

Georgia Consumers' Preference for Organically Grown Fresh Produce

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Farm chemical fertilizers and pesticides have played an important role in agriculture's effort to provide Americans with an abundant and low-cost food supply. During the last 50 years, food production has more than doubled although cropland acreage has declined and farm labor input decreased by more than three-quarters (U.S. Dept. of Agriculture). Much of this increase in agricultural productivity has been due to chemical fertilizers and pesticides. Their use has increased 14 fold since the late 1930s. While farm chemicals have increased agricultural productivity, their extensive use has made some people concerned about potential environmental consequences and food safety problems. Public awareness of health and environmental degradation associated with pesticides use surfaced in the early 1960s. A 1965 survey found 41.5 percent of Pennsylvania consumers surveyed concerned about eating fresh produce sprayed or dusted with chemical pesticides (Bealer and Willits). Over time, however, consumer concern about pesticides and their residues on food has intensified to the point of being a leading food safety concern (Hammonds; Heimbach; Sachs, Blair, and Richter).

The food industry has recently begun responding to this consumer concern by investigating ways to reduce their dependence on pesticides and by relying more on rotations and biological and mechanical controls (van Ravenswaay 1989). At the retail level, some supermarkets and food retailers have responded by offering organically grown fresh produce so shoppers can buy fresh produce grown without chemical pesticides. Some others are supplementing Federal pesticide residue monitoring program with private residue testing (Greene and Zepp; van Ravenswaay 1989).

At specialty health food outlets, consumer response to fresh produce grown without synthetic pesticides or fertilizers (organically grown) has been increasing. In California, Franco estimated that organically grown fresh produce sales grew 41 percent from 1986 to 1987, with total sales of more than \$50 million dollars. Despite this sales growth, organically grown fresh produce represents

only one percent of the total fresh produce market. To sustain the economic viability of organic farming methods, sales of organically grown fresh produce have to expand to supermarkets where consumers buy most of their fresh produce. Supermarkets are, however, experiencing dismal organically grown fresh produce sales and this has prompted some to stop offerings of organically grown fresh produce (Mejia).

Organic supporters claim that supermarkets have done a poor job of merchandising organically grown fresh produce. Supermarket executives counter that organically grown fresh produce supply is often over priced and inconsistent in both quantity and quality (Waterfield).

Objectives

The objective of this paper was to assess consumer preference for organically grown fresh produce. Our specific goals included: 1) Assessing consumers' preference for organically grown fresh produce; 2) determining the importance of sensory quality in organically grown fresh produce; 3) checking the importance of testing and certification of organically grown fresh produce to be free of pesticide residues; and 4) measuring consumers' willingness to pay higher prices for certified pesticide residue free fresh produce.

The first objective analyzes consumers' motivations and preference for organically grown fresh produce and addresses its market potential. Since influencing the demand for a product is both the product itself and the attributes related to the product, analysis of the potential demand for organically grown fresh produce is as important as understanding the consumer motivations. A survey of California consumers (Jolly et al.) found that safety, freshness, general health benefits, nutritional value, effect on the environment, flavor, and general appearance of product were important in choosing organic foods. Knowing who prefers organically grown fresh produce and why helps in establishing marketing strategies for expanding sales of organically grown fresh produce.

The second objective measures the importance of sensory quality in consumers' organically grown fresh produce purchase decisions. In stores, consumers evaluate fresh produce quality by its sensory characteristics like color, shape, firmness, and smell. Lockeretz has shown that consumers ranked sensory quality as more important than price in making fresh produce purchase decisions. Ott also found that sensory quality is important to consumers of certified pesticide residue-free fresh produce. However, some environmental groups such as the Public Voice for Food and Health Policy and the California Public Interest Research Group downgrade the importance of sensory quality (Waterfield).

The third objective deals with pesticide residues testing and certification. It determines how important it is for the consumers to have organically grown fresh produce tested and certified to be free of pesticide residues. Furthermore, we also address the question of who should be responsible for providing testing and certification services. Today, organically grown fresh produce certification is done by over 30 organic grower associations or state departments of agriculture (Poncavage). However, testing for pesticide residues is not usually a part of the certification process.

