

**STUDY ON AWARENESS OF GENETICALLY MODIFIED
FOOD (BIOTECHNOLOGY) AMONG HIGHER SOCIO
ECONOMIC AND EDUCATED GROUP (MEN AND
WOMEN) WITHIN THE THREE MAJOR TRIBES (IGBO,
HAUSA AND YORUBA)
IN NIGERIA**

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Introduction

Nigeria has a population of 120m people, the biggest black nation in Africa. It has 6 political zones, North East, North West, North Central, South East, South West and South South. Nigeria has many languages, but there are three main languages, namely, Yoruba, Igbo and Hausa/Fulani and official language, English.



Map of Nigeria

Nigeria has a lot of mineral resources namely:

Kaolin

Bitumen


Groundnut

Cotton


Cocoa

Oil (Petrol) etc.

Nigeria has 36 States of the Federation including the Federal Capital, Abuja. It is practicing the democratic system of government (The Presidency, Legislature and the Judiciary). Nigeria got its Independent from the British in the year 1960, October 1.




Genetically modified food is a defining technology for the future of food and agriculture. Science and industry are poised to bring consumers a wide-variety of products that have potential for meeting basic food needs, as well as delivering a wide-range of health, environmental and economic benefits. Given this, it is imperative that we answer the following questions: “What do we really know about how the public currently perceives biotechnology? And, how does this help to guide policy makers, regulators, consumers, farmers, food firms, and those in the biotechnology industry?” If we were to rely on existing research, our unfortunate response for both questions would be “not much




This answer should cause some concern because policy makers, regulators, consumers, farmers, food processors and distributors, as well as those in the biotechnology industry will make significant decisions in coming years that will define the direction of food biotechnology in Nigeria. The impact of such decisions will have economic, social, environmental and public health repercussions. These decisions will need to be based on rigorous scientific evidence examining potential risks, costs, and benefits to health, society, and the environment. However, because of the far reaching consequences it is also clear that decisions about biotechnology will necessarily be influenced by public opinion. As such, researchers must do more than develop a basic understanding of consumer opinions.

Genetically Modified Food.

There have been of course, a large number of publicly and privately funded studies that have examined public opinions about food biotechnology. Yet, we still don't have a very comprehensive picture of what consumers think about genetically modified foods. When looking at the existing publicly-funded studies, it is difficult to compare results because they were typically conducted by different researchers at different times, in different countries, and with different objectives. In addition, most of the larger studies have tended to examine public awareness and attitudes toward biotechnology in the abstract rather than focusing on specific products or their characteristics.



Such research typically asks consumers about the acceptability of biotechnology in general, rather than the acceptability of particular biotech products with specific characteristics. Ultimately, however, consumers must make individual purchasing. In many respects, consumers will decide the fate of food biotechnology by voting with their Naira rather than voicing their opinions on a survey. Yet, most studies provide little insight into consumers' likely answers. Given the shortcomings in the available literature, it is often impossible to conclude how public opinion is changing over time, how opinions differ around the world, and what consumers might do when faced with the opportunity to purchase genetically modified foodstuffs.



This study is the first in a series designed to address the deficiencies of the existing literature on consumer perceptions of agricultural biotechnology and to make this information available to all interested parties.




METHODOLOGY

METHODOLOGIA

Questionnaire Development

This study (Survey) is well situated to address perceived gaps in the current literature on High Socio Economic and Educated Groups (men and women) in Nigeria consumer awareness, acceptance, and perception of food biotechnology. This survey will serve as the basis for a set of longitudinal studies with the ability to comparability with several areas of inquiry. Special attention was paid to both the wording and order of the questions in the survey. Where opinions are not strongly held, how one phrases a question can significantly impact the likely responses to that question. Similarly, the answers given to questions at the beginning of a survey may influence answers to question later on.



