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CONSUMPTION OF ORGANIC FOOD IN TUNISIA AND CONSUMER BEHAVIOR: CASE OF OLIVE OIL

Abstract. Food consumption has gone through important changes. In fact, consumers' awareness in terms of health safety and quality has grown through time which progressively translated for an increasing search of rights, guarantees and information. Organic products offer an alternative to preserve health and quality but demand for these products is still low because of their high prices compared to standard products. This study analyzes Tunisian consumers' behavior towards organic agro-food products with an emphasis on olive oil. Based on an exhaustive survey of 450 persons, the variables studied in this analysis have been submitted to the methods of Principal Components Analysis (PCA) and Hierarchal Ascendant Classification (HAC) utilizing the statistics software SPSS. The aim of this study is to analyze Tunisian consumers' behavior towards organic products in order to construct a marketing strategy for developing organic consumption based on market segmentation. Cluster analysis allowed us to define four groups of consumers on basis of homogeneous characteristics: information about organic products, socioeconomic characteristics such as high income and education level of consumers, perception of difference on taste and on quality and point of sale. These constitute important variables and are primary tools for elaborating future marketing strategies for organic olive oil.

Keywords: organic olive oil, consumer, Principal Components Analysis, market segmentation, Probit.

Introduction

Nowadays, consumers more concerned about health issues related to food quality are returning

back to natural and organic products considering them as "noble" products. Despite the benefits of organic products on health and environment, their

consumption remains low due to their higher prices compared to conventional products [1]. In fact, lower productivity of organic farming and its high production costs explain this high price which has an adverse effect on their marketing and consumption (less than 1% in Tunisia-this trend is similar in Europe where organic consumption is about 10%) [2; 3]. Also, there is a lack of information on the benefits and the quality or “added value” of these products for the consumer.

In Tunisia, organic agriculture is considered strategy the weight at both national level in terms of lands. Tunisia is ranked first in terms of lands and second in terms of world exports in 2020. Since 1999, Tunisia has established a national strategy of organic agriculture with the aim to improve its international competitive position and increase the added value of the agricultural exports. For increasing land dedicated for organic farming various incentives were established in favor of investors such as trainings and subventions (30% for equipments and 70% for control and certification expenses) and also by progressively enhancing packaging and labeling instead of selling products in bulk. As a result of these incentives, organic lands reached rise from 217667 ha in 2015 to 355556 ha in 2020 (where organic olives cover 255000 ha, 5282 farms and 200 organic plants with capacity of 60000 Tons/day) producing 244190 Tons of diversified organic products mainly olives 100000 Tons and dates 6000 Tons. [4]. Exports increased from 1100 Ton in 2001 to over 14000 Tons in 2012 and 65000 tons in 2018 from which olive oil represents more than $\frac{3}{4}$ of the total organic exports (48000 tons in 2020) [4]. The expansion of olive culture is due to the the easier conversion of exploitation from conventional to bio. Recently, Tunisia has obtained the accreditation as the 8th organic exporter to the EU market (77 of exportations) and launched the label “BIO Tunisia” in line with international standards, specifically designed to help consumers to recognize organic Tunisian products [5].

Although all the efforts to promote this sector, the consumption of organic products remains low in Tunisia and production is mostly intended for exter-

nal markets. These two factors have an adverse effect on their marketing and in Tunisia bio is about 1%. In Tunisia, this difference in prices between organic and conventional products ranges from 42% (dates) to 100% (olive oil), and can reach almost 500% for sugar and pasta. The local market is suffering also of a lack of a specific distribution network such as the existing some specific shops, limited spaces in big supermarkets and a weekly market of Soukra which was the result of an initiative of the Organic Department of the Agricultural Ministry launched in 2011 [6].

