



FoE Africa
ALERT 01

Does Africa Need a Genetically Modified Solution to Diarrhea?



March 2007

FOE Africa alertⁱ: No to the *medicine* rice

On the 6th of March 2007, it was reported in the media that a new variety of Genetically Modified (GM) rice containing human genes obtained preliminary approval from the US Department of Agriculture (USDA) for large-scale planting in Kansas. California-based Ventria Bioscience, the developer of the rice, claims that it can be used to treat diarrhea. A BBC TV report on the 6th of March showed images of African children in a hospital as an example of some supposed beneficiaries of the new rice.ⁱⁱ

FoE Africa believes that our continent does not need genetically modified solutions to diarrhea and condemns the use of African children as a tool to promote the new GM rice produced by Ventria Bioscience. Diarrhea is an illness that has well-known causes, and proven, inexpensive solutions. Ventria's GM rice is unproven, unnecessary, and a distraction from ongoing programs to save children suffering from diarrhea on our continent.

1. Introduction

Monitoring activities undertaken by Friends of the Earth Africa in 2006 revealed that Africa has been contaminated by illegal Genetically Modified (GM) rice LL601 in Ghana and Sierra Leone, main African recipients of rice as commercial imports and food aid from the United States.ⁱⁱⁱ

The dust raised by the revelation of the contamination of the food chain by an illegal rice variety, LibertyLink Rice601 (LLRice 601), had barely settled when news arrived of new contamination episodes in other parts of the world. On the 5th of March this year, the USDA announced that it was prohibiting the planting of another type of long-grain rice after confirmation of a new case of contamination.^{iv} The genetically modified contaminant detected in a long-grain rice variety known as Clearfield CL131 was not authorized for commercialization. Therefore, the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) decided to prevent its planting and distribution.

Just a few days before this latest contamination episode, it was reported that the USDA had given preliminary approval to a large-scale planting of a new variety of GM rice containing human genes!^v The rice, produced by a company called Ventria Bioscience, has been engineered to produce recombinant human milk proteins to be extracted from the rice for a variety of suggested uses. In the media, Ventria claims these proteins will be used in oral rehydration solutions to treat diarrhea. But elsewhere, the company says it will use them as supplements in yogurt, sports drinks and granola bars.^{vi}

If that earlier contamination was worrisome, the USDA's support for planting up to 3200 acres of Ventria's "pharmaceutical rice" is even more so. We are particularly concerned that this massive planting of drug-containing rice is going forward even though the U.S. Food and Drug Administration has refused to approve Ventria's recombinant pharmaceutical proteins as safe.^{vii}

2. The *Medicine* Rice

The first GM food crop containing human genes is set to raise many socio-economic, cultural as well as ethical questions besides the environmental and health concerns.

This rice is being produced by Ventria Bioscience, a biotech company based in California, USA. According to Ventria Bioscience, the rice, which will be planted on up to 3,200 acres in Kansas, is endowed with human genes that produce recombinant versions of human proteins, including bacteria-fighting compounds found in breast milk and saliva.^{viii} If Ventria's application is fully approved by USDA, this will be the largest planting of a drug-producing food crop in the USA.^{ix}

Ventria has been field-testing rice engineered with human genes since 1996 to produce three pharmaceutical proteins—lactoferrin, lysozyme and serum albumin. When farmers, consumers and food companies protested against their field trials in California and Missouri, concerned that the engineered crops would contaminate rice destined for the food supply, Ventria shifted to Kansas.^x

According to analysts, pharmaceutical (pharma) crops such as Ventria's rice pose a threat to human food supply and public health as the proteins they contain are intended to be biologically active in humans, yet have not undergone adequate testing or received FDA approval as drugs, and thus may thus be harmful if eaten accidentally. The chances of contamination are also high when such compounds are produced in food crops grown outdoors. The contamination routes are numerous, including cross-pollination and seed mixing during commercial growing and seed production.^{xi}

3. Diarrhea: A Watery Entry Point:

Ventria's rice has already been publicized in many written and audiovisual media as an important solution to one disease that particularly affects poor children in the Third World: diarrhea. On the 6th of March, a BBC report showed images of ill African children in a hospital as an example of some of the supposed beneficiaries of that new GM rice.^{xii}

"We can really help children with diarrhea get better faster. That is the idea," said Scott E. Deeter, president and chief executive of Sacramento-based Ventria Bioscience. The proponents of this GM rice say they want to widely introduce their products into oral hydration solution, "which is consumed by at least half of the world's children". They define their product as "the Holy Grail" of rice and assert "that is what every mother would want for their child".^{xiii}

