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Exploring the potential behavior of consumers towards transgenic forest products: the Greek experience

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Recently, the interest in wood products and bioenergy applications of transgenic forest trees is increasing worldwide, though plantations have been established to this purposes only in China. Information on the anticipated attitudes of consumers towards products from genetically-modified forest trees would therefore be of a particular interest both for developers and policy makers. This study investigated the purchasing behavior of potential Greek consumers towards the products from transgenic forest trees. In 2011, a survey was conducted based on randomly selected interviews of 418 potential consumers from all over Greece. Principal Components Analysis (PCA) was performed to identify the main factors affecting the potential purchasing behavior of consumers towards products from transgenic forest trees. Hierarchical and non-hierarchical cluster analysis was applied to PCA scores to identify homogeneous groups of consumers sharing a similar purchasing behavior. Discriminant analysis was used to cross-validate cluster membership of consumers based on PCA factors. Four groups of consumers showing similar potential purchasing behavior towards the products of transgenic forest trees were identified: (a) those interested in the quality of products; (b) those oriented towards lower prices; (c) those influenced by curiosity and labeling issues; and (d) consumers mainly interested in health safety issues and environmental impacts. Finally, a most frequent profile for each group of consumers was outlined according to their demographic characteristics and their opinions on the use of transgenic-tree derived products. Although it is unlikely that products from GM forest trees will be marketed in the next 10 to 15 years, information on the anticipated attitudes of consumers has to be taken into consideration by the developers and policy makers.

Keywords: Consumer Purchasing Behavior, Transgenic Forest Products, Transgenic Forest Trees

Introduction

The global consumption of forest products, such as wood, paper and woody biomass energy, has been rapidly expanding between 1965 and 2007. For example, the annual average rate for consumption of paper products increased approximately by 3% in the above period. With the global economic crisis started in 2008, the consumption of paper products declined by 2-3% in countries like the USA, Canada and the EU (Jonsson 2012, UNECE 2012), while it increased by 5-10% in Russia, China and other countries of South America. Further, econometric models indicated that the demand for paper products in the latter countries will keep rising in the future (Jonsson 2012).

Forest wood biomass is an important renewable resource that addresses multiple energy needs in the form of firewood, chips, charcoal, briquettes and pellets, as well as feedstock for the biofuels industry (Hinchee et al. 2009, Sedjo 2010, Harfouche et al. 2011). However, economically feasible long-term utilization of forest wood biomass for energy production depends mainly on its productivity, that should reach 8-10 dry tons acre^{-1} year^{-1} for industrial energy applications (Hinchee et al. 2009). Such high rates are largely higher than those currently obtainable from extant forests. As a consequence, a debate is currently ongoing among academics and the industry on the potential use of transgenic forest trees to meet the projected increased demand of forest products (Gartland et al. 2003, Van Frankenhuyzen & Beardmore 2004, Carman et al. 2006, Sedjo 2006, 2010, Farnum et al. 2007, FAO 2008, 2010, Zhu & Pan 2010, Harfouche et al. 2011).

Transgenic forest trees are Genetically Modified (GM) through the insertion/deletion of specific exogenous DNA sequences in order to manifest specific traits (http://www.forest-guild.org), such higher growth rates, lignin reduction and increased resistance to herbicides or forest pests. Despite the extensive research carried out on GM trees in the past 20 years, there is no currently market input for transgenic trees in Europe, the USA or other parts of the world, with the only exception of China (Häggman et al. 2012).

Public acceptance and the behavior of consumers towards forest products from GM trees mainly reflect people's concerns on the establishment of plantations of transgenic forest trees. Some concerns involve the potential spread of antibiotic and/or herbicide resistance genes from GM trees to other non-target species, the potential for long-distance pollen spread from long-lived trees, as well as the potential adverse, unexpected and unpredicted effects on biodiversity (Gartland et al. 2003, Sedjo 2006, FAO 2008). An additional concern is that GM forest plantations might generate profit for private companies, while poorer communities might become further marginalized (Thomas 2001).