In order to better understand consumer perception of organic products and taking into account the lack of commercial information on these products, this study was based on a national survey on this subject. This survey targeted a population made up of a representative random sample of 450 individuals spread over different regions of Tunisia (Tunis, Sfax, Sousse, Zaghouan, Monastir, etc.) with the aim of gaining a better understanding of the attitudes of Tunisian consumers. This survey is based on two initial hypotheses that we will try to verify the relationship between knowledge and information on organic food and the purchase decision. These hypotheses are formulated as follows:

H1: Tunisian citizens are aware of the benefits of organic products but are not in favour of purchasing these products.

H2: Tunisian citizens who are aware of organic farming adopt favourable behaviours towards organic products.

Thus, from a theoretical point of view, this research aims to validate the relationship between consumer awareness and purchasing behaviour in this case for organic products by investigating the role of marketing in promoting these products among Tunisian consumers.

On a practical level, this study will also lead to a segmentation of the Tunisian market for organic products based on the criteria retained in the survey. This classification of consumers into homogeneous groups according to well-defined socio-professional and regional criteria will help guide the marketing

policy of any producer wishing to adopt adequate marketing strategies for organic products.

2. Methodology and data collection

From an economic perspective, this research will verify if there is a relationship between the consumer awareness and his purchasing behavior in the case of the olive oil emphasizing on the role of marketing in the promotion of this product for Tunisian consumers. On a more pragmatic level, this study will also help us to lead to market segmentation of Tunisian organic olive oil on the basis of the criteria in our survey. This classification of consumers in homogeneous groups according to clearly defined regional socio-professional criteria will aim to guide the marketing policy of organic producers wishing to adopt appropriate marketing strategies for their organic products [7].

Our analysis is based on an exhaustive survey of a sample of 450 consumers randomly chosen and interviewed face to face. Data were collected through direct interviews in different points of sale of olive oil (Supermarkets, hills, specific Bio groceries) in five regions of Tunisia known by their higher consumption of olive oil: Tunis, Sousse, Sfax, Monastir, Bizerte [8]. The survey was structured into sections including interest and awareness of organic products, socio-economic characteristics, sale point, frequency of consumption, perception of the quality of organic olive oil and difference on taste and price between

non organic olive oil. In order to summarize information obtained from the survey, the 62 variables studied in this analysis have been submitted to Principal Components Analysis (PCA) utilizing the statistics software SPSS and a Probit model to explain the most significant variables for purchase decision of organic products and olive oil in particular [9].

2.1. Principal components analysis

PCA is usually used to convert a great number of observations of possibly correlated variables into a set of linearly uncorrelated variables called principal components. The number of principal components is less than the number of original variables [10]. The first principal component has the largest possible variance (that is, accounts for as much of the variability in the data as possible), and each succeeding component in turn has the highest variance possible. The variables used in this survey can be classified into groups including characteristics of the consumer (age, education, sex, knowledge of benefits of organic products), place of purchase (oil production unit, supermarkets, from farmers), distribution (frequency of purchase, price) and the perceived quality and taste compared to conventional olive oil. All variables are dichotomous (dummy variables) depending on whether the consumer response is affirmative (yes) or negative (not) with the exception of the age variable was used as a continuous variable.

Table 1.– Specification of the variables used in the analysis

Variables	Definition of variables used	Nature
Fromoilfactory	The consumer buys organic olive oil from mills	0.1
Fromsupermarkets	The consumer buys organic olive oil from big surfaces	0.1
FromFarm	The consumer buys organic olive oil from farms	0.1
Frequency	The consumer buys organic olive oil frequently	0.1
Age	Age of consumer	continuous
Difference in taste	Difference in taste between organic olive oil and conventional	0.1
Difference in quality	Difference in quality between organic olive oil and conventional	0.1
Price	Price difference between organic olive oil and conventional	0.1
Education level	Higher level of education Higher level of education	0.1
Sex	Male or female	0.1
Information on organic	Knowledge of organic products benefits	0.1

As a first step of this analysis, a principal components analysis (PCA) was chosen with the aim of grouping variables on axis. In order to be able to apply PCA, there must be enough variability among variables to avoid singularity problems between

them. Correlation between selected variables (Table 3) justifies and consolidates the PCA, because we notice the inexistence of highly correlated variables and a determinant value of 0.125 which validates the use of PCA.

