

## Debate 2004'0822: Bt maize and mycotoxins, a documentation

Dear friends,

Thursday I got a piece from Tom de Gregory, and a day earlier the announcement of a new book by Henry Miller and Greg Conco, both sendings encouraged me to assemble some more materials on mycotoxins in maize.

My comments: Actually, we should make a strong point in defining Bt maize as health food, non-Bt maize has been scientifically proven to be riskier, especially in developing countries where growing conditions of maize are not really ok, and more so the storage lacks hygiene. This is an excellent example showing that even the today generation of GM crops can offer benefits to the consumer.

Both authors present the evidence and more so the background of an asymmetric risk perception of the public.

One of the weak points of risk assessment with GM crops is its onetrack-mindedness. Its time to talk about new concepts of risk, which should relate to all kinds of agriculture. Why does organic food has its automatic blessings from the consumers? One of the reasons is that we in science stare like hypnotized chicken in one direktion to find out about the risks of GM food (which is per se allright, but thats not the end of the story)

Therefore I propose to come to a more balanced risk definition, which takes into account a balance between risk and benefit, a balance, the Chinese have found hundreds of years ago by combining the icons risk and chance into the same word RISK.

I suggest, risk should be defined as follows:

<http://www.botanischergarten.ch/Risk/Chinese-Riskdef.pdf>

The piece of Thomas DeGregori has encouraged me to add more documentation, including some helpful slides and a bibliography, see below.

Thomas R. DeGregori: A Fungus in the New York Times

A shorter version of this letter was sent to the Times -- and to the Houston Chronicle, which reprinted the Times piece under discussion:

To the editor:

In his column on language in the Sunday New York Times, William Grimes praises the virtues of huitlacoche, "a fungus that grows on corn" and "ranks as a delicacy in Mexico, where cooks use it to impart a rich, mushroomy flavor to food." True though this may be, Grimes ignores or is unaware of the dangers that huitlacoche poses to pregnant women, particularly poor women who may not have a choice of what to eat.

Huitlacoche is a fumonisin, a carcinogenic mycotoxin produced by the fungus called fusarium ear rot. It inhibits the utilization of folic acid, lack of which in pregnant women often results in infants with spina bifida and, less commonly, acephalous infants. This was very likely the cause of the thirty acephalous infants born in the lower Rio Grande

valley in 1990-1991. A recent article in the Journal of Nutrition has studied occurrences of the condition worldwide, including those in Texas, and makes the risk very clear.

In his praise for Chez Panisse, Grime demonstrates an identification with the food police who would have us fear modern food production while praising that which is "natural" and therefore "safe." Going online, one finds that huitlacoche is a proffered item in "health food stores" in the U.S. A recent investigation by the United Kingdom Food Standard Agency found some batches of "organic" maize (or corn) to have close to thirty times the usual level of fumonisins. The much-maligned transgenic Bt corn has far and away the lowest level of fumonisins, 90 to 95% less than conventionally grown maize, which is in turn vastly below "organically" grown maize, which has the highest level of infestation (DeGregori 2002, 108 109, Burke 2004, and FSA 2003a&b). Fumonisin-infested maize or corn can be fatal when fed to pigs and horses and can end up in milk when fed to cows. And we must never forget the other major fungal infestation of corn (as well as rye and peanuts), aspergillus f

lavus, whose aflatoxins have brought untold misery to humans, such as the affliction known as St. Anthony's Fire, and remains a scourge causing serious health problems and death for the poor, especially where they cannot afford fungicides and the routine screening to identify the infestations. In many poor areas of Africa, the infestation is real and identifiable, but for them, the choice is either to eat the infested grain or starve.

We would not wish to prevent healthy adults (who are not pregnant) from enjoying this delicacy, as long as they are aware of the dangers and can avail themselves of vitamin B supplementation, one of marvels of twentieth-century science, which identified vitamins and then learned to manufacture them cheaply. The issue is serious enough, though, that the Times might wish to run a brief news item for those who do not read the letters column, so that readers have the information to make the proper judgment and take the necessary precautions. Precautionary principle anyone?