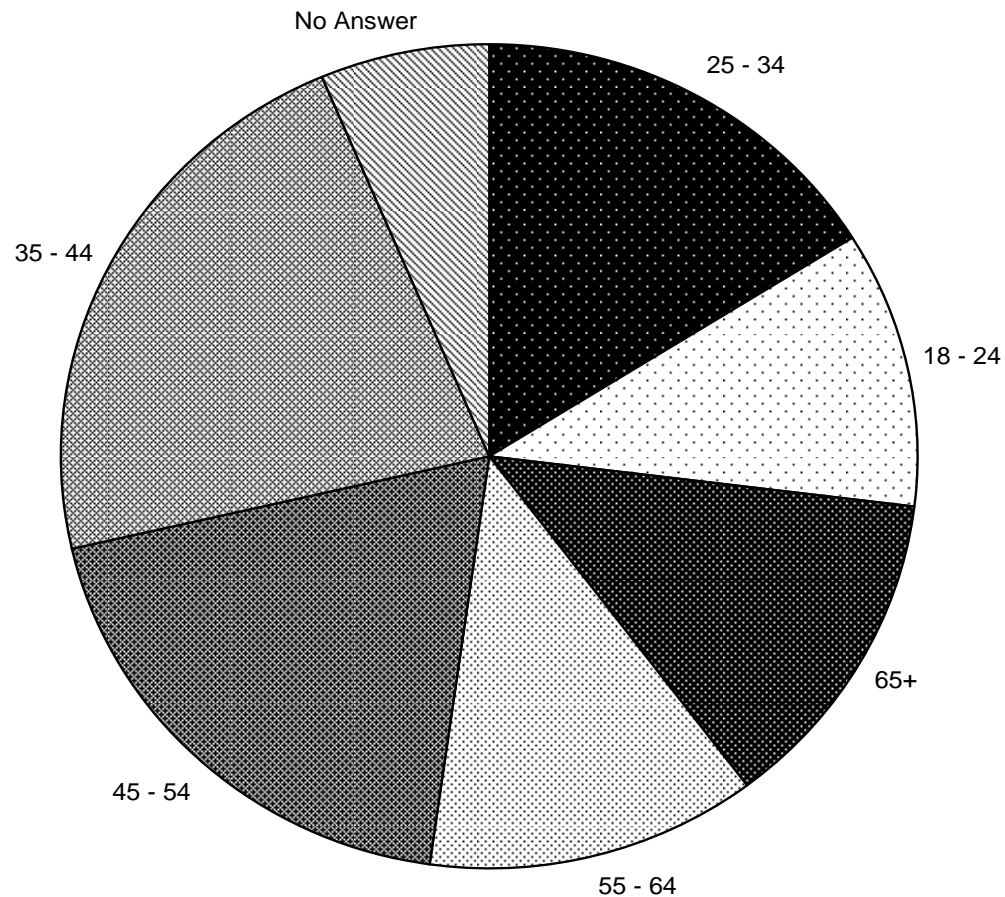
Significant thought also went into the selection of the appropriate terminology used to describe the technology which is the subject of the questionnaire. The study decided to use “genetic modification” as the primary description.

The term “genetic modification” is increasingly being used by a variety of organizations and governmental institution to specifically describe the application of recombinant DNA technologies to create new varieties of Agricultural products. The term “genetically modified” is often shortened to its initials “GM”, creating a new adjective used in conjunction with specific Crops or products. Example people refer to “GM tomatoes “GM nuts”, GM Food.

Sample Selection

The targeted sample frame was the non-institutionalized Nigerian adult (eighteen years and older) civilian population. The target sample of persons was selected using three states, namely: Oyo (Ibadan) Dominated by Yoruba, Enugu (Igbo) in the South East and Hausa -Fulani in the North (Kano) proportional probability sample drawn from the households in Nigeria allowing a sampling error rate of 3% a minimum of three times, at different times of the week, to reach people who were infrequently at home. Quotas were set up to ensure that representative numbers of males and females were interviewed. Random selection of which adult in the household was to be interviewed was accomplished by asking to interview the person aged 18 or over whose birthday had occurred most recently.

Figure I: Age Distribution of Respondents.



