

## THE QUALITY OF APPLES – PREFERENCES AMONG CONSUMERS FROM SKIERNIEWICE, POLAND

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### A B S T R A C T

The presented studies are part of European HiDRAS Project, having as the goal an increase of consumer acceptance and diffusion of disease resistant apples. Consumer survey focused on habits of fruit eating and expectations towards apple quality. The respondents were from Skierniewice, Poland, and the surrounding countryside. The number of respondents was 219 in 2004 and 246 in 2005. They were inquired about frequency, amount and motivation of eating fruit and apples in particular. They were also asked to identify, order and rank different apple quality traits according to their own preferences. Numbers and forms of questions were fitted to the age of the target group.

Over 90% of both adult and younger consumers like apples, and over 30% eat more than seven apples a week. Most of the adult consumers buy apples directly from growers or at the farmers market. Most also considered these outlets to be the best sources of high-quality apples. Most of the adult consumers do not buy apples from environmentally friendly orchards because they are difficult to find on the local market. Adult respondents considered flavour and juiciness to be very important. Many respondents also stated that sweetness and firmness were very important. By far most of the younger consumers preferred sweet, red apples. The teenagers strongly preferred firm apples, whereas the children strongly preferred soft ones. As concerns external quality traits such as size or colour, younger respondents are rather changeable in their decision. However, when it comes to the internal attributes such as texture and flavour they gave really consistent responses.

### INTRODUCTION

Successful marketing of fresh apples requires thorough knowledge of

consumer preferences and perceptions. European consumers have become very demanding about fruit quality, and are willing to pay more for high

quality products (Steenkamp and van Trijp, 1996).

Quality has been defined in many ways and contexts, and there is little agreement on what it is, how it can be measured, and how it relates to consumer acceptance (Shewfelt, 1999). When consumers are asked what fruit quality means to them, they always answer in terms of the following:

- taste and other sensory characteristics;
- nutritional value;
- convenience; and
- wholesomeness, which they associate with organic and natural production (Grunert, 2005).

Scab-resistant apple cultivars can play an important role in satisfying consumer demand for ecologically friendly food products because thanks to them growers may reduce the usage of fungicides. However, few growers take the risk of planting scab-resistant apples because they are not sure whether consumers will buy them (Kuhn and Thybo, 2001a). Thus, European Project called HiDRAS, had as the goal an increase of consumer's acceptance and diffusion of disease resistant apples. As part of the project, adults and children in various parts of Europe were asked about their fruit eating habits and their expectations in terms of apple quality. Younger consumers were included in the study because they represent a growing share of the fruit market. Their influence on fruit purchasing decisions is also increasing (Dziuk-O'Donnell, 1999). Furthermore, the preferences of adult consumers are not very useful in

predicting the preferences of younger consumers (Kuhn and Thybo, 2001b). According to a previous survey, Polish consumers over eighteen years old prefer apples that are red, sweet, and slightly sour (Zmarlicki, 1996).

The aim of this study was to gain knowledge about habits of apple eating as well as preferences towards particular apple quality traits. The survey was conducted among consumers from Skierniewice, Poland, and the surrounding countryside.

## MATERIAL AND METHODS

### Survey of adult consumers

The survey in Skierniewice was conducted over two years. 219 consumers were surveyed in 2004, and 246 were surveyed in 2005. The consumers were recruited from among both male and female population. There were mainly workers or customers of local office and students. Participation in the study was voluntary.

The questionnaire consisted of twenty-three questions on habits, with emphasis on fruits, particularly apples. The consumers were also asked about which snacks they like to consume. The main part of the questionnaire dealt with apple quality characteristics. The consumers were asked to rank particular characteristics, or to score them on a scale from 1 to 5 (Land and Shepherd, 1988). They were asked about what kind of apples they preferred. They were also asked to describe the ideal apple. Questions pertaining to organic production were also included on the questionnaire. The consumers whether

also asked where they believed that high quality apples could be purchased.

### **Survey of younger consumers**

A survey was also conducted among younger consumers in three age groups: teenagers (13 to 15 years old), pre-teens (9 to 12 years old), and children (6 to 8 years old). The consumers were recruited from among school students in Skierniewice.

The questionnaire for younger consumers was an abbreviated version of the questionnaire for adult consumers. Nonetheless, it included questions on fruit and apple eating preferences and habits. The teen and pre-teen groups were also asked to rank specific hedonic characteristics, such as flavour, sweetness, sourness, juiciness, firmness, size, skin colour, and nutritional value.

The questionnaire for pre-teens and children was supplemented with pictures and pictographs to help them answer the questions as accurately as possible. Teens and pre-teens were asked to describe the ideal apple. Children were asked what associations apples had for them.

