

# 转基因食品的伦理审视

Ethical Examinations on Genetically Modified Food

毛新志 著

湖北人民出版社

# 转基因食品的伦理审视

Ethical Examinations on Genetically Modified Food

吕新志 著

湖北人民出版社

鄂新登字 01 号

图书在版编目(CIP)数据

转基因食品的伦理审视/毛新志著.

武汉:湖北人民出版社,2005.1

ISBN 7-216-04213-1

I. 转…

II. 毛…

III. 食品—外源—遗传工程

IV. TS201.6

中国版本图书馆 CIP 数据核字(2005)第 012681 号

转基因食品的伦理审视

毛新志 著

出版: 湖北人民出版社  
发行:

地址:武汉市雄楚大街 268 号  
邮编:430070

印刷:中国科学院武汉分院科技印刷厂

经销:湖北省新华书店

开本:880 毫米×1230 毫米 1/32

印张:11

字数:274 千字

插页:1

版次:2005 年 1 月第 1 版

印次:2005 年 1 月第 1 次印刷

定价:25.00 元

书号:ISBN 7-216-04213-1/TS·20

本社网址:<http://www.hbpp.com.cn>

# 序

转基因食品的研究、开发和利用引起的伦理问题，对于当代生物技术来说，是比较典型的。转基因食品的种植和食用，涉及人体健康问题，或更确切地说，食用的转基因食品是否会在人体内长期蓄积及其对人体结构和机能的可能效应问题，而且涉及环境问题，即转基因作物的种植是否有可能干扰生态的平衡，破坏物种多样性的问题。与其他生物技术一样，转基因食品的研究开发和利用，涉及到如何正确处理经济效益与生命健康效益的关系问题，而这一问题不仅存在于生物技术的应用之中，也存在于流行病（例如 SARS 和艾滋病）的防治之中。更为重要的是，当探讨转基因食品的开发利用对人体健康和生态平衡的可能效应时，涉及许多变量，而这些变量中有许多是未知的，甚至我们不知道我们对什么不知道。已有的成本效益分析、风险评估等有效方法已不能完全适用。这就造成了我们对转基因食品开发和利用的伦理评估的困难。这种困难也见之于基因治疗、异种移植、辅助生殖等其他生物技术。人体和生态环境都是复杂系统，预测复杂系统的变化需要新的研究方法。还有一个问题是，随着生物技术的发展，科学家与公众之间的鸿沟在加深，在转基因食品上尤为明显。最后但同样重要的还有一个围绕转基因食品开发和利用的文化冲突问题，即在一些问题上的分歧有深刻的文化根源，我们不能要求信奉自然主义的人或者素食主义者去食用转基因食品，尤其是可能含有动物基因的蔬菜水果。这一切要求决策者在做出有关生物技术的决策时增加透明度，多展开科学家、决策者与公众之间的对话，确保决策的科学性和民主性。

对于这样繁多的问题，已经不是一篇博士论文所能容纳的了。作者在攻读博士学位的三年之间，含辛茹苦，撇开市场经济的种种引诱，安心、静心地探讨了有关转基因的差不多所有的伦理问题，并对转基因食品的管理也提出了有益的建议。我们不能要求一篇博士论文能解决所有问题，而只能将它看作在更高层次探讨有关问题的新开端。这本书的出版将改变对伦理问题讨论的这个景观。我期待随着本书的出版，对转基因食品问题的探讨将更具理性、更为深入。

邱仁宗

北京草桥欣园

2004年10月7日

## 摘 要

21 世纪是生物技术的世纪，转基因食品的研究与发展已经成为学术界乃至广大公众的热门话题。1983 年，世界第一例转基因作物——转基因烟草诞生。1994 年，美国实现第一例转基因植物——延迟成熟转基因番茄的商业化种植，随后一些国家如加拿大、阿根廷、中国也开始种植转基因作物。转基因食品会给人类带来巨大的经济效益，但是它也有各种风险和伦理问题。那么，转基因食品是否安全？转基因食品是否应该标识？基因是否应该授予专利权？应该如何保证转基因食品商业化的利益公正分配？……专业人员和公众都十分关心这些问题。通过分析和探讨转基因食品伦理问题，对转基因食品进行伦理审视，并提出合理的解决方法，为我国转基因食品的研究与发展提供伦理原则和管理建议，无疑具有重要的理论意义和实践意义。