Although numerous studies have been carried out on public attitudes towards GMOs, no investigations have been carried out in Europe on the potential behavior of consumers towards products from transgenic forest plantations. Previous studies conducted in the USA indicated that consumers are concerned about purchasing final wood products from GM trees, though they generally show a positive attitude towards transgenic forest trees (Sedjo 2004). Moreover, empirical stu-

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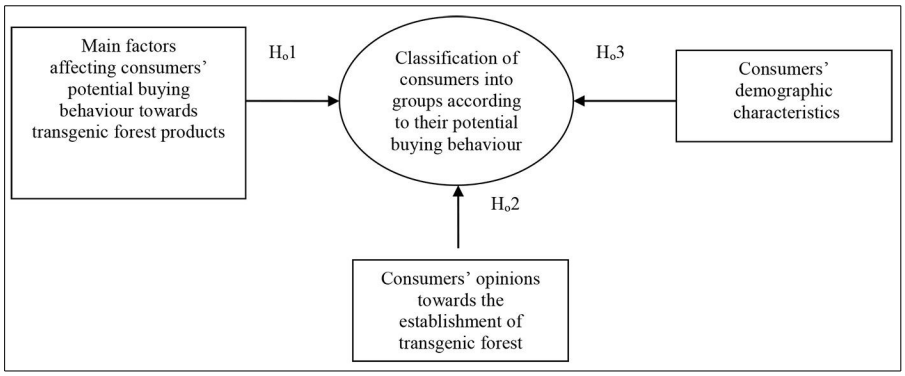

Fig. 1 - The Conceptual Model used for the classification of the potential purchasing behavior of Greek consumers towards products derived from transgenic forest trees.

dies showed that the public attitudes towards forest products are influenced by factors such as cost and availability (DuPuis 2000). Also, purchasing behavior is influenced by many factors including information, social and cultural norms, beliefs, values and perceptions (Ajzen 1991, Ajzen & Fishbein 1980, Beckett & Nayak 2008). Therefore, information that consumers receive through labelling, branding or other promotional and marketing efforts could influence their response towards GM forest products (Tokarczyk & Hansen 2006, Ajzen 1991).

Although it is unlikely that products from GM forest trees will be marketed in the next 10 to 15 years (Sedjo 2004), scientifically based information on consumers' attitudes is extremely important both for developers and policy makers. Indeed, for the developers investments are unlikely to be forthcoming without the expectation of viable markets, while for the policy makers, there is a need to respond adequately through regulation tools and programs (Aguilera et al. 2013).

This paper aimed at surveying the attitude and the potential purchasing behavior of Greek consumers towards products derived from transgenic forest tree plantations. The profile of potential consumers according to their demographic characteristics and their response towards the establishment of such plantations has been also investigated.

Materials and methods

The conceptual model

A conceptual model was developed to place key concepts into an identifiable framework (Fig. 1) aimed at investigating: (i) the relationships between factors affecting the potential purchasing behavior of Greek consumers towards the products from transgenic forest trees; and (ii) the consumer groups who exhibited a specific purchasing behavior. The model also explored the linkage between consumers who exhibited a specific purchasing behavior and their opinion towards the establishment of transgenic forest plantations.

The starting null hypotheses for this study were:

- $H_0$1: consumers cannot be classified into groups according to their potential purchasing behavior towards products from transgenic forest trees;
- $H_0$2: opinions of consumers towards the establishment of transgenic forest plantations are not related to a particular potential purchasing behavior (*i.e.*, group of consumers with potential similar purchasing behavior);
- $H_0$3: demographic characteristics of consumers are not significantly related to their potential purchasing behavior.

