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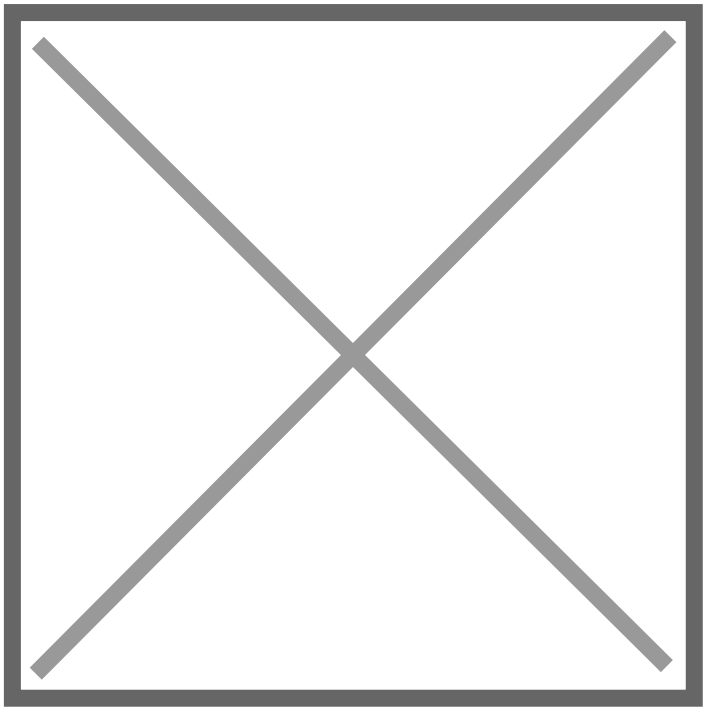
"We expect golden rice to reach farmers in 2011-12"

09 November 2006 | News



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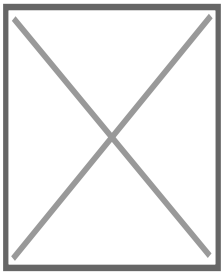

Prof. Ingo Potrykus is the co-creator of the famed golden rice. He is also the emeritus professor at the Institute of Plant Sciences, Swiss Federal Institute of Technology in Switzerland and is working for the deregulation of the golden rice. During a recent visit to India, Prof. Ingo Potrykus shared his views on the bio-fortification power of the golden rice and expressed concern over the delay in getting the regulatory approvals.

Why has the golden rice not reached the ultimate end users as yet?

I am deeply frustrated that the golden rice is still not in the hands of the farmers. It could take a long time to reach the people and the delay of every single year costs India alone between 5,500 and 39,700 lives. The key hurdle stalling the availability of golden rice is the regulation. Though the product (golden rice) is ready, it has still not been able to help save lives. It should be released as soon as possible.

Why is there a delay in getting the regulatory approvals?

According to me, the delay is hundred percent to be blamed on the regulatory system. Genetically Modified Organisms (GMOs) are regulated, although there is no scientific justification for this regulation. The argument for regulation is that the GMO technology leads to contradictory genome alterations. Although traditional breeding leads to massive contradictory genome alterations, it is not regulated and so the logic for the regulation of GMOs is beyond understanding. Since the regulation is firmly established around the world, from the moment we had the scientific breakthrough, which we wanted to give free of charge to the developing countries to help in improving nutrition, we had to do hundreds and hundreds of additional experiments to develop a product, which has a chance to pass through the regulatory process.

To give you a few examples: Regulatory authorities do not accept materials that contain a selector marker gene. There is no scientific reason for this consideration. So we had to spend two years in breeding out the selector marker gene. The regulatory authorities have stipulated that there should be no unnecessary piece of DNA in the genome which means that the integration pattern has to be streamlined. So we had to produce thousands of events to screen for one event which has a streamlined integration and this took us another two years. And so on and so forth.

There are numerous cases, where without any scientific justification the regulatory authorities have set a stage where years and years are lost for a product which could save lives. And that is why I am deeply frustrated.

How soon do you think the golden rice can be made available?

Assuming that the entire regulatory process will run on similar lines as with other GM systems, we expect the golden rice to reach the hands of the farmers in India, Bangladesh, Vietnam, Philippines, Indonesia and China in 2011-12. It will take so long because after investing six years into developing events that are amenable to the regulatory authorities, we can now start developing varieties. It did not make sense to have varieties until we had the right events to use as a basis for variety development. And then these varieties have to be deregulated.

The variety development in India, Philippines, China and Bangladesh, Indonesia and Vietnam will take two to three more years. Then these varieties have to be taken through the full regulatory process.

