

ANALYZING CONSUMER PREFERENCE TO DIFFERENT RICE VARIETIES IN TURKEY

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Abstract

The aim of this research was to analyse consumer behaviour regarding different varieties of rice. The research was pursued in two stages, firstly the focus group method was used to explain different Socio-Economic Status (SES) group characteristics and sensory evaluations related to rice. The target of this research is to investigate consumer preference and determine if sensory attributes can be used to predict consumer acceptability for different varieties of rice. Focus group results indicate that Baldo and US Calrose are significantly different from Ordinary rice regarding outlook, good cooking, palatability and cleanliness. Consumers are willing to pay more for Baldo than other varieties. Secondly, the field research was conducted with 632 housewives using the face-to-face interview method. The field research results were similar and Baldo is perceived differently from other varieties except regarding price. Therefore, US Calrose consumption is higher than Baldo. Hierarchical cluster analysis indicates that US Calrose was considered the best imported rice, highly hygienic, shiny, standard length of grains and easy-to-cook.

Key words: food research, focus group, field research, hierarchical cluster, Baldo, US Calrose

INTRODUCTION

Rice is the most preferred food and its consumption is increasing in developing countries such as Turkey. However, in some developing countries like Korea the consumption of rice, the staple food of the Korean diet, has continually decreased over the past few decades as the national diet has become more westernized (Keunmin 2004). Rice consumption reaches 9 kg per capita in Turkey (AERI 2007). Different type of rice varieties compete in the Turkish rice market like imported US Calrose and domestically produced Baldo. Annual rice market size is an approximately €550 million, and 40% of the demand is provided via import (TUIK, 2007). The target of this research is to investigate consumer preference and determine if sensory attributes can be used to predict consumer acceptability for different varieties of rice. Tomlins et al. (2005) found that consumer acceptability of local and imported raw and parboiled rice varied with the imported raw and parboiled rice usually being preferred to locally produce ones. Consumer research is particularly difficult for food products, because of the especially subtle and complex nature of food products as stimuli at the point of purchase and during consumption, the complex nature of consumer response to them, and most marketers' limited understanding of sensory processes and how to research sensory effects (Garber et al., 2003). Research and development projects involving consumer products typically use both sensory evaluation and consumer market research. The sensory testing determines quantitative differences in terms of an appropriate set of attributes and the consumer testing establishes consumer liking of the products (Buck et al., 2001). Preference analysis is a generic term given to

techniques that quantify, analyse and interpret consumer preference formation for products (Kleef et al., 2006). The study of consumers' preference analysis and consumer attitudes towards specific products constitutes an especially interesting issue in the field of marketing. Hori et.al (1996) used preference analysis on aromatic rice for different attributes in Britain. The aim of this research was to analyse consumer attitude and preferences between traditional rice varieties – Baldo and imported rice varieties – US Calrose and Ordinary rice.

MATERIALS AND METHODS

Materials

Consumers' rice purchase behaviour and factors affecting rice preferences are analysed in two steps. In the first stage, the focus group method was used to analyse market dynamics and consumer preferences. The second stage comprises a field research survey that is formed by 632 face-to-face interviews. The research data was collected from Istanbul in 2005.

Three rice varieties constitute research frame, which are Baldo, US Calrose and Ordinary rice. Baldo and US Calrose are generic type of paddy as known internationally. Ordinary rice type is called domestically it is blend of a few varieties for making a pilaf.

The focus group

Focus group interviews provide qualitative information with a depth of human interaction. The principal advantage of focus group is synergism; that is, group

interaction generally provides more and better data than would individual in-depth interviews (Keown, 1983). Focus group analysis attempts to perceive conceptual similarity and to discover patterns by identifying those opinions, ideas or feelings that repeat, even though they were expressed in different forms (Dransfield et al., 2004). The group depth interview is most frequently useful and appropriate in the developmental and exploratory phases of research (Goldman, 1962). Focus groups often are conducted before the fielding of a large sample survey (Calder, 1977).