基因工程在农业、食品、医药、环保等方面有广泛的应用。在市场的运作下，转基因植物、转基因动物和转基因微生物纷纷从实验室走向市场，取得巨大的经济效益。转基因作物的成本低、产量高；具有抗除草剂、抗虫和抗病毒等特性；可以提高食品的品质和营养价值；便于运输、储藏；增加保鲜性。正是转基因食品有诸多优点，2002 年全球有 13 个国家（包括 7 个发达国家，6 个发展中国家）实行了转基因作物的商业化种植，总面积达 5 867 万公顷。

“原则主义”是本文的理论根基。作者选择五个基本伦理原则——不伤害、效用、尊重、公正、整体性原则为评价我们有关转基因食品的行动提供一个伦理框架。

转基因食品是自然的还是非自然的？根据道家的“自然主义传统”，转基因食品是非自然的，是违背自然规律的。按照儒家的思想，转基因食品是非自然的，但它并非就是违背自然规律。在儒家看来，“人能弘道，非道弘人”。当代学者对该问题的看法主要有两种观点，一种认为转基因食品是自然的，另一种认为转基因食品是非自然的。其实，转基因食品是自然的和非自然的统一体，仅仅以转基因食品是非自然的不能成为我们反对转基因食品的充分理由，但我们可以从转基因食品是自然的还是非自然的伦理争论中得到有益的启示——发展转基因食品既要尊重自然规律，又要尊重人性。

安全性问题是转基因食品伦理问题的核心。转基因食品的安全性主要包括食品安全、生态安全、对生物多样性的影响以及可能的跨物种感染四个方面。通过对这些问题正反观点的分析和评价，转基因食品安全性的一个初步结论是：转基因食品对人类健康短期的、直接的影响较小，但长期的、累积的、间接的影响还很难定论；转基因食品/转基因作物对生态环境和生物多样性破坏的可能性较大，如果控制不好，甚至是灾难性的，人们应该对此予以高度的重视；尽管转基因食品的跨物种感染可能性比较小，但是鉴于它的破坏性巨大，还是应该引起我们的重视。由于转基因食品可能带来特大风险，我认为我们应该对转基因食品采取“有罪推定”的战略。

转基因食品的人体实验和转基因食品安全性的伦理问题密切相连。在转基因食品进入市场之前，对它进行人体实验，检验它对人类健康的影响，以防转基因食品给人体健康带来可能的伤害。通过分析转基因食品是否应该进行人体实验的正反两方观点后，我认为转基因食品的人体实验可以得到伦理辩护，并就应该如何进行转基因食品的人体实验提出自己的建议。

鉴于转基因食品的安全性还没有定论，不同的民族、宗教团

体和公众有不同的价值观、宗教信仰和消费偏好，广大消费者有权根据自己的价值观、宗教信仰和消费偏好选择不同的食品。对转基因食品进行标识是为了尊重消费者的知情选择权。通过对标识问题和知情选择的正反观点进行评析后，作者认为：基于尊重消费者的知情选择权，转基因食品应该标识，尊重消费者的知情选择权可以成为压倒其他各种反对转基因食品标识的理由。

从专利法的角度来看，基因具有可专利性的特点。但是，给基因授予专利权应该有伦理基础，各国的专利法中相关的“伦理条款”的规定就是这种要求的反映。人们对基因是否应该给授予专利权的问题的分歧较大，基因专利的一个不可忽视的后果就是严重的利益分配不公。笔者通过对该问题的正反观点的评析得出结论：基因、转基因作物/转基因食品不宜或不应该授予专利权；目前比较可行的做法是抬高给基因授予专利权的门槛，并探索其他方式如科技奖励、减税或者免税来保护研究者和投资者的利益。仅仅依靠基因专利来保护基因资源不是发展基因产业的长远之计，各国应该在公平竞争、平等互利的基础上开展国际合作，达到“双赢”的目的。