Table 2. – Matrice of correlation between variables

	From-mills	Super-markets	From-farms	Frequen-cy	Age	Taste Dif-ference	Quality-difference	Price
From mills	1.000	-0.646	0.316	0.168	-0.096	-0.289	0.279	-0.114
Supermarkets	-0.646	1.000	-0.329	-0.179	0.078	0.152	-0.022	0.016
From farms	0.316	-0.329	1.000	0.058	0.019	0.115	0.084	0.121
Frequency	0.168	-0.179	0.058	1.000	-0.007	-0.015	0.168	-0.217
Age	-0.096	0.078	0.019	-0.007	1.000	0.184	-0.241	0.015
Taste difference	-0.289	0.152	0.115	-0.015	0.184	1.000	-0.742	0.137
Quality difference	0.279	-0.022	0.084	0.168	-0.241	-0.742	1.000	-0.153
Price	-0.114	0.016	0.121	-0.217	0.015	0.137	-0.153	1.000

As shown in (table 3), variables related to the place of purchase such as oil mill and supermarkets (-0.646) and those relating to the quality of organic olive oil as, difference on taste and difference on quality (-0.742) remain highly correlated. However, this correlation does not will cause future singularity problems that several survey questions are a multiple response and the consumer has several options.

Secondly, concerning the signs of the relationships between variables can be said that consumers who want to perched bio speak directly to mills and farms and not to supermarkets. About the taste and quality consumers have misconceptions about organic and as in the case of most organic products, consumers believe that the improvement in quality is accompanied by a bad taste binds with the absence of treatment and additives.

2.2. Cluster analysis

In order to summarize information obtained from the survey, AHC was performed to complete the Principal Component Analysis (PCA) with the objective to create a typology of consumers which includes homogeneous groups of individuals according to a number of variables studied in the survey.

[11].To measure the similarity of variables between two individuals, we use the Euclidean distance. The aggregation method used to measure the distance between two groups was Ward's method based on the meeting of the two classes that minimizes the increase in intra-class inertia. The result is shown on the chain aggregations and represented graphically in the dendrogram which indicates the number of classes and the order in which the successive aggregations were made.

2.3. Probit model

As the interest of this study is to see the reasons that influence the buying decision of organic olive oil, a probability model (Probit) was applied. As dependent variable of this model, purchasing decision has chosen in dichotomous mode (1 if the consumer buys olive oil and 0 if not).As explanatory variables and in addition to scores of 4 axes, given as result of the PCA analysis, some other variables were considered (table 5).In probability models, the most important is the percentage of correctly predicted values (91%) as well as the signs and significance of the coefficients of variables because the amplitude of coefficients is not important.

3. Results and discussion

3.1 Survey Result

3.1.1 ACP results:

The main goal is to reduce the data by grouping them into axes or factors whose number can range from 1 to 8 (total number of variables). (Table 3). The same table shows that the first axis explains 29%, the second 20%, third and fourth explain respectively 15% and 11% of the variance between the initial vari-

ables. From the 5th axis explanatory power becomes weaker and for this reason keep four axes that can explain 74.772% of the variability of the eight variables.

The number of axes to consider is also subject to the subjectivity of the analysis carried out, but tests or charts can facilitate the task and assist in decision making. The diagram shows the Eigen values in terms of number of components confirms that must be satisfied for a maximum of 4 components or axes.

Table 3. – Total Explained Variance

Components	Initial Eigen values		
	Total	Variance%	Cumulative%
1	2.316	28.954	28.954
2	1.609	20.110	49.063
3	1.165	14.566	63.629
4	0.891	11.143	74.772
5	0.812	10.150	84.922
6	0.701	8.765	93.687
7	0.336	4.200	97.888
8	0.169	2.112	100.000

After choosing the number of axes (four axis), for each one of them we must assign one name according to its most determining variables. (Table 4)

Axis 1: it is determined by the variable purchase olive oil from oil mills, supermarkets and farm. We can give him the name of *“place of purchase”*.

