



Bioethics Approach to Genetic Modified Organisms

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Opinion

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Abbreviation: GMO: Genetically Modified Organisms.

Opinion

Ethics, from the ancient Greek – *éthikos* – accrue from *ethos*, usual dwelling, understood as forming habit, which can be understood as character or nature. In the same way, moral, from the Latin – *morales* – is better understood in the sense of habit. Although it can be considered that both guide normal behavior in fact of decisions based on social values, considering the purely linguistic difference, it is possible to conceive a deeper differentiation, depending on the author's interpretation, in which morality is conceptualized as the common habit, not thought, relative to expected behaviors, while ethics as a reflection of this moral attitude. Adopting this sense, it is possible to understand ethics as something transcendent, even by a historical perspective.

According to Socrates, ethics consists in the pursuit of happiness within community limits, which he defines as legal. Based on this idea, Aristotle defines that man seeks his happiness as the ultimate reason, its conquest being possible through the maxim of becoming an individual, since man is not a being who is guaranteed in advance his own being, but he must conquer it by striving for his own freedom. In this context, ethics is related to freedom and determination and it is the guide for the rationality of action, which, repeatedly, produces the *hexis*, or habit. Considering the Christian basis in the Aristotelian ideal, Saint Augustine thought of the meaning of ethics as a choice in the spectrum of free will as a continuation of such an idea.

From this introduction, it is necessary to understand

ethics under a metaphysical or practical horizon. By the first conception, according to Immanuel Kant, ethics is greater than society, as a result of an ideal concept. For the second point of view, based on *praxis*, according to John Stuart Mill, there is a rational conception based on the reasonableness of reality. Therefore, it is appropriate to group the first theory as the universalist one and the second theory as the utilitarian one, being one of the exponents of this second line the communitarianism, in which a group determines what is ethical, reinforcing a positivist approach. In this context, the ethic comprehension is mandatory to understand biosafety and legal basis, even as bioethics.

Focusing on the discussion, genetically modified organisms (GMO) is defined as any biological entity whose genetic material (fundamentally DNA) has been altered by any genetic engineering technique in a way that would not occur naturally, with special acceptance of an exogenous gene. The general insecurity with the recombinant DNA technology advent had great worldwide repercussions in the 1990s and 2000s, bringing up several topics in the problem: gigantism of agro multinationals; compounds toxicology of the inserted genes products affecting human health; emergence of toxin-resistant pests, diseases and weeds; potentiated pollution, since some plants are transformed to resist herbicides, increasing the use of plant protection products; dissemination of genetically modified pollen grains outside the crop, affecting the natural genetic variability and free GMO farmers; and ethics in animal manipulation.

Bioethics is the ethics study within biological parameters, being a transdisciplinary concept among biology, philosophy and law. Although it is clear the progressive intention in society and the occurrence of a lack of moral consensus on several issues, it is observed that its applicability is still very restricted, generally associated with medicine,

in which questions about abortion, use of embryonic stem cells, patient rights, rights of human dignity, human cloning, among others. It is useful to expand its applicability to GMOs, with special issues as the consumer's right to information, corruption of the divine or natural ideal, animal welfare, and food safety. A theory of great applicability in medicine and that is useful for biotechnology is the principalist approach, which refers to a practical responsibility, supported by four *prima facie* principles: autonomy, beneficence, non-maleficence and justice. Regarding the first, its understanding is guided by attributing value to the free and intentional choice of cognitively and morally competent agents. For the principle of non-maleficence, the meaning relationship can be decomposed into *primum non nocere*, which requires avoiding unjustified damage to third parties, and *bonum facere*, already linked to beneficence, of valuing acts that provide some good to third parties. Finally, justice requires that provision be made equitably benefits, risks and costs among those involved.