## **RESULTS**

### **Demographic data**

A total of 219 adult consumers were surveyed in 2004 and 2005. The gender structure was similar in both seasons – about 40% male and 60% female. The proportion of adult respondents with higher education was 30.3% in 2004, and 43.3% in

2005. The proportion of respondents with secondary education was 31.3% in 2004, and 30.0% in 2005. The proportion of respondents with vocational education was 6.1% in 2004, and 6.7% in 2005. Moreover, the proportion of studying respondents was 31.1% in 2004 and 20.0% in 2005. 1% of respondents in 2004 declared elementary education. Most of the respondents lived in a small town, specifically Skierniewice, which has about 50,000 residents. Most of the respondents belonged to households consisting of three to four persons. About half of the respondents described their financial situation as being neither good nor bad.

During two year studies a total number of 103 teenagers, 81 pre-teens, and 62 children were surveyed. Generally, each group contained more girls than boys, with the proportion of girls ranging from 51.4% to 62.9%. The only exception was the children group in 2005, which consisted of 63% boys and 37% girls. 75.6% of the younger consumers lived in Skierniewice, and the rest lived in nearby villages.

### **Apple eating habits**

About half of the respondents stated that they eat apples several times a week (Tab. 1). None of the respondents stated that they never eat apples. Only about 4.2% of the respondents stated that they rarely eat apples.

More than half of respondents in each age group stated that they eat from one to six apples per week. 35.6% of the adults, 25.8% of the

Table 1. Apple eating habits by age groups. Means for 2004 and 2005. n = 219 for adults, 103 for teenagers, 81 for pre-teens, and 62 for children

Age group	Frequency of apple consumption [percentage of respondents]				
	every day	several times a week	several times a month	Rarely	Never
Adults	39.3	48.8	7.8	4.1	0
Teenagers	25.6	57.5	12.0	4.9	0
Pre-teens	48.1	45.7	2.5	3.7	0
	Number of apples consumed per week [percentage of respondents]				
	one	two to six	seven or more		
Adults	9.1	55.3	35.6		
Teenagers	13.5	60.7	25.8		
Pre-teens	6.2	59.2	34.6		
Children	3.3	58.8	37.9		

Table 2. Preferences for different fruits among adult and younger consumers. Means for 2004 and 2005. n = 219 for adults, 103 for teenagers, 81 for pre-teens, and 62 for children

Age group	Bananas [%]	Pears [%]	Apples [%]	Oranges [%]	Tangerines [%]
Adults	12.2	9.4	62.0	3.7	12.7
Teenagers	8.2	1.8	76.1	2.9	11.1
Pre-teens	8.2	7.5	72.6	4.1	7.7
Children	26.8	13.6	34.2	6.5	18.9

teenagers, 34.6% of the pre-teens, and 37.9% of the children stated that they eat seven or more apples a week. Significantly fewer teenagers responded that they eat more than seven apples a week. Significantly more teenagers responded that they eat only one apple a week.

Most of respondents stated that they rather like apples or that they like apples very much (over 90%), only among teenagers there was a group of respondents (7.8%) which resolutely does not like apples.

Most adults, teenagers and pre-teens stated that apples are the fruit

they choose most often among others (Tab. 2). The proportion of children stating that apples are the fruit they choose most often was significantly lower, although even in this group, apples scored higher than the other fruits included on the questionnaire, including bananas and tangerines. Children had markedly more cosmopolitan fruit preferences, and selected all of the fruits except for apples far more often than the other groups did. Teenagers were far less like to select pears than the other groups were (Tab. 2).

Table 3. Preferences for snacks during leisure-time. Means for 2004 and 2005 seasons. n = 219 for adults, 103 for teenagers, 81 for pre-teens, and 62 for children

Age group	Chips (crisps) or popcorn [%]	Sweets [%]	Apples [%]	Other fruit [%]	Salty snacks [%]	Nothing to eating [%]
Adults	2.3	16.8	35.8	5.4	12.1	27.6
Teenagers	29.0	24.8	18.6	11.2	16.4	0.0
Pre-teens	17.1	14.0	52.3	14.4	2.2	0.0
Children	27.4	12.1	30.0	12.3	18.2	0.0

In the leisure time (during reading a book or watching TV) adult respondents among snacks such as crisps/popcorn, sweets, apples, other fruits or salty snacks (Tab. 3), most often reach for apples (35.8 %) or do not eat anything. 52.3% of pre-teens and 30% of children also preferred apples as snack. An exception were teenagers who preferred crisps and popcorns (29.0%) or sweets (24.8%) and only 18.6% respondents from this age group pointed that they choose apples among other snacks. Crisps and popcorn were also popular within pre-teens (17.1%) and children (27.4%).