Axis 2: it is determined by the variables, the difference between organic and non-organic olive oil in

terms of taste and quality. We can therefore appoint quality. We can give him the name of *“quality”*

Axis 3: it is determined by the variables, frequent consumption of organic olive oil and its price. These variables are related to marketing. We can give him the name of *“marketing”*

Axis 4: it is determined by the variable age of the consumer and income. It is called *socio-economic perfil*

Table 4. – Component matrix after rotation (a)

	Components			
	1 place of purchase	2 quality	3 marketing	4 socio-economic perfil
From Mills	0.789	-0.304	-0.174	-0.037
From supermarkets	-0.839	0.036	0.136	0.079
From farm	0.703	0.098	0.176	0.065
Frequency	0.196	0.043	-0.760	-0.052
Age	-0.020	0.141	-0.005	0.985
Difference on taste	-0.047	0.938	0.024	0.055
Difference on quality	0.074	-0.892	-0.103	-0.121
Price	0.124	0.165	0.773	-0.054

3.1.2. Results of the Hierarchical Ascendant Classification (CAH)

The Ascending Hierarchical Classification (CHA) identified four homogeneous classes on the

basis of homogeneous characteristics taking in account the following aggregation table and dendrogram from SPSS results

Table 5. – Agglomération Schedule

Stage	Cluster		Coefficient s	Stage cluster first appears		Next Stage	
	Cluster 1	Cluste 2		Cluster 1	Cluster 2		
Dimension 0	1	434	0.000	0	0		
	2	318	0.000	0	0		
	3	271	0.000	0	0		
	
	445	72	74	370.903	428	433	446
	446	3	72	413.231	441	445	447
	447	3	8	462.1441	446	442	449
	448	1	2	524.402	444	443	449
	449	1	3	600.024	448	447	0

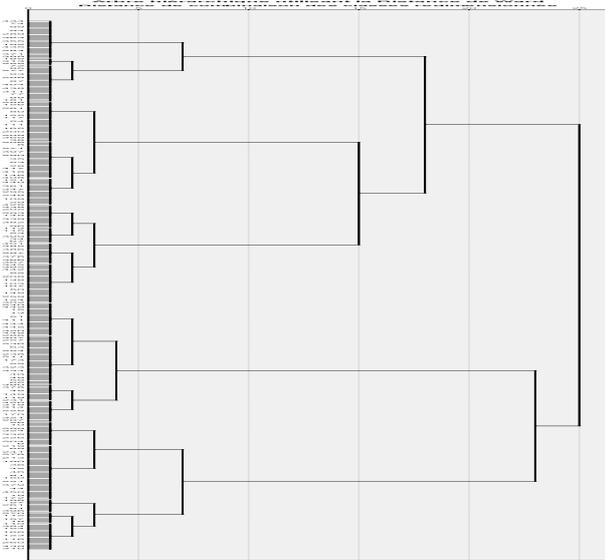


Figure 1. Dendrogram (From SPSS)

• First cluster rational consumers

The first cluster accounts for 23% of respondents and is mainly characterized by young consumers (age between 25 and 40 years) with an average income level. Consumers in this group join not for beneficial aspects of organic food but essentially commercial factors. So the lacks of attention perception of organic products as not competitive prices compared

to conventional products drive the consumers to not buy it because of its high price.

• Second cluster: Fans

This group accounts for almost 27% of respondents. Consumers in this group show a good attitude to organic products and a deep concern in its ethical and environmental aspects. With regard to socio-economic characteristics, consumers are between 40–50 years old, households in this group mainly consist of three members, benefiting from an above-average income, higher levels of education. This group pays attention to organic labeling and has a high frequency of the consumption of organic products in everyday life. Among the most commonly consumed by this class products we found organic olive oil, considered better for health.