The technology was ready to be used in 1999 and if we would not have had the problem with the regulatory situation, plant breeders could have released the varieties in 2003 itself. So we are talking about eight years lost due to the regulatory process. If one relates the eight years to the fact that golden rice can save between 5,500 to 39,700 lives in India alone every year, one can see the consequences of regulations. I strongly feel that regulation does not protect people, rather regulation kills people.

Since the last seven years, I have been trying to present this. I am not expecting anything in return. I just want to make the golden rice available as fast as possible for the developing world, which is proving to be very difficult.

Many people have their apprehensions regarding the safety aspect of transgenic products. What are your comments?

Why are people concerned about GMOs? It is because of the fact that GMOs are regulated. I am afraid that much of this concern in public, in retrospect, reflects that GMOs are heavily regulated. An unbiased citizen will automatically believe that if a government regulates a technology, as strictly as it regulates GMOs, there must be a reason for this. And scientifically speaking there is no reason.

We have conducted extensive tests and now we have data from the first human feeding trials of the golden rice. From this data, we know that the bioavailability or the conversion to vitamin A is four times better than we expected. So now it is absolutely clear that even modest consumption of golden rice by children and lactating women will bring them out of the vitamin A deficiency status.

The old Greenpeace argument said that the golden rice is not good because children have to eat far too much rice than they can consume is out. In fact, those children and women have to eat only part of what they normally eat in rice to have enough vitamin A to be protected.

We have the results from three independent socio-economic studies done in the Philippines, Bangladesh and India. The study in India is the most extended one, which shows very clearly that the concept of bio-fortification for reducing weakness and malnutrition is very good. It is not only a biologically sensible approach, but it is probably the best available approach from the nutritional point of view and is by far the cheapest approach.

The Indian study compared the cost for interventions against malnutrition and they arrived at surprising figures. The most effective intervention used in India so far is the free distribution of vitamin A capsules which is a sensible approach, but the cost of lives saved every year using this intervention is $168, which does not seem much, but if one uses golden rice, the cost is only $3. Golden rice is sustainable because it virtually costs nothing.

The study also made clear that its potential in reducing vitamin A malnutrition in the Indian rice eating states is 99 percent. Where people eat rice it is enormously effective, if it has strong support from the government and is treated as a typical intervention. It should go into school meals and should be handed by the government by the other interventions also. It cannot be just left to the free market. It is critical on the whole, that the government uses its full capability of directing the product.

At what stage of development is the golden rice now?

We have transferred the trait to a series of carefully chosen argonomically successful Indica rice varieties in a number of different developing countries, and the trait is perfectly well expressed in all the different varieties. We have data from the initial field experiments done in the US, which shows specifically that the trait does not interfere with normal agronomic performances. So it is foreseeable that as soon as it passes through the regulatory procedure, golden rice will be successful.

In order to encourage farmers to use golden rice, we are making sure that that this trait is combined with other valuable agronomic traits which are of interest to the farmer.

Are you planning to introduce other traits as well into the golden rice?

Golden rice has successfully demonstrated the power of bio-fortification. It has provided proof of concept that to improve the micronutrients content on a genetic basis, genetic engineering technologies are successful. So I think it is fair to say that the golden rice has got the concept of bio-fortification started and moving. We are now working on improving the golden rice by adding iron and zinc.

I would like to see similar success with iron and zinc, as it is clear that these are even more burning deficiency problems. I am convinced that scientifically this would be possible and we are working on it. But it will not be deregulated easily. I have talked to numerous regulatory authorities about this concept and their reaction was identical.Under the present regulatory regime, it would not be possible to deregulate vitamin A, iron, zinc fortified in rice. Everyday nearly 24,000 people are dying due to various malnutritions. In five years from now, we will have rice with vitamin A, iron and zinc which could rescue many of those 24,000 people, but our GMO regulatory system will not allow this.

What is your message to the scientific community working in the agriculture segment?

The first message is that we have a deluge of molecular knowledge about plants, which is waiting to be used. I would love if some scientists had the interest to get them to work. It is far more convenient to work in the so-called "ivory tower" and most scientists are happy working there. My message to them is that they should take up some responsibility towards the society in addition to their academic work. My message to those few scientists who try to do something outside the "ivory tower" is that it is a very very tough job, far more difficult and demanding than research, leading to a pile of problems and frustrations.

My message to the scientific community is that they should not only award scientists focused on academic research but also institute some awards for those who take care of humanitarian problems. In our academic environment, there is no mechanism and no funding for this type of work.

And last, my message to the public sector is that the solution to humanitarian problems is your responsibility. It is not right to expect that the private sector will solve the humanitarian problems. The public sector should own its responsibility.

Rolly Dureha