Methodology

A survey with individual face-to face interviews have been carried out throughout Greece. Cluster sampling was used to form a representative sample of the whole Greek population. To obtain a geographically-balanced representative sample, nine out of the thirteen existing regions of Greece were selected for sampling, according to the methodology proposed by Oppenheim (2000). One prefecture in each administrative region was randomly selected and a surveying site was established in supermarkets and/or malls located at the capital/seat of each prefecture. A total of 50 consumers at each surveying site were selected based on a random systematic sampling, *i.e.*, the sixth person approaching the surveying sites was interviewed (McCluskey et al. 2003). The above sampling design allowed to obtain a representative sample of the whole Greek population, whose characteristics did not differ from those derived from the Census of 2011 (Chen 2007, Tsourgiannis et al. 2008, ELSTAT 2014).

A pilot survey was also conducted preliminarily to test if the questionnaire was properly designed to match the research objectives (Tsourgiannis et al. 2013). Consumers were asked for answering questions on the Likert scale from 1 to 5 regarding the factors that would affect their potential purchasing behavior of products from GM forest trees and their opinion on the establishment of transgenic forest plantations.

The main survey was conducted on November throughout December 2011 by interviewers from each selected prefecture. The sample size was adjusted based on the indications obtained from the pilot study, following the methodology proposed by Siardos (1997). In particular, the proportion of consumers (p) in the pilot survey who were willing to purchase at least once a product from GM trees (*e.g.*, woody biomass energy or woody product) was 86%. Thus in order to achieve a representative sample, the sample size should have been at least 420 consumers (to have z=3 and d=5% according to Siardos 1997). Moreover, a power analysis ($\beta = 0.95$) was carried out on pilot data using the software package G*Power 3.1 (Faul et al. 2009), obtaining a minimum sample size of 132 consumers for a medium effect size (Cohen 1988). The effect size was calculated as (mean of experimental group – mean of control group)/standard deviation, where a correlation greater than 0.5 is large, 0.5-0.3 is moderate, 0.3-0.1 is small, and anything smaller than 0.1 is trivial (Cohen 1988). Based on the above analysis, a sample size of 450 consumers has been considered as fully representative of the whole Greek population.

To extract the key information from the dataset made up with the responses of 418 consumers, multivariate analysis techniques were applied. Principal Component Analysis (PCA) was used to identify those variables accounting for the largest amount of variance within the dataset. To search for the smallest set of such variables, redundancy between variables was checked by applying the Bartlett's test of sphericity and the Measure of Sampling Adequacy (MSA) to the correlation matrix. Variables showing a high proportion of large absolute correlation values and an MSA index < 0.5 were discarded from further analyses.

An orthogonal rotation (varimax method) was conducted and standard criteria (eigenvalue = 1, scree test and percentage of variance) were used in order to determine the factors in the first rotation (Hair et al. 1998). Different trial rotations were attempted, and factor interpretability was used to compare the eight variables (from PCA) related to the purchasing behavior of consumers with a smaller set of underlying factors.

PCA scores obtained from the above analysis were subjected to cluster analysis to classify the consumers with similar purchasing behavior into homogeneous groups. Both hierarchical and non-hierarchical methods were applied (Hair et al. 1998) on all 418 observations.

Quadratic Discriminant Analysis (QDA)

was performed to assess whether the key factors identified through the factor analysis could accurately predict and discriminate cluster membership. Furthermore, the Friedman's one-way test was performed to identify the relationship between the consumers' opinion regarding the establishment of transgenic forest plantations and their particular purchasing behavior. Finally, the chi-square analysis and the Fisher's exact test were carried out on contingency tables using the software package STATISTICA® (StatSoft Inc., Tulsa, OK, USA) to test for differences in demographic characteristics among the groups of consumers identified. Finally, the most frequent profile of each group of consumers based on their demographic characteristics was obtained.

Results and discussions

Multivariate analysis was used to identify the key information from the 418 responses to the questionnaire used in the survey. The list of variables affecting the potential purchasing behavior of Greek consumers towards products from GM forest trees are reported in Tab. 1, along with the eigenvalues and the percentage of variance accounted for by each variable considered. The eight main key factors affecting the purchasing behavior of consumers analyzed in this study are listed in Tab. 2.