The fourth objective measures the intensity of consumers' preference for organically grown fresh produce through their willingness to pay price premiums. Determining consumers' willingness to pay higher prices for tested and certified fresh produce should provide important economic and marketing information directly to the organic industry and indirectly to the government in guiding legislative decisions (van Ravenswaay 1988).

Data and Methodology

To accomplish above objectives, we used the Consumer Information Management System (CIMS) of the Georgia Experiment Station. CIMS maintains a consumer panel for conducting food demand research (Huang and Misra). Panel members represent a stratified sample (by income and location) of Georgia consumers. During the spring of 1989, we conducted a mail survey among 580 households. The survey resulted in 389 returned questionnaires which represents a response rate of 67 percent.

We asked the participants of the panel a variety of questions concerning their fresh produce purchasing practices. We asked about factors that influence their purchase decisions, their preference for organically grown fresh produce, opinion about testing and certification, and willingness to pay more for organic and certified pesticide residues free fresh produce. We initially asked the consumers to rate the importance of seven product attributes that influence their purchase decision. The pre-selected list of seven attributes were: low price, appearance of the product, freshness, whether in season, nutritional value, selection, able to pay the exact amount, and other. We also asked them to identify their top three food concerns from a pre-selected list of 10 concerns. The pre-selected list of 10 food concerns were: foods grown using pesticides, foods high in salt, foods high in saturated fats, foods high in sugar, foods high in cholesterol, food poisoning, chemical food preservatives, chemical food additives, food too low in nutritional value, and food prices too high. After providing a simple definition of organically grown to mean grown without chemical pesticides or fertilizers, we asked whether the respondent would prefer to buy organically grown fresh

produce, if available. We asked those who preferred to buy organically grown fresh produce to indicate a specific reason for their preference from a list of four pre-selected reasons. The pre-selected list of four reasons were: it is natural, it is chemical residue free, it tastes better, and other. Also, we asked those who showed a preference for organically grown fresh produce if they would buy organically grown fresh produce if the produce had sensory defects (blemishes, soft spots, insect holes). The last set of questions dealt with testing and certification of organically grown fresh produce to be free of pesticide residues. We asked all panelists to express their opinion about the importance of testing and certification of conventionally and organically grown fresh produce. Furthermore, the panel members selected their preference of who should do the testing and certifying from six choices. The pre-selected list of six choices were: government agencies, independent testing laboratories, supermarkets, other, and don't know.

We tested the impacts on consumers preference for organically grown fresh produce due to differences in socioeconomic, demographic, product attribute preferences, and food concern characteristics among households. We used the Chi-square contingency tests to determine if there were significant differences on respondents' preferences for organically grown produce due to age, education, income, race, sex, and product attributes and concern variables.

Respondents Characteristics

Since the primary food shopper completed the questionnaire, it was not surprising to find that the majority of the respondents were female, 68 percent. Over three-quarters (77 percent) of the respondents were white. Less than 10 percent of the respondents were in the age group of 25 years old or younger. The distribution was even among the other age groups, 26-35, 36-45, 46-60, and 61 years or older. Almost one-quarter (23 percent) of the respondents had annual household incomes of less than \$15,000. Over a third (35 percent) had incomes of \$35,000 or more. When compared to the general adult population of the state, there were fewer respondents under 25 and more between 36 and 60. The sample median household income of \$25,000 matches closely with the \$25,386 reported median household income in the state. The racial mix also is very similar. Seventy-seven percent of the respondents are white compared to 74 percent of the state's white population. However, the sample is demographically upscale with higher educated respondents as 48 percent of the sample respondents have at least some college education, this compares to 28 percent for the state of Georgia.

Preference for Organic Produce

About 61 percent of the respondents expressed a preference for organically grown fresh produce. We found the most important reason for preferring organically grown fresh produce to be its freedom from chemical residues. This result is consistent with Jolly et al.'s findings from a survey of California consumers. Consumers' preference for organically grown fresh produce was invariant of race, age, education, and household income of the respondents (Table 1). However, we found the gender of the respondent significantly related

Table 1.
Cross-Tabulations of Respondents' Willingness to Buy Organic Produce by Economic, Demographic, Preference, and Concern Variables