From the company's sources, an experiment using this technology has already been conducted in Peru on 140 infants from 5 to 33 months in age, in hospitals attended by the poorest sectors of the population.^{xiv} Several reports indicate that parents of the children were not adequately informed of the experimental nature of the treatment, and at least two mothers of infants in the clinical trial reported that their infants suffered from allergic reactions, causing the Peruvian government to launch an enquiry into the experiment.^{xv}

4. Does Africa need a genetically modified solution for diarrhea?

Diarrhea is responsible for over 2 millions of deaths every year, the majority in the Third World.^{xvi} Despite being a major cause of deaths among children, particularly

those under five years old, today there are already well-known measures to prevent and treat diarrhea. In fact, these proven and effective measures have already reduced the mortality rate of children suffering from diarrhea from 4.6 million deaths in 1980 to 1.5 to 2.5 million deaths today, and is regarded as one of the greatest medical achievements of the 20th century.^{xvii}

Simply put, when a person has loose or watery stools, he has *diarrhea*. If mucus and blood can be seen in the stools, he has *dysentery*.^{xviii} It can be mild or very serious and may come suddenly or remain for many days. It is known that the disease is more common among young children and especially so with the under-nourished ones. A well nourished child would usually recover from a case of diarrhea even without any medical treatment. For a poorly nourished child, on the other hand, an attack of diarrhea can easily prove fatal.

One of the most prevalent causes of diarrhea is linked to the limited access to safe water supply and sanitation coverage. In Africa, nearly 40 percent of the population has an unsafe water supply and poor sanitation coverage. The World Health Organization (WHO) found that a reduction in the number of diarrhea cases and deaths due to diarrhea was directly related to access to safe water supply and sanitation services.^{xix} As the Water Quality and Health Council indicates, “if access to safe water and sanitation coverage were improved there would be a smaller frequency of diarrhoea cases”, which consequently would mean that patients would avoid costs related to treatment expenditures, drugs, transportation and time spent going to hospital and clinics.^{xx} The WHO concluded in a 2004 study that simple technologies for improvement of water and sanitation “would lead to a global average reduction of 10% of episodes of diarrhoea”.^{xxi} WHO concludes that if the level of intervention was higher, the reduction of diarrhea episodes could be higher: “access to in-house regulated piped water and sewerage connection with partial treatment of waste waters, could achieve an average global reduction of 69%”.^{xxii}

The cause

Diarrhea is a symptom of infection caused by a host of bacterial, viral and parasitic organisms most of which can be spread by contaminated water. It is more common when there is a shortage of clean water for drinking, cooking and cleaning, and basic hygiene is important in prevention.

Water contaminated with human faeces, for example from municipal sewage, septic tanks and latrines, is of special concern. Animal faeces also contain micro-organisms that can cause diarrhoea.

Diarrhea can also spread from person to person, aggravated by poor personal hygiene. Food is another major cause of diarrhoea when it is prepared or stored in unhygienic conditions. Water can contaminate food during irrigation, and fish and seafood from polluted water may also contribute to the disease.

World Health Organization

It is important to note that diarrhea usually lasts a day or two and goes away on its own without any special treatment. Only prolonged cases, however, present indications of other problems. Thus, special treatment for diarrhea is needed only occasionally. What children suffering from this condition need is rehydration as they

lose a lot of water through the diarrhea. There are already very cheap and accessible ways of fighting dehydration by simple oral rehydration therapy.

It is obvious from the above that the world does not require rocket science in order to combat incidents of diarrhea. More than anything else, what is needed is basic hygiene, safe water access and the provision of infrastructure that would support that. Moreover, investing in “genetically modified” solutions when “simple” solutions exist constitutes a diversion of energies from the already challenging objective to guarantee the right to clean water and sanitation.

Interventions

Key measures to reduce the number of cases of diarrhea include:

- Access to safe drinking water.
- Improved sanitation
- Good personal and food hygiene.
- Health education about how infections spread

Key measures to treat diarrhea include:

- Giving more fluids than usual, including oral rehydration salts solution, to prevent dehydration
- Continue feeding
- Consulting a health worker if there are signs of dehydration or other problems

World Health Organization

5. CONCLUSION

African children have been used once again in the media in order to facilitate acceptance for a new product which is not needed in our continent. Diarrhea is a disease with well-known causes, as well as solutions. If deaths from a preventable disease such as diarrhea are to be stopped, more efforts should be undertaken to tackle its causes and greater investments should be made in improving basic water and sanitation conditions in our continent.

We once more state that Africans do not need GMOs and by no means want “medicine crops” beyond the ones already supplied by nature. Africans do not need these expensive, experimental fixes.