Based on the cluster analysis carried out on PCA scores, consumers appeared to split into four groups according to their purchasing behavior towards products from GM trees (Tab. 3). Those groups were: (a) consumers who are interested in the quality of products ("Prod. Quality"); (b) consumers who are orientated towards lower prices ("Lower Prices"); (c) consumers who are influenced by labeling and curiosity issues ("Curiosity/Labeling"); and (d) consumers who are interested in health safety issues and the environmental impacts ("Health/Environ.").

The consumers interested in the quality of products from GM trees (group a) comprised 12 % of the respondents and were mainly influenced by the quality of the products and their advertisement. They were also interested in the potential negative environmental impacts of transgenic forest plantations, as well as in labeling issues regarding the indication of the transgenic origin of products.

Tab. 1 - Results of the principal component analysis carried out on the responses of 418 Greek consumers, with the variables affecting their potential purchasing behavior towards the products from transgenic forest trees.

PCA Component	Eigenvalue	Variance (%)	Cumulative Variance (%)	Variable	Communalities
1	4.785	17.088	17.088	V1 Low price for transgenic origin paper products	0.583
2	4.168	14.887	31.976	V2 Quality of transgenic origin paper products	0.668
3	2.282	8.150	40.126	V3 Brand name of transgenic origin paper products	0.583
4	1.768	6.313	46.439	V4 Certification regarding the place of origin of the transgenic origin of paper products	0.541
5	1.526	5.450	51.888	V5 Labeling regarding the transgenic origin of paper products	0.594
6	1.355	4.838	56.726	V6 Health safety issues regarding the transgenic origin paper products	0.508
7	1.232	4.398	61.125	V7 Possible negative environmental impact of the transgenic tree plantation used for paper production	0.753
8	1.078	3.850	64.974	V8 Advertisement of transgenic origin paper products	0.740
9	0.961	3.432	68.407	V9 Consumers' curiosity regarding the transgenic origin paper products	0.673
10	0.935	3.339	71.746	V10 Low price for transgenic origin wood products	0.710
11	0.803	2.869	74.615	V11 Quality of transgenic origin wood products	0.635
12	0.688	2.456	77.071	V12 Brand name of transgenic origin wood products	0.682
13	0.655	2.339	79.410	V13 Certification of the place of origin of transgenic origin wood products	0.608
14	0.617	2.203	81.613	V14 Labeling regarding the transgenic origin of wood products	0.686
15	0.588	2.100	83.712	V15 Health safety issues regarding the transgenic origin wood products	0.655
16	0.543	1.940	85.652	V16 Possible negative environmental impact of the transgenic tree plantation used for wood products production	0.782
17	0.487	1.739	87.392	V17 Advertisement of transgenic origin wood products	0.736
18	0.443	1.583	88.975	V18 Consumers' curiosity regarding the transgenic origin wood products	0.730
19	0.431	1.540	90.515	V19 Low price for transgenic origin woody biomass products	0.647
20	0.409	1.460	91.975	V20 Quality of transgenic origin woody biomass products	0.602
21	0.353	1.262	93.237	V21 Brand name of transgenic origin woody biomass products	0.625
22	0.352	1.259	94.496	V22 Special characteristics of transgenic origin woody biomass products	0.580
23	0.327	1.168	95.664	V23 Certification of the place of origin of transgenic origin woody biomass products	0.550
24	0.305	1.089	96.752	V24 Labeling regarding the transgenic origin of woody biomass products	0.625
25	0.274	0.980	97.732	V25 Health safety issues regarding the transgenic origin woody biomass products	0.630
26	0.234	0.835	98.567	V26 Possible negative environmental impact of the transgenic tree plantation used for woody biomass products	0.674
27	0.218	0.779	99.346	V27 Advertisement of transgenic origin woody biomass products	0.715
28	0.183	0.654	100.00	V28 Consumers' curiosity regarding the transgenic origin woody biomass products	0.679

Tab. 2 - Key factors and dimensions affecting the potential purchasing behavior of Greek consumers towards the products from transgenic forest trees.

