



# The World Foundation for Natural Science

## The New World Franciscan Scientific Endeavour of The New World Church

*Restoring and Healing the World through Responsibility and Commitment in accord with Natural and Divine Law!*

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Thursday, February 16<sup>th</sup>, 2017

## ***GMO corn proven not to be substantially equivalent to natural corn***

Genetically modified foods have been allowed to market because of their being labelled *substantially equivalent* to natural foods. In the United States this means that GMO only needs a GRAS – Generally Recognised As Safe – submission from its inventor to the Food and Drug Administration (FDA), in which the onus of proof of safety lies with the inventor; the FDA won't assess for safety [1]. In fact, under the letter of law, in order for GRAS to be granted, the inventor has to prove safety through a history of studies; the inventor must provide all experimental data to show safety; and the scientific community must have consensus agreement of safety [2]. With GMO, this has never been the case; this rigorous law has not been enforced on the GM food industry [1].

In 1993, the Organisation for Economic Cooperation and Development (OECD) introduced the “concept of substantial equivalence” and this was endorsed by the United Nations in 1996 [1]. This means the inventor of a GMO is not forced to conduct rigorous long term studies to prove safety [1]. “[T]he concept of substantial equivalence does not demand solid proof of safety and significantly relies on theoretical assumptions and reasoning. In this approach, if a bioengineered food organism can be ascertained to be ‘substantially equivalent’ to its conventional counterpart, it will be considered as safe as that non-engineered organism, even without the kinds of tests that are necessary to establish that it actually is.” [1]. Substantial equivalence, as a term, has remained ill-defined. The OECD states: “The concept of substantial equivalence embodies the idea that existing organisms used as foods, or as a source of food, can be used as the basis for comparison when assessing

the safety for human consumption of a food or food component that has been modified or is new.” [3] As a letter in *Nature* pointed out: “The adoption of the concept of substantial equivalence by the governments of the industrialised countries signalled to the GM food industry that as long as companies did not try to market GM foods that had a grossly different chemical composition from those of foods already on the market, their new GM products would be permitted without any safety or toxicological tests.” [3]

Over the last twenty years, the negative health effects of GMO foods have been well documented [4]; it's clear GMO is toxic. Read also The World Foundation for Natural Science fact sheet on the health effects of GMO [5].

Now it is evidential why GMO is potentially harmful. A study recently published in *Nature's Scientific Reports* provides **evidence that GMO corn is not substantially equivalent to natural corn** [6]. The study examined the glyphosate tolerant genetically modified maize (corn) NK603. It had been assessed as substantially equivalent to its natural, non-GMO counterpart so it could be brought to market. Yet the study found that, under molecular profiling, 117 proteins and 91 metabolites were found to be significantly altered in Monsanto's NK603 corn by the GM transformation process. The GM animal feed is already approved by the European Food Safety Authority as substantially equivalent and hence considered safe [7]. However, studies show that non-target animal life is harmed by GMO crops considered substantially equivalent. For example, in 2009 Schmidt *et al.* [8] reported lethal effects of the microbial Bt toxins Cry1Ab and Cry3Bb on lady beetles. This study and in concert with at least 30 other publications, resulted in Mon810 cultivation being banned in Germany in 2009 [9]. Other studies show mammals fed GMO soy and GMO corn causes kidney problems and liver damage [10].

The authors of the *Scientific Reports* study, which showed substantial differences between GMO and natural maize, “...observed higher amounts of ROS [reactive oxygen species] that act as free-radicals promoting oxidative stress in those transgenic plant materials. We also confirm a metabolic imbalance in energy and carbohydrate metabolism... the evidence we present clearly shows that NK603 and non-GM isogenic maize are not substantially equivalent and **the nutritional quality of GM feed might be hampered by metabolic imbalances related to plant energy and stress metabolism.**” [6] The health consequences of eating GMO have been observed in

animals and also in humans. A dramatic 50 per cent increase in reported soya allergies in one year alone, occurred when in 1999 GMO soya was introduced to the UK [11]. Also, in 1999 *The Lancet* published a study showing that genetically modified potatoes caused stomach and intestinal lesions in rats [12]. What would happen to humans if we ate those GMO potatoes? Or GMO maize over a substantial period of time? It is reported that chronic bowel diseases have been on a steep increase since the introduction of GMOs in the United States [13].

The US Food and Drug Administration has stated, “The agency is not aware of any information showing that foods derived from these new methods [genetic modification] differ from other foods in any meaningful or uniform way.” [14] Given that most governments currently permit the GM industry to decide whether their product is safe or not, it is imperative a change takes place where independent, rigorous testing is enforced, testing similar to that of the Scientific Reports paper discussed. When such deep analysis of GMO does occur, it becomes very obvious that GM foods are definitely not substantially equivalent and should be banned.

Further to this, in January 2017, a ruling in the California Law Courts upheld that Monsanto’s herbicide weed killer, glyphosate, must carry a warning label of its carcinogenicity [15]. This is because of the findings of the World Health Organisation’s International Agency for Research on Cancer (IARC) which declared glyphosate as a probable carcinogen in March 2015 [16]. The IARC found studies showed that glyphosate may cause a type of cancer called non-Hodgkin lymphoma in humans and that glyphosate does cause cancer in animals [17]. Fresno County Superior Court Judge Kristi Kapetan has ruled that glyphosate should be put on California’s database of carcinogens [18]. The consequence of this is that every product containing glyphosate in California must carry a warning label that it could cause cancer. When glyphosate is sprayed onto a plant, it is absorbed into the plant – it cannot be washed off [18] – **as such a further consequence may be that genetically engineered crops designed to be resistant to glyphosate may also have to carry a similar warning label!** If this was to occur we could see a potentially large decline in the planting of genetically modified crops and an equal decline in the use of glyphosate, something that would be good for mankind, nature and the planet.

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Published Thursday, February 16<sup>th</sup>, 2017 in the categories Natural agriculture, Genetically Modified Organisms (GMO).

<https://www.naturalscience.org/news/2017/02/gmo-corn-proven-not-to-be-substantially-equivalent-to-natural-corn/>