The Sample size was 300 respondents, 46 percentage of whom are male. The age of the respondents ranged from 18 to 82, with a median of 42 years. The age distribution of respondent is as provided in Figure I.

Results

Awareness of Genetically Modified Agricultural and Food Products

Food biotechnology is not an issue that seems to be on the agenda of most Nigerians.

Most Nigerians who responded to the survey said they have heard relatively little about these technologies. When asked how much they are aware about genetic modification, genetic engineering, or biotechnology, only 9 percent of the respondents indicated “a great deal” while 40 percent reported “some,” 19 percent said “not much,” and 30% percent said “nothing at all” 2% not sure. (see Table I).

Table I: Public Awareness of Food Biotechnology

Question

Genetic modification involves new methods that make it possible for scientists to create new plants and animals by taking parts of the genes of one plant or animal and inserting them into the cells of another plant or animal. This is sometimes called genetic engineering or biotechnology. How much have you heard or read about these methods?

Table 1

	No.	A Great Deal	Some	Not Much	Nothing at All	Not Sure
Population	300	9%	40%	19%	30%	2%
Sex						
Male	180	10	20	45	20	5
Female	120	6	35	48	3	8
Age						
18-24	20	5	30	60	5	0
25-34	40	5	32	58	5	0
35-44	77	10	35	45	10	0
45-54	90	10	35	40	15	0
55-64	43	15	42	33	5	5
65+	30	15	43	30	10	2

Group of People



Table I: Public Awareness of Food Biotechnology

One hundred people surveyed from Enugu dominated by **Igbo** in the South East (Enugu State)
Question

Genetic modification involves new methods that make it possible for scientists to create new plants and animals by taking parts of the genes of one plant or animal and inserting them into the cells of another plant or animal. This is sometimes called genetic engineering or biotechnology.

How much have you heard or read about these methods?

Table 1

	No.	A Great Deal	Some	Not Much	Nothing at All	Not Sure
Population	100	10%	20%	40%	25%	5%
Sex						
Male	60	8	19	41	26	6
Female	40	7	21	46	21	5
Age						
18-24	20	10	17	43	29	1
25-34	15	7	20	40	27	7
35-44	25	12	18	41	24	5
45-54	20	10	17	39	26	6
55-64	10	10	22	38	25	5
65+	10	7	20	40	27	6

Table I: Public Awareness of Food Biotechnology

(One hundred people surveyed) from Ibadan the capital of Oyo State, dominated by **Yoruba** (Ibadan)
Question

Genetic modification involves new methods that make it possible for scientists to create new plants and animals by taking parts of the genes of one plant or animal and inserting them into the cells of another plant or animal. This is sometimes called genetic engineering or biotechnology.

How much have you heard or read about these methods?

Table 1

	No.	A Great Deal	Some	Not Much	Nothing at All	Not Sure
Population	100	20%	35%	10%	30%	5%
Sex						
Male	70	20	40	10	25	5
Female	30	25	35	5	30	5
Age						
18-24	15	19	36	10	30	5
25-34	10	21	40	9	28	2
35-44	25	19	35	10	31	5
45-54	36	18	40	10	27	5
55-64	8	18	42	10	25	5
65+	6	17	43	9	26	5

Biotechnology is Not a Topic of Conversation for Most Nigerians

The finding that Nigerians are not well informed about biotechnology is also reflected

in the fact that the respondents say that they have ever discussed the topic with anyone. A slightly greater proportion of men (20%) than women (12%) report having had a conversation about biotechnology.

Those who work in the food industry were no more likely to report having had a conversation about biotechnology than those in the general population.




Tomato during planting



Tomato plant



The result of genetic engineering



Only 19 percent of those who say that their jobs involve growing or processing food and 10 percent of those who say their jobs involve preparing or selling food reported ever having had a conversation about biotechnology. In contrast, 22 percent of those who identified themselves as scientists or engineers and 9 percent of those in the medical professions reported discussing about biotechnology.

What is on the Supermarket Shelf?