Factor	Key attitude dimensions	Factor Loadings
Labeling	Labeling of wood products	0.788
	Labeling of paper products	0.716
	Labeling of woody biomass products	0.682
	Certification of the place of origin of wood products	0.674
	Certification of the place of origin of paper products	0.610
	Certification of the place of origin of woody biomass products	0.564
Health Safety Issues	Health safety issues regarding the woody biomass products	0.732
	Health safety issues regarding the wood products	0.657
	Health safety issues regarding the paper products	0.635
Brand Name	Brand name of woody biomass products	0.736
	Brand name of wood products	0.544
	Brand name of paper products	0.534
	Special characteristics of transgenic paper products	0.490
Possible Negative Environmental Impacts	Possible negative environmental impact of the transgenic tree plantation used for wood products	0.864
	Possible negative environmental impact of the transgenic tree plantation used for paper products	0.842
	Possible negative environmental impact of the transgenic tree plantation used for woody biomass products	0.701
Low Price	Low price for wood products	0.802
	Low price for woody biomass products	0.758
	Low price for paper products	0.707
Advertisement	Advertisement of paper products	0.806
	Advertisement of wood products	0.753
	Advertisement of woody biomass products	0.609
Quality	Quality of paper products	0.724
	Quality of wood products	0.629
	Quality of woody biomass products	0.569
Curiosity	Consumers' curiosity regarding the wood products	0.758
	Consumers' curiosity regarding the woody biomass products	0.731
	Consumers' curiosity regarding the paper products	0.653

The consumers orientated towards lower prices (group b) comprised 30% of the sample. The potential low prices of such products, their advertisement and brand name, as well as health safety issues were the main factors affecting their potential behavior in purchasing the products of GM forest trees. Consumers influenced by labeling and curiosity issues (group c) were about 35% of the respondents. Most of these consumers declared that they were willing to purchase the products from GM forest trees mainly for curiosity reasons. However, they would like the transgenic origin of products to be indicated on labels. The potential low prices and the brand name of the transgenic products have a significant impact on the purchasing decision of these consumers. Finally, 23% of the respondents could be grouped as consumers who are interested in health safety issues and the possible negative environmental impacts (group d). No other factors were found to affect their potential purchasing behavior towards the products of transgenic forest trees.

Tab. 3 - Classification of consumers according to their purchasing behavior towards products from transgenic forest trees. (Prod. Quality): Consumers interested in the product's quality; (Lower Prices): Consumers orientated towards lower prices; (Curiosity/Labeling): Consumers influenced by curiosity and labeling issues; (Health/Environ.): Consumers interested in health safety issues and environmental impact.

Factor	Group of consumers (Cluster centers)				Prob
	Prod. Quality	Lower Prices	Curiosity/ Labeling	Health/ Environ.	
Labeling	0.09730	-0.46515	0.40216	-0.04300	0.001
Health safety issues	-1.15498	0.48819	-0.40129	0.57287	0.001
Brand name	-0.78262	0.24192	0.10984	-0.08375	0.001
Potential environmental impact	0.19923	-0.12281	-0.19710	0.36740	0.001
Low price	-0.36624	0.60421	0.29574	-1.08728	0.001
Advertisement	0.35850	0.34692	-0.17698	-0.38821	0.001
Quality	1.00944	0.33586	-0.58081	-0.09216	0.001
Curiosity	-0.10825	-0.42322	0.59287	-0.28697	0.001
Total (N=418)	*50*	*128*	*146*	*94*	-

Discriminant analysis was performed on the scores from the factor analysis carried out to assess the reliability of the groups obtained by the cluster analysis. A summary of such cross-validation analysis is presented in Tab. 4. It is evident that the eight variables identified could accurately predict and discriminate the group membership of consumers. Therefore, our first starting hypothesis $H_0$1: "Consumers cannot be classified into groups according to their potential purchasing behavior towards products from transgenic trees" could be rejected.