以上探讨的伦理问题都和转基因食品的商业化问题密切相关。转基因食品是否应该商业化？通过运用伦理原则对该问题的正反两方面的观点进行分析，我认为转基因食品的商业化可以得到部分辩护，即转基因食品可以商业化。转基因食品商业化的关键问题是应该如何进行商业化？一是要采取有效的措施尽量扩大转基因食品商业化的收益，减少它的风险；二是要保证转基因食品商业化的利益的公正分配。转基因食品商业化的利益冲突是客观存在的，应该采取相关措施避免利益冲突，对不同利益进行协调，这就需要利益相关者在转基因食品的商业化过程中遵守国际合作的基本原则和公认的国际准则，按照“义利合一”，“君子爱财，取之有道”的伦理规范进行国际合作，互惠互利，达到利益



分配公正的目的。

对转基因食品的伦理问题进行哲学反思，旨在进一步总结和深化转基因食品伦理问题的研究。转基因食品可能给人类的生存与发展带来巨大经济利益，但它也伴随着各种风险。为了使转基因食品更好的造福于人类，我认为我们应该将技术化生存与人性化生存有机结合起来，并实现不可持续发展观向可持续发展观、还原论向有机整体论和单一的线性思维向多元的立体思维的转换，实现人与自然的和谐发展。

转基因技术/转基因食品同历史上任何一项高新技术发展和应用一样，总会伴随着科学之争，伦理(哲学)之辩，科学界和伦理学(哲学)界有必要引导人们以理性的态度来对待转基因技术/转基因食品。人们在发展转基因技术/转基因食品的时候，既要坚持历史唯物主义，坚持人的本真的存在，即转基因技术/转基因食品应该为人类生存与发展服务，不能违背人类的伦理本性；又要坚持实践发展原则，尊重转基因技术的自身规律，努力探索、研究和发展转基因技术，谨慎地发展转基因食品，使转基因食品造福于人类。

## Abstract

The 21<sup>st</sup> century is a century of biotechnology. The research and development of GMF (genetically modified food) has already become a hot topic in the academic circle and even in the public. The first GMC (genetically modified crop) -genetically modified tobacco was born on the earth in 1983, and the first GMC of commercial cultivation (delayed ripening tomato) emerged in the USA in 1994, then GMC began to be planted in some countries such as Canada, Argentina, China. Is GMF safe? Should it be labeled? Should it be patented? How to ensure the just distribution of interests in the process of the commercialization of GMC? etc., these issues have been paid more attention to by professionals and the public. It is of great significance in theory and in practice to analyze and explore these ethical issues and provide ethical guidelines and regulatory recommendations for the research and development of GMF in China.

Genetic engineering has been widely applied in the fields of agriculture, food, medicine, environmental protection and so on. Under the operation of market, genetically modified organisms including GM plants, GM animals and GM microorganisms have entered the market from laboratory and great economic interests have come out with them. Because there are many advantages for GMC, such as high yield, less cost, herbicide-resistant, insect-resistant and virus-resistant, quality and nutrition improving, convenient for transportation and storage, and keeping fresh as many advocates have

claimed, some countries have given priority to the research of GMC and its commercial cultivation. In 2002, there were thirteen countries (including five developing countries and eight developed countries) where GMC was commercially planted, and the planting area of GMC on the earth was 58.67 million hectare.

The “principlism” is the rationale of this dissertation. There are five basic ethical principles such as the principles of nonmaleficence, utility, respect, justice and integrity that provide us an ethical framework for evaluating our action in relation to GMF.

Is GMF natural or unnatural? According to the naturalist tradition of Taoism, GMF is unnatural and it violates the natural law. For Confucianism, GMF is unnatural, but it is not bounded to violates the natural order, because it seems to Confucianism that “Human can carry forward the dao, but the dao cannot carry forward human” (Confucius). There are two kinds of arguments about GMF for the present scholars: some scholars think that GMF is natural, and the other scholars think that GMF is unnatural. In fact, GMF is a unity of natural and unnatural, and GMF being unnatural is not a sufficient reason for rejecting GMF, but we can get some good enlightenment from this argument. We not only should respect natural orders but also should respect humanness in the process of developing GMF.

