

HCB Meeting with Mr Pujol and Mr Rémondet - 09/26/2017

Position: Mr Pujol : Scientific watch and prospective delegate and Mr Rémondet : Scientific officer

Institution: HCB

We met Mr Pujol: “Delegate for scientific watch and foresight” and Mr Rémondet: “Scientific officer”. HCB works with 4 ministries: the research, environmental, financial, agricultural.

We discussed about some techniques to do “GMOs” accepted by the laws :

- The NPBT (New Plants Breeding Techniques): genome editing technique without introducing a foreign gene Question: will it be considered as a GMO? Work on the regulation. The HCB is going to consider if mutations such as Crisp Cas 9 is part of an GMO or not.
- Pesticides containing RNAi (interfering RNAs, “new GMOs”). For now, not considered as GMOs (100% organic) but there are many debates and uncertainties around this question.
- Forced mutagenesis.

OUR PROJECT SOFTER SHOCK

We have to place our project in the research and innovation that we have today. We are at the core of a regulatory front. Some people consider GMOs as a transitory stage towards a non-GMO agriculture.

The problem of producing AFP is that when the temperature decreases under -3°C , we exacerbate the risk of deterioration of the buds instead of protecting the plant. Because under ice the buds are at 0°C and are protected from freezing.

We should instead produce ice that will wrap leaves and buds and protect from low temperatures (ice = very good isolant)

Two ideas were told :

- The first one will be to use air humidity - Improve the sprinkling technique : humidity in the air to form natural ice crystals, so find a mechanism to fix these crystals on the leaves using the atmospheric air .

- The second idea is to make bacteria produce specific precursors (chemicals) that will avoid the ice formation INSIDE the plant.

For the security and safety part

INSIST on this part during the conversation at Boston !! Part really important for our project that can save us from “dangerous GMO thought”.

Mr Pujol told us that the techniques and methods we wanted to employ in our system are statistically independent but technically dependent which is perfect, to avoid all genetical transfers. For more safety, do not hesitate to accumulate the different strategies because one is never sufficient.

We have to be careful, if we take a chassis of the leaf, see if the killswitch affect also microorganisms that are similar but don't carry the GMO plasmid, disrupt horizontal transferts .. → solution different killswitch systems. The horizontal transfers btwn all organisms on the leaf are already facilitated. If the idea is to kill organisms that receive the plasmid then there is a risk to destroy all the bacterial flora in choosing a bacteria already present on it. If we choose a stranger micro-organism, we lower the risk of gene transfers.

Study which adjuvants do we introduce in our solution, to not perturb bacteria.

Good idea the fact of adding only a solution (non natural AA) after we have sprayed our mixture in the leaves. Avoid more contacts with the environment. (DEVELOPER PLUS) Make sure that the amino acid we choose is not present in the environment. For the mutations introduced, do not hesitate to insert it in two different places of the genome in order to lower the statistical risk of reversion (example of Oxitec engineered mosquito. There was a problem because of mutations in the offspring deleting the dependance to the synthetic compound).

For the bioreactor, to use it we should first ask for a authorization to the gouvernement.

We could spray the result (proteins, compounds etc ..) from a GMO product. There are no specific authorizations needed.

The idea of not producing a GMO should be kept to propose another version of the project and show our reflexion for an industrial development.

Human Practices

Engaging with farmers is a very important part => we must value this during the presentation.

VERY IMPORTANT TO ENGAGE WITH FARMERS AND CONSUMERS !!

The toxicological part is very important. We need to develop as much as we can for the wiki . For the GMO regulation: The toxicological and ecotoxicological tests are very important, in order to place our project in a GMO category for the society security. For such a project, the toxicological studies will require huge means and be very long (study on rats especially)

Their opinion

Good thought in the biosecurity of the project, the project is well-balanced and structured, that works meaningful on the society.