Respondents' characteristics	Preference to buy organic produce		Chi-square value	Significance level
	would buy	Wouldn't buy		
	percent			
Race			4.340	0.227
White	60	40		
Black	71	29		
Sex			2.735	0.098
Male	55	45		
Female	64	36		
Age (yrs.)			2.933	0.402
<25	68	32		
25-44	61	39		
45-60	56	44		
>60	68	32		
Income ('000\$)			2.659	0.447
<20	66	34		
20-30	56	44		
31-40	64	36		
>40	58	42		
Education			1.936	0.164
College	60	42		
Non-college	65	35		
Concern for pesticide residues			10.042	0.002
Concerned	70	30		
Not concerned	54	45		
Concern for food poisoning			4.121	0.042
Concerned	65	35		
Not concerned	54	46		
Concern for high prices			0.035	0.003
Concerned	49	51		
Not concerned	66	34		
Preference for low prices			4.309	0.038
Important	59	41		
Not important	73	27		

to preference for organically grown fresh produce, females being more willing to buy organically grown fresh produce than males. Penner et al. also found that men are more likely than women to discount the importance of food safety. An inspection of the table also shows that a higher proportion of non-white households (71 percent) preferred organically grown fresh produce in comparison to that of white households. To learn about consumer motivations for purchasing organically grown fresh produce, we analyzed consumers' preference for product attributes and food concerns. When asked to rate the importance of product attributes in their produce purchasing decision, respondents identified freshness, appearance, nutritional value, and low price (in decreasing order), to be the most important factors. However, only the low-price attribute was statistically significant between those who indicated a preference for organically grown fresh produce and those who did not (Table 1). Those respondents who did not consider low price to be an important factor in fresh produce purchase decision showed a stronger desire to buy organically grown fresh produce. Among those who identified freshness, appearance, nutritional value, and low prices to be important decision making factors, preference to buy organically grown fresh produce varied between 58 percent to 62 percent.

What were the top three food concerns of Georgia consumers? Among those who preferred organically grown produce, about 51 percent of the respondents chose pesticide use, 31 percent chose preservatives and additives, and 29 percent chose food poisoning. Also, 27 percent of the respondents said one of their top concerns was high food prices. As shown in Table 1, concerns about pesticides use, food poisoning, and high prices were statistically significant between those who indicated a preference for organically grown produce and those who did not. Respondents with a higher concern for pesticide residues and food poisoning, but a lower concern for high food prices, showed a stronger tendency to buy organically grown fresh produce. About 70 percent of those who chose pesticides use and 65 percent of those choosing food poisoning preferred to buy organically grown fresh produce.

These results suggest that preference for organically grown fresh produce is potentially high among Georgia consumers. Although acceptance of organically grown produce among non-whites and females was higher than their counterparts, differences in socioeconomic and demographic subgroups do not influence consumers' preference for organically grown fresh produce. The evidence suggests that concerns about health effects of pesticide residues, food poisoning, and preservatives and additives, and preference for quality (freshness and appearance) most differentiate the respondents. Furthermore, concern about high food prices also seem to discourage consumers from buying organically grown fresh produce.

Acceptance of Sensory Defects

We found that Georgia consumers consider the characteristic of appearance to be an extremely important factor in their fresh produce purchase decision. The appearance and freshness of organically grown produce, in many cases, are allegedly not of the same high quality as in conventional produce. It is, therefore, important to determine if consumers would buy organically grown produce that suffers from some type of sensory defects (insect holes, blemishes, soft spots). Over one-half of the respondents who had earlier expressed a willingness to buy organically grown fresh produce refused to accept any sensory defects. Only about one-quarter of them were willing to buy organically grown fresh produce even with sensory defects and another one-fifth were uncertain. This shows the importance of sensory quality in Georgia consumers' acceptance of organically grown fresh produce. For most of the potential consumers of organically grown produce, a trade-off between use of farm chemicals and sensory quality appears unacceptable.

We further analyzed the data to determine if consumers' attitude toward sensory quality differs significantly among socioeconomic and demographic subgroups. The results suggest a correlation between attitudes about sensory quality and a respondent's race, income, and educational level. Table 2 shows that non-white households were extremely sensitive to sensory quality and did not want to buy organically grown fresh produce with any sensory defects. Furthermore, respondents with college education and higher income appear more likely to tolerate some sensory defects in organically grown fresh produce than those with less than college education and with less income.