This lack of awareness of biotechnology appears to translate directly into a general lack of recognition of food biotechnology on supermarket shelves. Despite the abundance of products with genetically modified ingredients in the market today, only one-in-five Nigerians (20 percent) are aware that genetically modified food products are currently for sale in supermarkets.



1. Supermarket Fruit



2. Supermarket Fruit

Three quarters of Nigerians (75 percent) do not believe such products are in food stores, while another quarter (25 percent) are not sure. In contrast, while there are few genetically modified fruits and vegetables currently available in the marketplace, 10% believe that they have eaten a fruit or vegetable created using biotechnology (Figure 2). A little more than one-third (35 percent) specifically indicated that they had not eaten a genetically modified fruit or vegetable while 30 percent were not sure.

What Do Nigerians Really Know About Food Biotechnology?

Self-Rated Knowledge of Food Production

Nigerians tend to believe that they are generally well informed about the process of food production in Nigeria. When asked to rate their basic understanding of how food is grown and produced, three-quarters of the respondents (75 percent) indicate that their knowledge is at least “good” (Table 3). Women who respondents with higher levels of education tend to report the highest levels of understanding.

Biotechnology Quiz

To determine actual understanding of science and technology with respect to genetics and genetic modification, the survey respondents were presented with a nine-question “biotechnology quiz” to assess basic knowledge of biological facts and principles. Despite the fact that 66 percent of Nigerians reported that their knowledge of science and technology was at least “good,” the quiz results suggested otherwise. As shown in Table 5:

Table 5: Biotechnology Quiz Results.

Question	Nigeria Results (2007)		
	True (%)	False (%)	Don't Know (%)
There are some bacteria which live on waste water (True)	84	10	6
Ordinary tomatoes do not contain genes, while genetically modified tomatoes do (False)	19	62	19
If a person eats a genetically modified fruit, their genes could be modified as a result (False)	20	60	20
The father's genes determine whether the child is a girl. (True)	60	30	10
The yeast used to make beer contains living organisms (True)	15	15	70
Genetically modified animals are always larger than ordinary animals (False)	10	30	60
It is impossible to transfer animal genes into plants. (False)	30	40	30
Tomatoes genetically modified with genes from catfish would probably taste "fishy" (False)	30	60	10
Genetically modified foods are created using radiation to create genetic mutations (False)	50	40	20

*Correct responses are shaded.

Images of Biotechnology, Genetic Engineering, and Genetic Modification


It is clear that most Nigerians do not know much about biotechnology, yet they still seem to have opinions about it. So, what are their impressions of the technology? Using a word-association task, the survey participants were asked to report the first thought or image that came to mind in response to the terms biotechnology, genetic engineering, or genetic modification. The sample was randomly split into thirds, so that each person surveyed only responded to one of the terms, and of course, none of the terms had yet been mentioned in the survey. The responses were recorded verbatim and initially coded into 49 categories and then into one of 11 main classifications (see Table 7).

The results suggest that, consistent with their reported unfamiliarity with the subject, many Nigerians have no real first thought or image that they associate with the terms biotechnology, genetic engineering or genetic modification. Interestingly, the term biotechnology evokes the fewest associations, with more than one-in-four respondents (26 percent) failing to report a first thought or image, even after additional prompting. About one-in-five respondents (22 percent) were unable to produce a first thought or image in response to the term genetic modification, and one-in-six (17 percent) were unable to do so with regard to the term genetic engineering


The term genetic modification yielded the most negative associations, with one-in-four respondents (25 percent) bringing to mind images of Frankenstein, test-tube babies, mutants or monsters, or responding with words like yuck, disgusting, fake, evil, tampering, danger, and wrong. The term genetic engineering evoked similar responses in one-in-five respondents (20 percent), while only 10 percent of those had similar negative associations with the term biotechnology. In contrast, the term biotechnology lead to the most positive associations, with 13 percent reporting images of new medicines or foods or responding with words like better, progress, improved, future, modern, or approve. Only 8 percent had similar responses to the term genetic modification and only 5 percent had positive associations with the term genetic engineering.