The safety of GMF is a crucial ethical issue. It includes four dimensions such as food safety, ecological safety, effects on biodiversity and possible cross-species infection. After analyzing and evaluating the arguments for and against the related issues, the author draws the following conclusion: the short and direct influences of GMF on human health are relatively small, but the long and indirect

influences of GMF on human health are uncertain; the probability about the influences of GMC/GMF on eco-environment and biodiversity may be relatively high, and GMC/GMF may give rise to disastrous outcome if we cannot control it well; and we should pay more attention to the issue of possible cross-species infection because of its mega-risk although the probability of cross-species infection is very low. The author argues that we should carry out the strategy of "guilty until proven innocent" towards the safety issue of GMF for its possible mega-risk.

Human experiment with GMF is directly related to the safety of GMF. In order to know the effects of GMF on human health, we should make human experiment with GMF before it enters the market for protecting possible harm to human health. On the basis of analyzing and evaluating the two kinds of arguments on this issue, human experiment with GMF can be justified ethically. The author also provides some recommendations about how to carry out human experiment with GMF.

Because there is not a clear answer to the safety issue of GMF, consumers have rights to choose different food (such as GMF and non-GMF) on the basis of their own cultural tradition, religious belief and consuming favor. The labeling of GMF is to respect the consumers' right to informed choice. The author discusses and analyzes the arguments for and against the labeling of GMF and draws the following conclusion: we should label GMF on the basis of respecting for consumers' right to informed choice and this reason should override other reasons of opposing labeling.

From the perspective of the patent law, gene is provided with the properties of patenting. However, there should be ethical basis

for gene patenting, and “ethical articles” in the patent law of many countries are the reflection of this requirement. There are many divergences about this issue whether gene should be patented or not, and the serious outcome of gene patenting would be the unjust distribution of interests. From analyzing and evaluating different arguments on this issue, it follows that gene or GMF/GMC is not suitable to be patented or should not be patented, and it is necessary to improve the criterion of gene patenting for the public interests and to search for the other means such as carrying out the award of science and technology, reducing or exempting tax to safeguard the interests of researchers and investors. Mere dependence on gene patenting to protect genetic resources is not a feasible long strategy, and different countries should make international corporations on the basis of just competition and mutual beneficence and reciprocity, then the developed countries and the developing countries can share the rational interests from international cooperation of GMF.

The above ethical issues are related to the commercial issue of GMF. Is GMF should be commercially planted? On the basis of analyzing and evaluating different arguments on this issue, the available conclusion is that commercialization of GMF can be partly justified ethically. In another words, GMF may be commercially planted. The crucial issue is how to carry out commercialization of GMC/GMF. On one hand, we need adopt efficient means to increase the interests of GMF and decrease the risk of GMF; on the other hand, we need take effective and practicable means to ensure the just distribution of interests in the process of commercialization of GMF. The conflict of interest in the process of commercialization of GMF objectively exists, so we need to take means to avoid the conflict of

interest, coordinate different interests and promote the just distribution of interests. If the stakeholders would observe the basic principles of international cooperation and the ethical norms of “the unity of interest and morality” and “Gentlemen who love money should take it according to ethical norms” in the process of international cooperation, the result of the just distribution of interests would be guaranteed.

Philosophical reflections on these ethical issues are to summarize and deepen the research on these ethical issues of GMF. GMF will provide human kind the great interests and potential risks as well. The author argue that we should unite the technological dimension with humane dimension of human existence, and carry out the paradigm shift from non-sustainable development to sustainable development, from reductionism to organic holism and from monist linear thinking to pluralistic and non-linear thinking in order that GMF can serve the harmonious development between human and nature.