Sincerely yours,  
Thomas R. DeGregori  
Professor of Economics  
University of Houston

References:

Burke, M. (2004),  
Electronic Source: Don't worry, it's organic, Royal Society of Chemistry (RSC) online,  
Chemistry World Issue  
6, <http://www.rsc.org/chemistryworld/features/free/CW00406F0030.htm>

DeGregori, T. (2002)  
Bountiful Harvest: Technology, Food Safety and the Environment Cato Institute,  
Washington, pp Pp. xiii, 262.  
<http://www.independent.org/publications/TIR/article.asp?issueID=5&articleID=57>

Food Standard Agency (2003),  
Electronic Source: Contaminated maize meal withdrawn from sale,  
<http://www.food.gov.uk/news/newsarchive/2003/sep/maize> and  
<http://www.food.gov.uk/news/newsarchive/2003/sep/moremaize>  
and <http://www.food.gov.uk/multimedia/pdfs/maizemeal10.pdf>

Marasas, W.F.O., Riley, R.T., Hendricks, K.A., Stevens, V.L., Sadler, T.W., Gelineau-van Waes, J., Missmer, S.A., Cabrera, J., Torres, O., Gelderblom, W.C.A., Allegood, J., Martinez, C., Maddox, J., Miller, J.D., Starr, L., Sullards, M.C., Roman, A.V., Voss, K.A., Wang, E., & Merrill, A.H. (2004)

Fumonisin disrupts sphingolipid metabolism, folate transport, and neural tube development in embryo culture and in vivo: A potential risk factor for human neural tube defects among populations consuming fumonisin-contaminated maize. *Journal of Nutrition*, 134, 4, pp 711-716

<http://www.botanischergarten.ch/Mycotoxins/Marasas-Fumonisin.pdf>

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Further reading on the subject in a broad sense is announced by

Henry Miller and Greg Conco

The Frankenfood Myth: How Protest and Politics Threaten the Biotech Revolution

The book will soon be available, here the details:

Miller, H. & Conco, G. (2004)

The Frankenfood Myth, How Protest and Politics Threaten the Biotech Revolution

Praeger Publishers, London, IS: 0-275-97879-6, pp 296

[http://www.greenwood.com/books/BookDetail.asp?dept\\_id=1&sku=C7879](http://www.greenwood.com/books/BookDetail.asp?dept_id=1&sku=C7879)

you will find purchase details in the link, endorsements of scientists and a short description.

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some more materials:

recipe for an excellent meal with Huitlacoche from Mexico, a famous speciality with some really special features

<http://sugerencias.restaurantesdemexico.com.mx/receta-final-chef.cfm?sug=69>

A text showing the connection between poverty and fungal disease and its disastrous impact on the population, reason enough to switch to Bt maize asap

Exposure of Rural and Urban Populations in KwaZulu Natal, South Africa, to Fumonisin B1 in Maize

Chelule, P.K., Gqaleni, N., Dutton, M.F., & Chuturgoon, A.A. (2001)

Exposure of rural and urban populations in KwaZulu Natal, South Africa, to fumonisin B-1 in maize. *Environmental Health Perspectives*, 109, 3, pp 253-256

<http://ehp.niehs.nih.gov/members/2001/109p253-256chelule/chelule-full.html>

a very helpful text from the internet, the figures included in a pdf - and ppt - document below

Munkvold, G. & Hellmich, R. (1999),

Electronic Source: Genetically modified, insect resistant corn: Implications for disease management,

A. Feature, APSnet, Plant Pathology Online, The American Phytopathological Society (APS) Copyright 1994-2004, accessed: 2004

<http://www.apsnet.org/online/feature/BtCorn/Top.html>

some slides as a pdf document for downloading, some helpful illustrations from the google/internet and from Munkvold et al. 1999

<http://www.botanischergarten.ch/Mycotoxins/Huitlacoche-etc.pdf>

<http://www.botanischergarten.ch/Mycotoxins/Huitlacoche-etc.ppt>

a bibliography extracted from the Web of Science with some more additions about the topic of mycotoxins:

<http://www.botanischergarten.ch/Mycotoxins/Bibliography-Mycotoxins-20040821.pdf>

a further important reference is a report from Kurt Bodemüller:

Bodemüller, K. (2001),

Electronic Source: Health-relevant and environmental aspects of different farming systems: organic, conventional and genetic engineering, [www.internutrition.ch](http://www.internutrition.ch),

InterNutrition - Swiss Association for Research and Nutrition, Switzerland, accessed: 2004

[http://www.internutrition.ch/in-news/mediainfo/med001120zus\\_f.html](http://www.internutrition.ch/in-news/mediainfo/med001120zus_f.html)