### Apple buying habits

Most of the respondents stated that they buy apples directly from growers or at the farmers market. Most respondents also stated that these were the best sources of high-quality apples. About a third of the adult respondents said that they consider apples to be relatively inexpensive, and slightly more than half considered them neither expensive nor inexpensive.

57.0% of the adults stated that they do not buy apples from environmentally friendly orchards. The main reason they gave is that such kind of apples is difficult to find on the local

market. It is worth mentioning that some of respondents as ecological mistakenly consider apples from old orchards or private gardens without any protection. Respondents who buy apples from environmentally friendly orchards do so mainly because they believe they are more wholesome.

### Preferences of adult consumers

When asked to grade various apple quality characteristics on a five-point scale, most of respondents considered flavour and juiciness to be very important. Many respondents also stated that sweetness and firmness were very important (Tab. 4). Also when asked to rank the traits in order of importance, the respondents most often placed flavour, juiciness and firmness at the top of the list, whereas sourness, size and skin colour rather on the end.

Low position of particular traits on the ranking list does not exclude their impact on consumer preferences (Tab. 5). 42.4% of respondents stated that they like sweet apples very much, and only 16.7% declare the same for sour apples. What is more, 36.9% respondents pointed they slightly dislike or dislike sour apples at

Table 4. The importance which adult respondents attach to particular quality attributes, percentage of respondents giving each score in 5-point rate scale. Means for 2004 and 2005. n = 219

	Percentage of respondents				
	1: totally unimportant 5: very important				
	1	2	3	4	5
Flavour	2.7	1.8	6.8	22.4	66.2
Sweetness	2.3	5.5	23.7	35.2	33.3
Sourness	8.2	15.1	30.1	28.8	17.8
Juiciness	1.8	2.7	8.2	33.3	53.9
Firmness	3.2	6.4	26.9	26.9	36.5
Size	5.9	18.7	37.0	27.9	10.5
Skin colour	11.4	16.9	29.7	24.2	17.8
Nutritional value	15.5	13.7	22.4	16.9	31.5

Table 5. Preferences of adults for taste, size and skin colour. Percentage of respondents giving each score in 5-point hedonic scale. Means for 2004 and 2005. n = 219

	Percentage of respondents				
	1: I dislike very much 5: I like very much				
	1	2	3	4	5
Sweet	2.6	5.5	17.7	31.8	42.4
Sour	14.5	22.4	21.5	24.9	16.7
Large	6.7	13.3	34.3	28.2	17.5
Medium	2.4	4.9	31.5	23.3	37.9
Small	30.9	35.9	25.8	4.8	2.6
Red	0.9	1.9	19.2	25.2	52.8
Green	11.3	25.5	33.8	15.9	13.5

all. If it concerns size, 37.4% of consumers like very much medium size apples, whereas 30.9% indicated that they do not like very much small ones. More than 50% of respondents appreciate very much red colour of apple, while only 29.4% declare more than neutral attitude to green fruits.

### Preferences of younger consumers

Younger respondents stated that they eat apples because they like them and because consider them

good for their health. However, when they were asked to rank the characteristics in order of importance, nutritional value was low on the list. The results for skin colour were also inconsistent. The majority of younger respondents declared in one answer that the colour of the peel does not have any significance for them while simultaneously in the choice test over 80% of them chose the red colour of the peel as the most preferable one (Tab. 6). Most of the teenagers and pre-teens preferred medium-sized apples, whereas most

Table 6. Preferences for particular apple traits in younger consumers. Choice test. Means for 2004 and 2005. n = 103 for teenagers, 81 for pre-teens, and 62 for children

		Teenagers	Pre-teens	Children
		[%]	[%]	[%]
Colour	red	83.8	71.8	88.7
	green	16.2	28.2	11.3
Size	large	43.4	44.1	56.8
	medium	52.6	52.3	28.7
	small	4.0	3.6	14.5
Taste	sweet	70.5	72.4	83.0
	sour	29.5	27.6	17.0
Texture	firm	86.6	51.7	34.8
	soft	13.4	48.3	65.2

of the children preferred large apples. By far most of the young respondents in all three age groups stated that they like sweet apples very much. As concerns apple texture, the teenagers strongly preferred firm apples, whereas the children strongly preferred soft ones.

### Consumer expectations

The adults most often stated that the ideal apple should be sweet, juicy, nicely coloured, and shiny. However, some stated that it should be also slightly sour. The teenagers and pre-teens stated that the ideal apple should be sweet, juicy and firm. Children imagined the ideal apple as red and round, and frequently associated apples with Christmas tree ornaments.