Cross-tabulations of consumers' attitude toward sensory quality of organically grown fresh produce by their attribute preferences and food concerns revealed statistical significance for consumers' concern about pesticide residues, preservatives, high prices, and nutrition. Respondents with greater concern for pesticide residues, preservatives, prices, and nutritional value showed a stronger willingness to tolerate some sensory defects on organically grown fresh produce (Table 2).

Testing and Certification

Regardless of their preference for organically grown produce, a majority (87 percent) of respondents wanted assurance of testing and certified residue free produce. About 70 percent of those who prefer organically grown fresh produce considered testing for pesticide residues to be very important and for another 25 percent it was somewhat important.

Table 2.

Cross-Tabulations of Respondents' Preference for Organic Produce with Sensory Defects by Economic, Demographic, Preference and Concern Variables

Respondents' characteristics	Buying organics with sensory defects		Chi-square value	Significance level
	Would buy	Wouldn't buy		
	percent			
Race			29.098	0.001
White	40	60		
Black	2	98		
Sex			0.864	0.353
Male	36	64		
Female	29	71		
Age (yrs.)			3.626	0.305
<25	15	85		
25-44	33	67		
45-60	37	63		
>60	23	77		
Income ('000\$)			9.466	0.024
<20	22	78		
20-30	26	74		
31-40	50	50		
>40	38	62		
Education			5.116	0.024
College	40	60		
Non-college	24	76		
Concern for pesticide residues			4.788	0.029
Concerned	38	62		
Not concerned	24	76		
Concern for preservatives			10.333	0.001
Concerned	47	53		
Not concerned	23	76		
Concern for high prices			5.124	0.024
Concerned	44	56		
Non concerned	27	73		
Concern for nutrition			3.771	0.052
Important	34	66		
Not important	16	87		

The intensity of the desire for pesticide residues free fresh produce is invariant of socioeconomic and demographic characteristics of the respondents. Cross-tabulations (Table 3) of consumers' desire for pesticide residues free fresh produce by their product attribute preferences and food concerns showed statistical significance only for consumer concern for pesticide residues. Respondents with greater concern for pesticide residues were more likely to demand testing and certification of fresh produce.

We asked those who preferred organically grown fresh produce and desired testing and certification to rank their choice of agencies or organizations that

Table 3.

Cross-Tabulations of Respondents' Preference for Testing and Certification of Organic Produce for Pesticides Residue by Economic, Demographic, Preference, and Concern Variables

Respondents' characteristics	Importance of Testing & Certification			Chi-square value	Significance value
	Very important	Somewhat important	Not important		
	percent				
Race				2.791	0.835
White	71	28	1		
Black	80	20	0		
Sex				1.591	0.451
Male	67	31	2		
Female	75	24	1		
Age (yrs.)				3.095	0.797
<25	73	27	0		
25-44	71	28	1		
45-60	79	19	2		
>60	69	31	0		
Income ('000\$)				6.700	0.349
<20	79	21	0		
20-30	76	22	2		
31-40	71	29	0		
>40	63	35	2		
Education				1.635	0.441
College	68	31	1		
Non-college	75	24	1		
Concern for pesticide residues				7.225	0.027
Concerned	80	20	1		
Not concerned	65	33	2		

should be responsible for providing the services. About 60 percent of the respondents chose a non-government organization (independent testing lab, or grower association, or other) and only about 28 percent preferred a government agency. Twelve percent did not express any specific preference. Among those respondents who chose a non-government organization, about 72 percent of them preferred an independent laboratory to be responsible for conducting testing and certification. The rest of the respondents (28 percent) divided themselves between grower associations, supermarkets, and other (non-specified) organizations. Although the disapproval of grower organizations and supermarkets does not come as a surprise, lack of confidence in the government monitoring system is bothersome. As feared by many scientists (Kennedy), it appears that the public's trust and confidence in the government's ability to guarantee the safety of our food supplies has eroded and more consumers are turning to private initiatives for protection.

Cross-tabulations of respondents' choice between non-government and government monitoring system by economic, demographic, preference, and concern variables showed statistical significance for the chi-square statistic for age, income, education, preference for appearance, freshness, and nutrition value (Table 4). Older respondents preferred the government agency. However, respondents with higher income and education chose a non-government agency more often than their counterparts. Respondents who consider appearance, freshness, and nutritional value to be important showed a stronger tendency to prefer a non-government agency.