• Third cluster: Immature

Includes 32% of respondents, who are young and low-income consumers, with a low level of studies and expressing no concern towards organic products. These individuals are not interested of organic products in their sales whose consumption appears Immature.

• *Fourth cluster: Natures*

This group accounts 18% of respondents whose age is above 40 years. They are aware of the benefits of organic on health and on environment, but their consumption is associated to really pragmatic motivation and hampered by the high price of these products.

To conclude, we can say that the small family size, high income and advanced level of education of consumers are pragmatic motivations to consumption of organic food products.

3.1.3. *Probit result:*

The results of the probit model are presented in (Table 3). Factor 1 (place of purchase) and Factor

2 (quality) had a positive sign, while factors 2 and 3 (marketing and age) are negative. The same on the level of higher education and sex were with positive signs. Knowledge of organic products and point of sale had a negative sign. As a conclusion, we could say that the place of purchase and the best quality of organic olive oil stimulates the frequency of purchase by the consumer. With regard to the place of purchase factor, which initially had a negative relationship with the purchase in supermarkets, it indicates that the consumer buys organic olive oil directly in oil factories or farms. Quality remains an important factor to increase consumption and frequency of purchase of organic olive oil.

Table 6. – Coefficients of the probit model

	Coefficient	Degree of freedom	Sig.
Place of purchase	1.294	1	0.036
quality	0.408	1	0.365
marketing	-4.298	1	0.000
Age	-0.243	1	0.609
Higher levels of education	0.045	1	0.958
sex	1.605	1	0.063
knowledge bio	-0.810	1	0.145
Point of sale	-0.038	1	0.966

The negative sign of factor 3 (commercialization of organic olive oil) indicates that the distribution is considered by the consumer as a barrier, especially if we consider the price (prices of organic products are higher than same conventional products), therefore demand/price elasticity is very high (price remains the main concern of Tunisian consumers and a major constraint for organic product consumption). As for the 4th factor (age), we observe that the negative sign (although not significant) indicates that younger people are more aware of the benefits of organic products. Since its recent introduction in Tunisia, the consumer has not yet included these products in his consumption habits. Concerning level of education, organic food consumption increases with high socio-professional category. Knowledge of organic products, with a negative sign, means that the con-

sumer is not stimulated by this factor to increase the frequency of purchase of organic products. Finally, place of purchase is not considered by the consumer as an important factor when purchasing.

4. Conclusion:

The information from a survey could serve professionals for a better understanding of consumer behavior in Tunisia towards organic products allowing them to act on the most significant factors in order to develop the consumption of organic products in Tunisia. In this respect, we may recommend to concentrate on marketing in distribution channels such as supermarkets highlighting the benefits of organic products. Also, applying prices close to conventional products will help targeting a range of consumers with high financial resources who are willing to purchase these products.

In general, this study has allowed first to rank trends and consumer perceptions towards Tunisian organic products (principal component analysis) and in the second place to look for the most important factors influencing the frequency of purchase of these products by reference to a product appreciated by Tunisian olive oil is organic. The information comes from a survey conducted in this regard in order to be as close as possible to the consumer. The statements that follow from this analysis will serve professionals to better understand consumer behavior and Tunisia play on the most significant factors in order to promote and consolidate the consumption of organic products in Tunisia. In this term we may recommend more publicity to better know the benefits of organic products, a price close to the most studied and conventional products, targeting a range of consumers with high financial resources and willingness to acquire these products.

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In addition to these marketing tools, organic olive oil consumption could be promoted on base of its better sensory quality. In fact, recent studies confirm that acidity is inferior when the olive oil was extracted from biological olive fruits. Moreover, the phenolic compounds in olive oil issued from the biological olive are higher than phenols in olive oil issued from conventional olives (Ben Mohamed et al. [7]). In fact, the phenolic compounds of olive oil have multiple biological effects, including antioxidant activity, nutritional properties suggested to play a incentive role in the development of organic oil consumption not only in Tunisia but also all over the world.

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