a new product, but would indeed require very peculiar cautions : preliminary scientific studies,

indispensable Government authorization, campaigns of information to consumers before sales, all those steps representing a long period of time

- Even in case of authorization, it would be up to each company to decide or not to market GMF.

4/ Regarding the potential use of GMF

In a situation of uncertainty, the interviewees expressed cautiously opinions and questions about the potential technical advantages and the potential risks (environment, health). We observed that they often expressed personal opinions, like consumers.

Some mentioned the responsibility towards their customers, as a concern in case of fortuitous import of GMF.

5/ About the actions that should be set up in case some GMF reach the market :

- information and labelling are indispensable for all, to be in a transparent relationship to consumers, and allow their choice,
- the necessary framework for that commercialization should be set up at international level, at least EU scale

About the new practices which would be needed in the companies:

- generally the interviewees found difficult to answer about an unknown situation,
- some mentioned the need to set up controls on the products (the question of availability of adequate technique was rarely mentioned), and for the supplies (existing traceability being a first basis)
- seldom the question of segregation of supply chains (conventional, GMF) was mentioned.

Conclusion of the preliminary analysis of the interviews with actors of the supply chain

These first results are coherent with the perception of the consumers observed in the focus groups. While GMF is a remote object, the economic actors, except for small companies, have often anticipated the risk of fortuitous import, and establish an a-priori position excluding GMF from their supplies, because of a likely rejection by consumers.

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