Table 4.

Cross-Tabulations of Respondents' Preference of Who Should be Responsible for Testing and Certification by Economic, Demographic, Preference, and Concern Variables

Respondents' characteristics	Who should conduct testing		Chi-square level	Significance level
	Government	Non-Govt.		
	percent			
Race			1.868	0.600
White	25	75		
Black	31	69		
Sex			0.555	0.456
Male	30	70		
Female	25	75		
Age (yrs.)			5.689	0.128
<25	20	80		
25-44	23	77		
45-60	23	77		
>60	40	60		
Income ('000\$)			5.332	0.149
<20	33	67		
20-30	30	70		
31-40	20	80		
>40	18	82		
Education			3.931	0.046
College	19	81		
Non-college	31	69		
Preference for appearance			8.702	0.003
Important	24	76		
Not important	56	44		
Preference for freshness			2.833	0.092
Important	25	75		
Not important	46	54		
Preference for nutrition			4.589	0.032
Important	24	76		
Not important	42	58		

Pay Higher Prices

About 95 percent of the consumers that would buy organically grown produce considered testing and certification to be either very or somewhat important. When asked to indicate their willingness to pay higher prices for testing and certification for pesticide residues, however, many respondents declined to give specific amounts. Among those who had a willingness to pay, most (66 percent) said that they would only pay up to 10 percent higher than what they were paying for conventionally grown fresh produce. While about 12 percent of the respondents would pay an even higher premium, 22 percent would not pay higher prices at all.

The willingness to pay a premium is invariant of the socio-economic, demographic, preference, and concern variables, except income and race. Zellner and Degner reported that highly educated persons tend to be less willing to pay more for safer chicken. However, the level of education was not a significant factor in this analysis. As shown in Table 5, white and higher income households

Table 5.

Cross-Tabulations of Respondents' Willingness to Pay a Price Premium for Testing and Certification for Pesticides Residue by Economic, Demographic, Preference, and Concern Variables

Respondents' characteristics	Willingness to pay price premium				Chi-square value	Significance level
	No premium	Up to 5%	Within 5%-10%	Above 10%		
	percent					
Race					14.981	0.091
White	22	36	30	12		
Black	20	63	10	7		
Sex					1.136	0.768
Male	21	47	21	11		
Female	22	38	27	12		
Age (yrs.)					8.643	0.471
<25	0	64	27	9		
25-44	28	34	25	13		
45-60	13	49	26	13		
>60	26	40	25	9		
Income ('000\$)					18.726	0.028
<20	18	45	32	5		
20-30	18	50	21	11		
31-40	23	52	19	6		
>40	29	24	24	24		
Education					0.931	0.818
College	21	37	28	14		
Non-college	24	41	25	10		

were more willing to pay a higher price premium for testing and certification than non-white and lower income households. About 60 percent of the respondents who would pay more than 10 percent premium were earning greater than \$40,000 per year. In contrast, among those who would pay up to 10 percent price premium, 60 percent of them earned less than \$40,000 per year.

Summary and Conclusions

For the Georgia consumers surveyed, it is significant that six out of every 10 respondents expressed a preference to buy organically grown fresh produce. This clearly says there is a potential to expand organically grown fresh produce from specialty stores to the general market. The results did not show any direct relationships between socio-demographic variables and the groups of consumers who would and would not buy organically grown fresh produce. However, there was evidence suggesting race, age, sex, and levels of education and income to be significant determinants of consumers' risk perceptions, attitude toward chemical pesticides, and purchasing decisions of organically grown fresh produce. The attribute preference and food concern characteristics were, however, found to be more prominent in the decision making process of Georgia consumers. Preference for freshness and appearance, and concerns about food safety, nutrition, price and pesticide residues, most differentiate the respondents.

The most important factor to the marketing potential of organically grown fresh produce in Georgia appears to be some certification that these produce are free of chemical residues. Perhaps of equal importance, retailers should make available organically grown fresh produce at a reasonable price that is competitive with those grown by conventional methods. They should also seek produce without defects in sensory quality. An additional factor important to the consumer is testing and certification of organically grown fresh produce to be free from pesticide residues by an independent testing laboratory.

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