The Friedman's non-parametric test was used to explore the opinion of consumers on the establishment of transgenic plantations (Tab. 5). The results revealed that most consumers shared a similar opinions. In particular, most consumers interested in the quality of products (group a) believe that the establishment of transgenic forest plantations will increase job opportunities and the farmers' income, and reduce the production cost and output losses. On the other hand, they also believe that the establishment of such plantations could have a negative impact on wild native species and, in general, could harm

the biodiversity of ecosystems. Regarding the consumers orientated towards lower prices (group b), respondents think that plantations of transgenic forest trees will contribute to the reduction of costs and output losses of the production, and to the increase of job opportunities and farmers' incomes. Furthermore, most consumers influenced by curiosity and labeling issues (group c) were of the opinion that the establishment of transgenic forest plantations may negatively impact wild species, harm the human health, reduce the production cost, increase the job opportunities, improve the income of farmers, improve the production of biomass and contribute to the reduction of production output losses. Finally, consumers interested in health safety issues and the environmental impacts (group d) mostly believe that the establishment of plantations of transgenic forest trees could represent a danger for human health and for the future of wild species, with negative environmental impacts on the biodiversity of ecosystems.

Overall, the first three groups of consumers (a, b, c) paid more attention to the economic impacts of the products from GM forest trees, and were moderately concerned of the possible environmental impacts associated with their production. That is, these potential consumers are willing to buy transgenic forest products, because their purchasing behavior is mainly driven by economic issues, such as price, quality, labeling and branding. These findings coincide with the results of previous studies dealing with the purchasing behavior of consumers towards non-transgenic forest products (DuPuis 2000, Tokarczyk & Hansen 2006). Contrastingly, the last group of consumers (group d) were mainly focused on the possible negative impacts of the establishment of plantations of transgenic forest trees on the biodiversity and the environment, supporting the arguments of other authors (Pajari et al. 1999, Vlosky et al. 1999, Gartland et al. 2003, Sedjo 2006). Hence, our starting hypothesis $H_0 2$: "Consumers' opinions towards the establishment of transgenic forest plantations are not significant in relation to a particular potential purchasing behavior (group of consumers with potential similar buying behavior)" could be rejected.

In order to outline the most frequent profile of the respondents based on their demographic characteristics, chi-square and Fisher's exact tests were also applied on each consumer group previously identified, with the aim of testing for possible differences among groups for each characteristic. Tab. 6 indicates that most consumers interested in the quality of products (group a) were 65 or older, retiree, did not have children and attended the high school. Instead, most consumers orientated towards lower prices (group b) were 30-44 years old, civil ser-

Tab. 4 - Summary of the discriminant analysis carried out on PCA scores for cross-validation purposes (total N = 418, N correct = 409, proportion correct = 97.8%). For the labels of the groups of consumers, see Tab. 3.

Actual classification	Predicted classification of consumers			
	Prod. Quality	Lower Prices	Curiosity/ Labeling	Health/ Environ.
Prod. Quality	48	0	0	2
Lower Prices	0	125	1	1
Curiosity/Labeling	0	1	146	0
Health/Environ.	2	2	0	91
Total N	50	128	146	94
N Correct	48	125	145	91
Prop. of Correct Classification	96.0%	97.6%	99.2%	96.8%

Tab. 5 - Consumers' opinions towards the establishment of transgenic forest plantations. Numbers are the average ranks on the Likert scale adopted. For the labels of the groups of consumers, see Tab. 3.