Six focus groups were conducted to investigate perceptions and opinions of rice consumption and rice purchase behaviour. Focus groups were arranged in the Istanbul city. Constructing a three different Socio-Economic Status (SES) group and each one were organized twice. A and B SES groups were combined with respect to low proportion of these groups' member and common approach for the other survey such a TV ratings in Turkey. Each focus group was formed by 9 housewives who have between 24–50 ages and lasting approximately 60 minutes. A and B group characteristics are, \$5 000+ household income per month, high residential and luxury district, university degree or higher education. C SES group characteristics are \$2 000–\$5 000 household income per month, residential district, high school education. D SES group characteristics are below \$2 000 household income per month, low residential district, primary school education. Because social class homogeneity within focus groups is claimed to be important by authors writing on the use of focus groups (Fern, 1982), we determined that all respondents in the study should be as homogeneous as possible.

At the first stage of focus group respondents were asked questions about rice purchasing behaviour such as retailer preference and reason, frequency of purchasing, package preference, and purchase decision criteria. Next, respondents were offered different kinds of rice and ask for them to identify. Finally, they were explaining about rice purchasing and rice cooking experience. At the second stage of focus group they were exposed short questionnaire about evaluation of three different rice varieties regarding willingness to pay, outlook, good cooking, palatability, and cleanliness.

The field research

The field research was conducted with housewives using the face-to-face interview method in the city of Istanbul. The average duration of face-to-face interview was 10 minutes at the respondents' house. The questionnaire was designed in connection with focus group analysis results. Firstly, rice purchasing behaviours were examined regarding attitude towards different rice varieties. Next, housewives' opinions related to imported rice were revealed with seven point Likert scale.

Data analysis

The analysis of variance (ANOVA) was used to determine differences between rice types and their price and attributes at focus group and field research level. A one-way ANOVA procedure was performed in this analysis. A one-way ANOVA considers one treatment factor with two or more treatment levels. The goal of the analysis is to test for differences among the means of the levels and to quantify these differences (SAS, 1999).

A Paired Samples t-test was used to determine consumption differences between the different rice varieties. The Paired Samples t-test compares the means of two variables. It computes the difference between the two variables for each case, and tests to see if the average difference is significantly different from zero (McClave & Benson, 1988).

$$\bar{d} \pm t_{\alpha/2} \left(\frac{Sd}{\sqrt{n}} \right) \tag{1}$$

In the Equation (1) \bar{d} indicates arithmetic mean differences between rice variety pairs, $t_{\alpha/2}$ indicates confidence level, Sd indicates standard deviation between pair differences and n indicates the number of pairs.

Respondents' opinions on rice were analysed with cluster analysis. The term cluster analysis encompasses a number of different algorithms and methods for grouping objects of similar kind into respective categories. The most commonly used measure of similarity is the Euclidian distance or its square (Malhotra, 1983).

$$d_{ij} = \sqrt{\sum_{k=1}^n (x_{ik} - x_{jk})^2} \tag{2}$$

In the Equation (2) d_{ij} indicates Euclid distance, x_i indicates first variable, x_j indicates second variable and k indicates grouping of sample size.

Cluster analysis is an exploratory data analysis tool which aims at sorting different objects into groups in a way that the degree of association between two objects is maximal if they belong to the same group and minimal otherwise (Statsoft, 2004). Cluster analysis was used in many research projects on explotary studies (Dahl & Naes, 2004; Sahmer et al., 2006; Rybowska & Babicz-Zielinska, 2007). We used the hierarchical clustering method with dendrogram to illustrate a tree-like structure.

RESULTS AND DISCUSSION

The focus groups findings

The focus group analysis was carried out by regarding the same Socio-Economic Status (SES) group characteristics.

AB SES group characteristics

The first focus group consisted of housewives A and B SES group. In this group, the majority of housewives shop for food from market leader chain-supermarkets. The reasons for preferring those supermarkets are expressed as closeness in first place and high quality products in second place. The frequency of purchasing rice has been mentioned as once a month. The majority of the housewives purchase 3 kg packages (Table 1). The housewives participating in this group mostly pay attention to the freshness of the desired product. After freshness, the appearance of the product, palatability and distinctiveness of the rice grains are named as important to the consumers. Housewives are likely to change brand

C SES group characteristics

The majority of housewives purchase food from chain supermarkets. The criteria for outlet selection are closeness to their home, low price level according to product quality and wide product variety respectively. The frequency of rice purchasing has been mentioned as both once a week and once a month. Preferred package size differs according to purchase frequency although 3 kg packages are usually preferred by large families. Price is the most important factor that is considered by the housewives when purchasing rice. Hygiene is the second factor. The superior hygienic characteristics of imported rice are an important factor in its choice. Housewives of this group are likely to change their preferences according to the characteristics of the brands. The housewives in this group were able to define what kind of rice it was and even identified that Baldo kind of rice was not purely Baldo. Consumers expressed that they find US Calrose trustworthy but had recent problems about the purity of the rice products. Other imported rice brands, from Egypt and China, have not satisfied the housewives who participated in this group. They claimed that they have noticed the rice was not

preferences according to the characteristics of the product (freshness is the strongest factor). But some housewives in this group expressed that they always use the same brand and would hardly change their product because they got used to how to cook it best. Commercials, advertisements and presentations also have positive influence on house-wives in this group.