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- ⁱ FoE Africa Alerts are special bulletins issued on urgent issues related to genetically modified organisms. FoE Africa GMO campaign is coordinated by FoE Nigeria. Read more about these campaigns at www.eraction.org
- ⁱⁱ BBC. 2007. US mulls backing "medicine rice". 6 March. <http://news.bbc.co.uk/2/hi/americas/6422297.stm>
- ⁱⁱⁱ See Friends of the Earth Africa GMO Campaign http://www.eraction.org/index.php?option=com_content&task=view&id=24&Itemid=23
- ^{iv} USDA. 2007. STATEMENT BY DR. RON DEHAVEN REGARDING APHIS HOLD ON CLEARFIELD CL131LONG-GRAIN RICE SEED. 5 march http://www.aphis.usda.gov/newsroom/content/2007/03/ge_riceseed_statement.shtml
- ^v Washington Post. 2007. USDA backs production of rice with human genes. March 2. http://www.washingtonpost.com/wp-dyn/content/article/2007/03/01/AR2007030101495_pf.html
- ^{vi} USDA/APHIS Environmental Assessment, in response to permit application 04-309-01r from Ventria Bioscience for field-testing of rice genetically engineered to express human lysozyme, USDA APHIS BRS, p. 22, http://www.aphis.usda.gov/brs/aphisdocs/04_30901r_ea.pdf. See corresponding citation for lactoferrin at http://www.aphis.usda.gov/brs/aphisdocs/04_30201r_ea.pdf
- ^{vii} Ventria has tried and failed to obtain FDA approval for its recombinant human lactoferrin and lysozyme since 2003. Ventria withdrew its 2004 petition to FDA for approval of recombinant human lactoferrin on November 20, 2006, when it became clear to the company that FDA approval was not forthcoming. See <http://www.cfsan.fda.gov/~rdb/opa-g162.html>
- ^{viii} <http://www.physorg.com/news92460082.html>
- ^{ix} See article, "Scientist Group Urges Ban on Outdoor Pharmaceutical Food Crops" at <http://www.allamericanpatriots.com/m-news+article+storyid-20631.html>
- ^x See Poulter, Sean, *The Rice With Human Genes*, the Daily Mail, UK 05/03/07
- ^{xi} Ibid
- ^{xii} BBC. 2007. US mulls backing "medicine rice". 6 March. <http://news.bbc.co.uk/2/hi/americas/6422297.stm>
- ^{xiii} Bethell, D. 2006. LActiva and Lysomin: helping to save lives by improving oral rehydration solution. Making innovative diarrhea management accessible
- ^{xiv} The company reportedly sponsored a recent study in Peru and came to the conclusion "that children with severe diarrhea recovered a day and a half faster if the salty fluids they were prescribed were spiked with the proteins." See <http://www.washingtonpost.com/wp-dyn/content/article/2007/03/01/AR2007030101495.html>
- ^{xv} Leighton, Paula. "Study on infants in Peru sparks ethics inquiry," Science and Development Network, July 18, 2006. <http://www.scidev.net/content/news/eng/study-on-infants-in-peru-sparks-ethics-inquiry.cfm>; Diaz, D. (2006). "Transgénicos: Niños ya sufren sus efectos," La Republica (Peru), July 14, 2006. http://archivo.larepublica.com.pe/index.php?option=com_content&task=view&id=116503&Itemid=38&fecha_edicion=2006-07-14
- ^{xvi} WHO. Water related diseases. Diarrhea. http://www.who.int/water_sanitation_health/diseases/diarrhoea/en/
- ^{xvii} Victora et al (2000). "Reducing deaths from diarrhoea through oral rehydration therapy," Bulletin of the World Health Organization, 2000, 78(10). [http://whqlibdoc.who.int/bulletin/2000/Number%2010/78\(10\)1246-1255.pdf](http://whqlibdoc.who.int/bulletin/2000/Number%2010/78(10)1246-1255.pdf); CDC (2003). "Managing acute gastroenteritis among children: oral rehydration, maintenance, and nutritional therapy," U.S. Centers for Disease Control, 2003. www.cdc.gov/mmwr/preview/mmwrhtml/rr5216a1.htm
- ^{xviii} Where There is No Doctor, <http://www.hesperian.org/publications/download.php#wtno>. See also Werner, David and Bower, Bill (2005), *Helping Health Workers Learn*. The Hesperian Foundation, California
- ^{xix} Water Quality and Health Council. http://www.waterandhealth.org/newsletter/new/winter_2005/cost_benefits.html
- ^{xx} Ibid.
- ^{xxi} WHO. 2004. Evaluation of the costs and benefits of water and sanitation improvements at the global level. http://www.who.int/water_sanitation_health/wsh0404summary/en/index.html
- ^{xxii} Ibid