Opinions	Prod. Quality	Lower Prices	Curiosity/ Labeling	Health/ Environ.
It will contribute to an increase of job opportunities	6.61	6.51	7.24	5.97
It will contribute to a production cost reduction	6.42	7.13	6.51	5.97
It will contribute to an increase of farmers' income	6.33	6.41	6.07	6.11
It will contribute to reduction of production losses	6.25	6.61	5.35	5.47
It might have negative impacts on the environment	5.30	5.63	5.67	6.34
It might harm biodiversity and ecosystems	6.02	6.07	5.78	6.27
It might have negative impact on wild native plants	6.49	5.66	6.35	6.40
It might have negative impacts on human health	5.41	5.67	6.03	7.22
It is not necessary	5.41	4.96	5.70	5.07
It might contribute to climate change mitigation	5.93	5.01	6.08	5.29
It is important for biomass production	5.86	6.34	5.22	5.88

Tab. 6 - Profile of each consumer group regarding their demographic characteristics. Data reported are the percentages of the total respondents. For the labels of the groups of consumers, see Tab. 3.

Group	Demographic characteristics	Prod. Quality	Lower Prices	Curiosity/ Labeling	Health/ Environ.
Education	Primary school	10	13.3	6.2	7.4
$\chi^2_{[12]} = 30.019$, $p<0.01$;	Secondary school	24	19.5	34.2	10.6
Fisher's exact test 30.254, $p<0.01$	High school	34	36.7	39.7	45.7
	Bachelor degree	32	27.3	16.4	33
	Postgraduate degree	0	3.1	3.4	3.2
Number of Children	No children	46	33.6	48.6	33
$\chi^2_{[6]} = 14.150$, $p<0.05$;	1-2 children	34	37.5	32.2	48.9
Fisher's exact test 13.597, $p<0.05$	3+ children	20	28.9	19.2	18.1
Age	20-29	10	25.8	8.2	18.1
$\chi^2_{[12]} = 41.037$, $p<0.001$;	30-44	18	28.1	34.9	33
Fisher's exact test 38.131, $p<0.001$	45-64	26	19.5	28.1	34
	65+	46	26.6	28.8	14.9
Occupation	Private employee	12	18.8	14.4	18.1
$\chi^2_{[18]} = 52.699$, $p<0.001$;	Civil servant	30	20.3	43.8	20.2
Fisher's exact test 50.077, $p<0.001$	Free License	10	11.7	4.8	21.3
	Retiree	34	25.8	27.4	16
	Student	8	12.5	6.2	11.7
	Unemployed	6	7.8	3.4	11.7
	Other	0	3.1	0	1.1

vants, had 1-2 children and a high school degree. Moreover, consumers mainly influenced by curiosity and labeling issues (group c) had a profile similar to that of group b (those orientated towards lower prices), with the only difference of having no children. Finally, consumers interested in health safety issues and environmental impact (group d) were 45-64 years old, had 1-2 children, a high school degree and work as free licensed.

Thus, our starting hypothesis $H_0$3: "Consumers' demographic characteristics are not significantly related to a potential purchasing behavior" could be rejected.

Conclusions

This study contribute to better understand the potential purchasing behavior of consumers towards products from plantations of transgenic forest trees. In particular, our results indicated that there might be a potential market in Greece for products originated from transgenic forest plantations.

Four groups of potential consumers of products from GM trees with similar purchasing behavior were distinguished: (a) those interested in the quality of products; (b) those oriented towards lower prices; (c) those influenced by curiosity and labeling issues; and (d) consumers interested in health safety issues and environmental impacts.

In general, most potential consumers of transgenic forest tree products in Greece showed a purchasing behavior driven by economic issues (price, quality, labeling and branding). Therefore, there is the potential for market development of such products, that are not directly linked with human health impacts.

Although the products from plantations of transgenic forest trees are not expected to be commercialized in the nearby future, the scientifically-based information collected in this study on the anticipated attitudes of consumers may help future decision of both developers and policy makers dealing with transgenic forest tree products.

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