Housewives in this group have almost established familiarity with all kinds of rice but some of them had difficulties in distinguishing certain kinds of rice. They mentioned that they have heard of other imports like Egyptian and Chinese rice although they have never tried them. In addition, the housewives in this group claimed that they noticed either while cleaning the rice or after tasting it that it was not exactly the same. purely same kind and they noticed it either while cleaning the rice or after tasting it. Housewives specifically expressed that recently there are more mixed rice products on the market. Consumers especially wish to see protected patented logo products on the market.

D SES group characteristics

Housewives in this group expressed that they are shop from supermarkets close to their home and which have discounts due to suitable price policies of these retailers. Some large families prefer to purchase rice in sacks from wholesalers in order to economise. The frequency of shopping for rice is once a month. The majority of housewives prefer 3 kg packages. Some of the larger families purchase their rice in sacks 2–3 times a year. Price is the most important factor for housewives in this group while purchasing rice. After its price, housewives prefer to see a good appearance, freshness, large sized grains, and whiteness. Housewives usually purchase the same brand but mentioned that if they found another brand, with a suitable price and reasonable quality they would shift to the new brand. They mentioned that the brand name has no significance for them. In addition to

Tab. 1: Preferences according to SES group

Criteria	AB SES	C SES	D SES
Retailer preference	Chain supermarkets	Chain supermarkets	Closeness of supermarkets, discounts, wholesalers
Retailer selection criteria	Closeness, high quality products	Closeness, cheap & high quality products, product variety, store loyalty	Cheapness and closeness
Rice purchasing frequency	Once a month	Once a week /once a month	Once a month, 2–3 times a year
Preferred package size	3 kg	1 kg/3 kg	3 kg and sack
Purchase decision criteria rankings	<ol style="list-style-type: none"> 1. freshness 2. outlook 3. palatable 4. distinctiveness of the rice grains 	<ol style="list-style-type: none"> 1. price 2. hygiene 3. freshness 4. larger grains 	<ol style="list-style-type: none"> 1. price 2. outlook 3. freshness 4. larger grains

price, they also check the physical aspects of the product such as the large size, shininess and transparency of grains. The housewives in this group could not recognize the differences between the varieties of rice that was presented to them.

Women who prefer Baldo gave force of habit, big grains of rice and appearance as a reason for their preference. It is found that they choose Baldo especially for cooking pilaf. However, some housewives mentioned that they have tried US Calrose to cook pilaf and they were content with the performance. Generally housewives expressed that US Calrose is also preferred for cooking other meals.

ANOVA was used to test differences among rice varieties regarding respondents' willingness to pay for these products. The ANOVA result indicates significant differences among rice varieties concerning willingness to pay (Table 2). Post Hoc comparisons on rice varieties indicate that the participants are willing to pay more for the most popular type of 'Baldo' than other varieties.

Furthermore, differences among rice varieties were tested with ANOVA with respect to participants' ratings on rice attributes. We found significant differences among rice varieties on whole attributes (Table 3). Post Hoc comparisons on rice varieties indicate that Baldo and US Calrose are significantly different and better than Ordinary rice with respect to outlook, good

cooking, palatability and cleanliness. There are no significant differences between Baldo and US Calrose.

The field research findings

The field research comprises 632 housewives and was conducted through face-to-face interviews. The rice purchasing behavior of housewives was studied.

Purchasing behaviors on rice

The rice purchasing behavior of the consumers are classified and grouped under; reasons for the selection of the kinds of rice, package preferences, location of purchase, packaging and frequency of purchasing rice. All the different kinds of rice have been separately analyzed.