Public Acceptance of Food Biotechnology

Overall, the Nigerian public's position on the acceptability of genetic modification of food is decidedly . . . undecided. The data suggests that most Nigerians have not yet made up their minds about the issue. Yet, some familiar patterns emerge from the survey data. Consistent with prior surveys, Nigerians express greater support for the genetic modification of plants than they do for animals. When asked directly, the majority of Nigerians either strongly approve (16 percent) or somewhat approve (42 percent) of creating hybrid plants via genetic modification, whereas 18 percent disapprove (almost 6 percent were not sure) (see Table 8).



About one-fifth (22 percent) believe that creating hybrid plants through genetic modification is morally wrong. The majority (70 percent) of Nigerians, however, do not view such practices as morally objectionable. The remaining 8 percent are unsure or say that the moral status of genetic modification depends on the circumstances.



In general, men appear to be more approving of genetic modification than women. Younger and better educated persons also report higher levels of approval. In addition, as shown in Table 10, individuals who reported having heard or read about genetic modification before the survey were more approving of its use. Sixty-two percent of those who had heard or read about genetic modification approved of its use to create hybrid plants. Only 52 percent of those that had not heard or read about genetic modification approved of the application of the technology to create new plants. A similar pattern was evident in the case of animal genetic modification. Those who had heard of genetic modification before the survey were also less likely to be morally opposed to the technology.

Consumer Approval for Traditional Crossbreeding Methods.

As a point of reference, public acceptance of traditional crossbreeding techniques was also evaluated. Of course, traditional crossbreeding techniques have been used for thousands of years to improve agricultural products. Yet, half of those interviewed said that they had not heard of traditional crossbreeding when it was described to them in simple terms. This unfamiliarity is reflected in the fact that the hybridization of plants via traditional crossbreeding is viewed as acceptable by only 78 percent of Nigerians (Figure 3) and that nearly 19 percent of the public believes these techniques to be morally objectionable.



Slightly less than one-third (31 percent) of Nigerians say they approve of creating hybrid animals through traditional crossbreeding and half believe that using such techniques with regard to animals is morally and religiously wrong. It is important to point out that the approval ratings for the hybridization of plants and animals through genetic modification and through more traditional crossbreeding methods are quite similar.

What are the Concerns of Nigerians About Genetic Modification of Foods?

While most Nigerians say they would be in favour of at least some genetically modified food products, and nearly two-thirds believe that genetically modified foods will benefit many people, more than half (56 percent) say that the issue of genetic modification causes them great concern (Table I I), and many are concerned that genetic modification may pose a possible threat to future generations. In fact, four-out-of-five Nigerians agree with the idea that serious accidents involving genetically modified foods are bound to happen due to human error. I

Who Should Regulate Biotechnology?

Factoring prominently into the debate over consumer acceptance or opposition to genetically modified foods is the public's faith (or lack thereof) that the food biotechnology industry, the scientific community, and/or government regulators will protect them from unsafe products. As noted previously, 80 percent of Nigerians believe that strict regulation of genetic modification is needed. However, most respondents clearly exhibit skepticism that either companies engaged in food biotechnology or the scientific community is motivated or competent enough to protect the public from potentially adverse impacts of genetic modification.

Consumers Want the Right-to-Know

Nigerians feel strongly regarding their right to know about the use of genetic modification in the production of foods they consume. Consistent with past surveys on food biotechnology, the vast majority (90 percent) believe that foods created through genetic modification should have special labels.

Conclusions

This study is a necessary starting point for understanding public opinions of genetically modified products. The initial findings illustrate the wide diversity and uncrystallized nature of Nigerian attitudes. This position is despite the billions of Naira that have already been spent on biotechnology to develop new and improved foods, fuels, feeds, fibers, pharmaceuticals, and nutraceuticals. Given the potential economic, social and environmental impacts it should be obvious that this initial glimpse into public opinion, while important, is not enough. Continued research is imperative to help consumers, farmers, industrialists and policy makers to evaluate the role of genetic modification in the future marketplace.

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Thank you