Primarily, it is important to highlight that the impacts on the environment and health reflect, under the collective plan, impacts on society as a whole. Damage to third-party crops and beekeeping farmers, e.g. trigger socioeconomic impacts of great relevance. Specifically, the economic, geographic, sociological, philosophical, historical and legal topics of the issue are considered relevant. An analysis of great interest in the political and social environment is the claim of ongoing monopolization by companies producing GMOs, notoriously private multinationals. By the other hand, if there is competition between companies and there is no formal obligation, the government can make the situation worse instead of helping by company exemptions, so much regulation increasing the costs, and intellectual property as a way to protect and offset the companies by the scientific and economic exposure to society. Even so, mono and oligopoly phenomena are not problems restricted to genetic engineering, and it is not aggravated by it in a proper way.

From this first issue comes the next question. It is relevant to pay attention to land change resulting from competition between conventional and genetically modified crops farms. Therefore, in a natural freedom system the land structure is normally instable, as result of organizations complexity. It is clear that technological changes can lead to land changes, but this is general and once again away to the specificity of genetic engineering *per se*. In the other hand, attention to unfair competition, unfair boycott, and bioterrorism cannot be ignored.

In this context, the need to establish an ethical guideline for genetic engineering is shown to be the primary main within the scope of risk minimization. From the principalist bioethics approach, it is observed traits with multiple

positive purposes bringing benefits to farmers and to medical services, taking into account an efficient management of biosafety assessments. That may meet the four basic requirements, bringing advantages without aggression to third parties, with multiple participation of the people and institutions involved, regarding for justice and autonomy demeanors. However, irresponsibility in this sense, such as the contamination of neighboring crops with regulated pollen, directly violate the autonomy and non-maleficence principles and indirectly the justice principle.

In fact, the development, production, commercialization and use of safe GMOs may follow an ethical perspective, whether under the universalist approach or under the utilitarian approach. It is transcendent because it aims at an ultimate goal of multiple benefits, involving gains for science with the addition of development as a guarantee of being and gains for those involved in a free process. It is qualitatively useful, because it brings a greater advantage to society as a whole by providing a range of diverse solutions to recurrent problems today.

Therefore, we could not ignore the role of morality as the primal normative of people. In this context, the common, quantitatively representative belief in a divine law makes it necessary to include the theological position on the discussion. Most of the world's major religions do not have a clear stance on recombinant DNA technology. In Christian churches, of great plurality, it is notorious the position of the Catholic Apostolic Church, which issued recommendations and conclusions after a long process of discussion. From the gathering of diverse documents, notably the papal encyclicals *Renun novarum*, *Quadragesimo anno*, *Mater et magistra*, *Populorum progressio*, *Laboren exercans*, *Sollicitudo rei socialis* and *Centesimus annus*, and the letter *Octagesima adveniens*, from 1891 to 1991, the Compendium of the Social Doctrine of the Church was presented in 2004, as a result of the Pontifical Council for Justice and Peace work. It reinforced the prohibition of human cloning, as did by other religious leaders, but it demonstrated the endorsement of the use of science, without harming ethical principles, in maintaining the improvement of the quality of life. The theme was made explicit by the Pontifical Academy of Sciences, which highlighted the importance of technology in emergency measures to combat hunger, pointing out in its report that "there is nothing intrinsic in the use of genetic engineering to improve crops that would make plants and the food products derived from them dangerous".

By all this points of view, it is demonstrated that is possible to conduce the genetic engineering by an ethical behavior, considering all the social and economic externalities. Besides the regulation, it is mandatory to consider scientific research in any case, focusing in protein expression, compositional

equivalence, environmental outspreads, and the impact in human and animal health. GMO are an expressive tool for genetic breeding, so that their benefits can be observed by visiting farms and laboratories around the world. Based on principlalist bioethics, it is possible to develop recombinant

DNA technology in a morally acceptable manner, although there are impacts that can be analyzed by those involved. From this perspective, it is important that ideological pragmatism does not become a greater contaminating factor than adverse proteins.