The most important factor for families to prefer Baldo was its palatability and as the second reason they mentioned that Baldo rice has big grains (Table 4). The Turkish consumer still has a traditional pattern of consumption. Families still prefer Baldo for its palatability, its flavor, outlook and bigger grains. When we asked about why US Calrose was preferred instead of Baldo, the participant mentioned as the cleanliness of US Calrose. In addition to this its palatability, its flavor and its suitable price were mentioned as reasons for preferring US Calrose. Ordinary rice is preferred

Tab 2: Participants' willingness to pay different rice varieties

	<i>Baldo</i>	<i>US Calrose</i>	<i>Ordinary rice</i>	f	Sig.
Willingness to pay (€/kg)	1.220	1.093	1.092	16.066	0.000
Mean difference					
Baldo	–	0.12667 ^a	0.12769 ^a		

^aThe mean difference is significant at .01 level

Tab. 3: Participants' ratings on rice attributes

	<i>Baldo</i>	<i>US Calrose</i>	<i>Ordinary rice</i>	f	Sig.
Outlook	8.05	7.07	5.01	8.80	0.000
Mean difference					
Baldo	–	0.97998	3.05405 ^a		
US Calrose	-0.97998	–	2.07407 ^b		
Good cooking	8.24	7.92	6.50	5.542	0.006
Mean difference					
Baldo	–	0.32324	1.74324 ^a		
US Calrose	-0.32324	–	1.42000 ^b		
Palatability	8.51	7.72	5.70	12.451	0.000
Mean difference					
Baldo	–	0.79351	2.81351 ^a		
US Calrose	-0.79351	–	2.02000 ^a		
Cleanliness	8.56	7.80	6.01	16.001	0.000
Mean difference					
Baldo	–	0.75988	2.56757 ^a		
US Calrose	-0.75988	–	2.02000 ^a		

^aThe mean difference is significant a 0.01 level; ^bThe mean difference is significant at 0.05 level

because its price is low as a sales strategy. Consumers that are sensitive to price prefer this product because it is similar to Baldo kind of rice. Other reasons for identifying the product as Baldo are that it is easy-to-cook, palatable and has a good flavour.

Examining the quantity of different varieties of rice consumed, it is clear that Ordinary rice consumption is very low compared to Baldo and US Calrose (Table 5). The respondents' rice consumption was tested with paired samples t-test analyses to reveal the exact differences among the rice varieties. Table 6 indicates that the consumption of Baldo and US Calrose are not significantly different. In addition, both of them are significantly different from Ordinary rice with a 99% confidence level.

When we asked about why US Calrose was preferred instead of Baldo, the participants mentioned that the hygiene of US Calrose was an important factor. In

addition to this its palatability, its flavor and its suitable price were mentioned as reasons for preferring US Calrose.

Evaluation of kinds of rice according to different criteria

Consumers were asked to evaluate three different kinds of rice according to different criteria. The measurement was carried out using the 5 point Likert scale (closer to 1 means very good, closer to 5 means very bad). Arithmetic means are given in Table 7. Baldo is in the first place in all criteria except price. However, generally speaking US Calrose also proved that it is successful according to the marks it received.

Table 8 shows that Baldo is perceived significantly differently from other rice varieties regarding outlook,

Tab. 4: Reasons for preferred rice variety

	Baldo (%)	US Calrose (%)	Ordinary Rice (%)
Palatable	65.6	39.0	43.1
Bigger Grains	63.5	–	–
Flavour	51.1	30.0	43.1
Cleanliness	49.6	49.0	–
Good cooking	35.1	27.0	45.1
Force of Habit	19.1	7.0	–
Suitable Price	11.8	30.0	66.3
US Brand	–	15.0	–

Tab. 5: The quantity of rice consumed in a month for different varieties

	Consumption (kg/person)	95% confidence level	
		lower limit	upper limit
Baldo	1.0786	1.0050	1.1522
US Calrose	1.1848	1.0187	1.3508
Ordinary Rice	0.5534	0.5224	0.5844

Tab. 6: Paired samples t-test results between rice varieties

	Mean	t	Sig. (2-tailed)
Baldo – US Calrose	–0.14759	–1.522	0.130
Baldo – Ordinary rice	0.44311	10.810	0.000 ^a
US Calrose – Ordinary rice	0.66096	7.350	0.000 ^a