## DISCUSSION

In this study, apples were the most popular fruit among residents of Skierniewice and the surrounding countryside. This agrees well with previous studies, which found that

apples were the most popular fruit among residents of Lublin, Poland, and among Polish students (Czernyszewicz, 2002; Babicz-Zielińska and Zagórska, 1998).

Not many of the respondents stated that they buy apples from environmentally friendly orchards, mainly because they are not readily available on the local market. Increasing the availability of apples from organic and integrated orchards should therefore be a high priority for Polish fruit growers and distributors. Europeans care more and more about the origin and quality of the food they eat. Products from organic and integrated producers make up an increasing share of the European market (Richter and Hempfling, 2003). Interest in organic and integrated food products is also increasing among consumers in Poland (Euromonitor, 2005). Scab resistant cultivars can play a key role in increasing production to meet consumer demand.

43% of the adult respondents in this study stated that they would like to buy fruit from environmentally

friendly orchards. However, many of them are not familiar with the specifics of environmentally friendly fruit production.

To appeal to consumers, scab resistant cultivars should possess the characteristics most preferred by the respondents in this study. Most of the adults preferred apples that are sweet, juicy and firm, although some preferred also sour apples. This agrees well with a previous study (Zmarlicki, 1996). The scab-resistant cultivar 'Topaz', which is sour, juicy and firm, may thus appeal to some local consumers (Konopacka et al., 2006).

The younger respondents in this study preferred sweet, medium-sized or large apples, as do many consumers across Poland (Zmarlicki, 1996). They in overwhelming preferred red apples, which conflicts with a previous study in which Danish children were asked to choose among red apples, green apples, bananas or tangerines. 32% of the Danish children selected green apples, and only 26% chose red apples (Thypo et al., 2003).

The teenager in this study overwhelmingly preferred firm apples. Pre-teens had no clear preference. The children, on the other hand, overwhelmingly preferred soft apples. This finding can help fruit growers and retailers adapt their practices to meet the expectations of younger consumers.

## CONCLUSIONS

Apples are very popular in Skierniewice and the surrounding countryside. Over 90% of both adult and younger respondents like apples,

and over 30% eat more than seven apples a week.

Most of the adult consumers buy apples directly from growers or at the farmers market and consider these places as good location for purchasing apples of good quality.

Most of the adult consumers do not buy apples from environmentally friendly orchards because they are difficult to find on the local market.

Adult respondents considered flavour and juiciness to be very important. Many respondents also stated that sweetness and firmness were very important.

By far most of the younger consumers preferred sweet, red apples. The teenagers strongly preferred firm apples, whereas the children preferred soft ones.

As concerns external quality traits such as size or colour younger respondents are rather changeable in their decision, however, when it comes to the internal attributes such as texture and flavour they gave really consistent responses.

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## JAKOŚĆ JABŁEK – PREFERENCJE KONSUMENTÓW Z REJONU SKIERNIEWIC

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### S T R E S Z C Z E N I E

Prezentowane badania są częścią projektu europejskiego HiDRAS, którego celem jest zwiększenie akceptowalności i popularności jabłek parchoodpornych. Badania konsumenckie obejmowały przede wszystkim zwyczaj zjedzenia jabłek, a także oczekiwania w stosunku do poszczególnych cech jakościowych jabłek. Respondentami byli mieszkańcy Skierniewic i okolic, a ich całkowita liczba wyniosła 219 osób w 2004 i 246 w 2005 roku. Ankiety składały się z pytań o częstotliwość, ilość i motywy spożywania jabłek oraz preferencje w stosunku do najważniejszych cech jakościowych jabłek. Respondenci mieli za zadanie także uszeregować cechy jakościowe jabłek według ich własnych preferencji. Liczba i forma pytań były dostosowane do możliwości percepcyjnych poszczególnych grup wiekowych.

Ponad 90% dorosłych i młodszych respondentów lubi jabłka, ponad 30% jada więcej niż 7 jabłek na tydzień. Większość dorosłych ankietowanych twierdziła, że kupuje jabłka u producentów lub na bazarach ze względu na ich cenę oraz jakość. Dorośli respondenci pytani o ich preferencje w stosunku do konkretnych cech jakościowych jabłek, w większości wskazywali smakowitość i soczystość jako „bardzo ważne”. Mieli też pozytywny stosunek do twardości i smaku słodkiego. Podobne tendencje były obserwowane, jeżeli chodzi o respondentów poniżej 16 roku życia. Małe dzieci (w wieku 6-8 lat) wybierały miękkie jabłka, podczas gdy nastolatki preferowały jabłka twarde. Jeżeli natomiast chodzi o zewnętrzne cechy jakościowe jabłek, takie jak: wielkość czy barwa, dzieci były bardzo zmienne w swoich opiniach.

**Słowa kluczowe:** preferencje konsumentów, jabłka, cechy jakościowe