Transgenic technology/GMF is the same as other high technology in that its development and application are full of scientific and ethical/philosophical disputes. The scientific and ethical/philosophical workers need to lead people to keep rational attitude towards transgenic technology/GMF. When developing transgenic technology/GMF, we should persist in historical materialism and the real existence of human, i. e. serving human existence and development. We also should insist on the principle of practice, respect the laws of transgenic technology, and make efforts to study and develop transgenic technology and prudently develop GMF for the well-being of humankind.

# 目 录

导论 .....	( 1 )
第一章 转基因技术和转基因食品发展概述 .....	( 15 )
一、转基因技术的历史与现状 .....	( 15 )
二、全球转基因食品的发展概况 .....	( 17 )
第二章 各国对转基因食品的态度 .....	( 25 )
一、各国政府对转基因食品的态度 .....	( 25 )
二、各国学者对转基因食品的态度 .....	( 30 )
三、各国公众对转基因食品的态度 .....	( 32 )
第三章 “原则主义”和转基因食品的伦理问题 .....	( 35 )
一、伦理学的“原则主义” .....	( 35 )
二、伦理学理论和原则的作用 .....	( 77 )
三、转基因食品的伦理问题 .....	( 78 )
第四章 转基因食品——自然的还是非自然的 .....	( 81 )
一、相关概念的辨析 .....	( 82 )
二、中国传统文化对转基因食品是自然的还是非自然的 伦理审视 .....	( 83 )
三、当代人的争论及评析 .....	( 90 )
第五章 转基因食品的安全性 .....	( 101 )
一、转基因食品的食品安全 .....	( 101 )
二、转基因食品的生态安全 .....	( 129 )
三、对生物多样性的影响 .....	( 152 )
四、可能的跨物种感染 .....	( 159 )
五、转基因食品安全性的哲学反思 .....	( 165 )

第六章 转基因食品的人体实验·····	(170)
一、转基因食品人体实验的概念问题·····	(170)
二、转基因食品人体实验的伦理问题·····	(171)
第七章 标识问题与知情选择·····	(180)
一、转基因食品标识和知情选择的概念·····	(180)
二、紫外线食品标识的教训·····	(182)
三、转基因食品的标识问题与知情选择的伦理分析·····	(184)
四、转基因食品标识的哲学思考·····	(194)
第八章 基因专利、利益分配和国际合作·····	(198)
一、基因专利和利益分配·····	(199)
二、基因专利与国际合作·····	(224)
第九章 转基因食品的商业化·····	(231)
一、转基因食品商业化的伦理争论·····	(232)
二、转基因食品商业化的利益冲突和利益协调·····	(246)
三、转基因食品商业化的哲学思考·····	(260)
第十章 转基因食品伦理问题的哲学反思·····	(270)
一、技术化生存与人性化生存的统一·····	(270)
二、可持续发展方式向可持续发展方式的转换·····	(283)
三、人类思维方式的转换·····	(302)
第十一章 转基因食品研究与商业化的伦理原则与 管理建议·····	(312)
一、前言·····	(312)
二、伦理原则·····	(312)
三、管理建议·····	(313)
结束语·····	(317)
参考文献·····	(320)
后  记·····	(331)



# TABLES OF CONTENTS

<b>Introduction</b> .....	( 1 )
<b>Chapter 1 Overview of the development of genetically modified technology and genetically modified food</b> .....	(15)
1. The history and the <i>status quo</i> of genetically modified food .....	(15)
2. The survey of the development genetically modified food in the world .....	(17)
<b>Chapter 2 Attitudes of different countries towards genetically modified food</b> .....	(25)
1. Governments' attitudes towards genetically modified food from .....	(25)
2. Scholars' attitudes towards genetically modified food from in different countries .....	(30)
3. The public' attitudes towards genetically modified food from in different countries .....	(32)
<b>Chapter 3 'Princilism' in ethics and ethical issues of genetically modified food</b> .....	(35)
1. 'Princilism' in ethics .....	(35)
2. The functions of ethical eheories and principles .....	(77)
3. Ethical issues of genetically modified food .....	(78)
<b>Chapter 4 Genetically modified food——is it natural or unnatural</b> .....	(81)
1. Analysis of the relating concepts .....	(82)