^a The mean difference is significant at 0.01 level

Tab. 7: Evaluation of rice varieties in different preference criteria

	Baldo		US Calrose		Ordinary Rice	
	Ar. Mean	St. Dev.	Ar. Mean	St. Dev.	Ar. Mean	St. Dev.
Palatable	1.5208	0.8338	1.8696	1.1485	2.2869	1.0683
Outlook	1.6307	0.8076	1.9565	1.1245	2.3610	0.9335
Good cooking	1.6042	0.8317	1.9386	1.1594	2.2667	0.9691
Cleanliness	1.6829	0.8806	1.8860	1.0765	2.6345	2.9460
Price	2.5123	0.9800	2.3246	0.9889	1.8819	0.8496
Availability	1.4615	0.7417	2.0536	0.9918	1.7082	0.9091
Standard product	1.6109	0.7675	1.9038	0.9170	1.8815	0.9299

ease of cooking, palatability, availability and standardised quality of the product. On the other hand, the price of Baldo is significantly higher than US Calrose and Ordinary rice.

Evaluation of opinions about rice

Consumers were asked 7 opinion questions about rice. Questions were asked using the seven point Likert scale (closer to 1 is definitely agree, closer to 7 is definitely not agree).

The results are recorded as follows; when we examine averages in general, there is a tendency towards the

middle except for 7 (Table 9). The reason is that the amount of people who agreed and who did not agree is close in values and some opinions were recorded as neutral. For this reason, the marks for each opinion are evaluated through frequencies.

When the opinions were studied one by one, more than half of the participants remarked that price is the most important reason for choosing which rice to purchase. In second place, opinions on “the brand name is not important” were analysed and the majority of the consumers answered in accordance to it. This can also be seen in rice-purchasing behaviour. However, when asked directly, some of the participants said that the

Tab. 8: Analysis of respondents’ judgements on rice attributes

	<i>Baldo</i>	<i>US Calrose</i>	<i>Ordinary rice</i>	f	Sig.
Outlook	1.6307	1.9565	2.3610	82.824	0.000
Mean difference					
Baldo	–	–0.32586 ^a	–0.73033 ^a		
US Calrose	–	–	–0.40447 ^a		
Good cooking	1.6042	1.9386	2.2667	63.964	0.000
Mean difference					
Baldo	–	–0.33443 ^a	–0.66250 ^a		
US Calrose	–	–	–0.32807 ^a		
Palatable	1.5208	1.8696	2.2869	79.570	0.000
Mean difference					
Baldo	–	–0.34873 ^a	–0.76605 ^a		
US Calrose	–	–	–0.41732 ^a		
Cleanliness	1.6829	1.8860	2.6345	32.387	0.000
Mean difference					
Baldo	–	–	–0.95153 ^a		
US Calrose	–	–	–0.74849 ^a		
Price	2.5123	2.3246	1.8819	59.843	0.000
Mean difference					
Baldo	–	0.18772 ^b	0.63042 ^a		
US Calrose	–	–	0.44270 ^a		
Availability	1.4615	2.0536	1.7082	39.986	0.000
Mean difference					
Baldo	–	–0.59203 ^a	–0.24662 ^a		
US Calrose	–	–	0.34542 ^a		
Standard product	1.6109	1.9038	1.8815	14.898	0.000
Mean difference					
Baldo	–	–0.29295 ^a	–0.27062 ^a		
US Calrose	–	–	–		

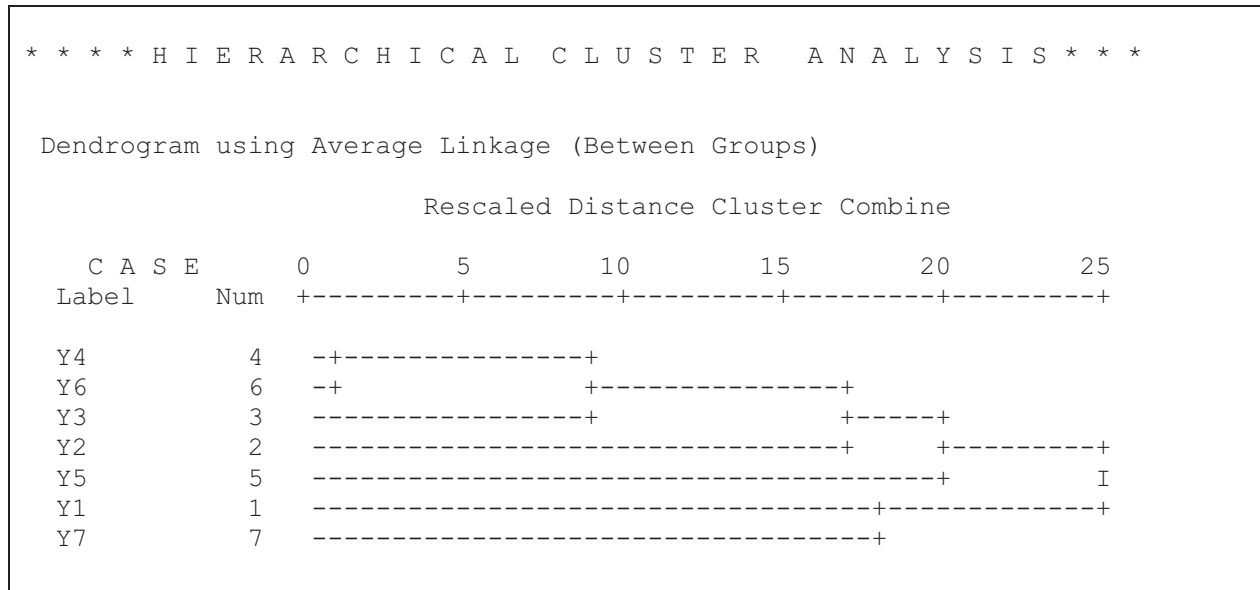
^a The mean difference is significant at 0.01 level; ^b The mean difference is significant at 0.05 level

Tab. 9: Average ratings for judgements

Opinions	Arithmetic Mean	Standard Deviation
1. Price is an important factor for me while purchasing rice	3.1565	2.2194
2. Brand name is not very important for me while purchasing rice	3.9618	2.2799
3. The reason why I choose imported rice is because it is cheap and high quality	3.7700	2.1649
4. US Calrose is the best imported rice	3.4836	2.0809
5. I am not content with the “Ordinary Rice” kind of rice	3.3882	2.0618
6. American US Calrose rice is clean, shiny, has standard-sized grains and is easy-to-cook	3.3178	1.9999

7. I prefer products with guarantee logos to the other ones	1.8457	1.3885
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Figure 1: Hierarchical cluster analysis result on Dendrogram graphics



brand name is important for them, indicating that the opposing opinion was fairly distributed.

25.8% of the participants responded neutrally to “US Calrose is the best imported rice” and as a result the average is close to the center. When we exclude the participants who had no encounter with the product, we can say that majority of the participants agree with the suggestion. The proportion of participants who are not content with ordinary rice is much higher than those who are content.

Consumers who purchase US Calrose mentioned that they are content with the performance. The quality assurance logo and the last opinion showed that consumers do not 100% trust the product that they purchase and they want rice brands to be inspected.

Grouping analysis, a multi variable statistics method, was applied to the opinions and found out which ones have similarities and that have prior importance. It shows the degree of the relationship of the distances between the groups. When the dendrogram is examined, it is seen that the two opinions that form the closest to one and other (Figure 1). These are the 4th and 6th opinions and they are the initial (starting) groups. The fact that US Calrose, being the best imported rice due to its high level of hygiene, shininess, the standard length of the grains and cooking performance was certified by the participants. Other opinions did not form close groups.

CONCLUSIONS

Consumers love to eat rice. Substitute products like pasta and bulgur can never be alternatives to rice. Bulgur consumption is still decreasing and calculated

2 kg/year per capita, and also pasta consumption is showing horizontal progress as around 5 kg/year per capita. Turkish people enjoy consuming rice and consumption is increasing. Turkish consumers’ first preference is the Baldo type of rice. However, the higher price of this type creates an opportunity for US Calrose. Therefore, US Calrose consumption per person is higher than Baldo. US Calrose was found to be the most preferred rice variety in another consumer based research (Tomlins et al., 2005). US Calrose is not only a cheap rice but is also clean, shiny, standard length and easy-to-cook.

Although domestic paddy production is increasing, Turkey is still a net importer. This is because no matter how fast domestic production increases, the faster increasing population makes it a must to import rice. Imported rice products hold a considerable market share. Imported rice varieties are cheaper than the domestically grown variety Baldo and the demand for imported rice is rising rapidly. There are and will be more paddy (raw rice) factories in Turkey with advanced technology that will require paddies to operate. Production in Turkey is not sufficient to meet these demands. That is why the import of paddies will be demanded from the government. Then it would be inevitable for USA rice and Paddy to increase their market share. The most important finding during this study is the vitality of the presentations in the market and promotional activities for consumers.

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