

CONSUMER BEHAVIOUR OF PRODUCTS OBTAINED FROM MEDICINAL AND AROMATIC PLANTS: A SEGMENTATION BASED ON FREQUENCY AND PURPOSE OF THEIR USE

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Abstract

The consumption behaviour for products obtained from medicinal and aromatic plants (MAPs) has been little studied, until nowadays, in Romania. In the current context, in which there can be noticed an accentuated increase of these products' supply on the market and the consumers' concern with a healthy lifestyle, this study has aimed at a segmentation of the consumers of MAPs products, according to their frequency, purpose of use and socio-demographic features. The data collection has been carried out in Cluj-Napoca, by administering a questionnaire to the city's residents, consumers of MAPs products. The collected data have been statistically analysed, resulting in three distinctive consumer clusters, namely Cluster 1 - "Heavy users", Cluster 2 - "Rarely users" and Cluster 3 - "Occasional users". Each cluster has been subsequently described according to the significant variables for the performed analysis. Gender, education and income are important predictors of the consumption of these products, and the purpose and frequency of their use differ within the obtained segments. The practical implications of this study are represented by the possibility to adapt the marketing strategies to each segment of consumers.

Key words: medicinal and aromatic plants, consumption behaviour, preferences, herbal products, cluster analysis

INTRODUCTION

Products derived from medicinal and aromatic plants (MAPs) have dominated the human pharmacopeia for thousands of years [37]. Until the 16th century, they were the main remedies used in preventing and treating several illnesses, their uses being especially based on empirical experience, transmitted from one generation to another [29]. Testimonies of these uses are found in the oldest myths, traditions and writings [24]. The first pieces of evidence on the use of MAPs come from different parts of the world, such as the Middle East, Greece, China and India [18]. Medicinal plants lied at the basis of different traditional medical systems, such as Ayurveda and Chinese medicine [18, 24]. In the European countries, Greeks and Romans had significantly contributed to the development of phytotherapy [15], and in

Romania, MAPs had been used since the Thracians' times [40].

Despite their longevity, MAPs continue to influence the life, culture and human history, thus determining the modern civilization to adopt new methods of process and use of medicinal and aromatic plants, as well as of their derivative products [18, 29]. In developing countries, medicinal plants continue to lie at the basis of the medical system, and in some cases they represent the only therapeutical option [41].

A series of intermediary or final products used in the pharmaceutical, cosmetic and food industry can be obtained from MAPs [23].

In the pharmaceutical industry, three categories of MAPs products are being used: allopathic medicines, phytotherapeutic products and botanical supplements. Use indications vary globally, according to the socio-economic and cultural aspects, as well as to legislative regulations [4, 37].

At the European Union level, there are differences among the member states concerning the definition and classification of herbal medicines, the products obtained from the same medicinal plant either being considered food supplements, or herbal medicines in accordance with the legislative regulations [13].

Phytotherapy is part of the complementary and alternative medicine and it is used for the prevention and treatment of certain diseases [34]. Although it is based on traditional medicine, it is sometimes devoid of an adequate scientific validation [7]. Phytotherapeutic products are presented under the form of extracts, tinctures, teas and capsules [23] and most of the times, the effect is not the result of only one constituent [9]. At the EU level, the Directive 2004/24/EC of the European Parliament and Council from March 31st 2004 regulates the traditional medicines based on plants. In accordance with it, before a herbal medicine product is being introduced on the market, it must first be registered in one of the following conditions: full authorization through the same procedure as for a traditional medicine, stage which requires safety and efficacy studies; well-established use marketing authorization application, in case there has been an utilisation of at least 10 years within the EU with an acknowledged efficacy and an acceptable safety profile; traditional use registration, a simplified procedure for the authorization of products which demonstrate a traditional use for the mentioned indication for at least 30 years, of which 15 years must have been within the EU [34, 33]. Botanical drugs are evaluated from the safety and efficacy perspective, just like the allopathic medicines, but the process can be accelerated if there is a safe utilization history [4]. At the EU level, most applications for Traditional use registration are held by the UK (348), followed by Germany (285), Romania being situated on the last places, with only 8 approved registrations since the implementation of the directive until the end of 2016 [10].

The possible interaction between the phytotherapeutic products and the

conventional medicines must also be taken into account [16]. Many times, specialists don't ask their patients if they use such products, or patients omit to specify this aspect [9], but the risk of side effects can increase when medicines based on plants are taken concomitantly with the conventional ones [19]. Also, there is the possibility to modify the pharmacokinetics of the conventional therapeutic agents, with the risk to potentiate toxic effects or to diminish their efficacy [38, 16].

MAPs are also found in food supplements, being aimed at completing the diet. Sometimes, the MAPs used in botanical supplements are similar to the ones from phytotherapeutic products, the final product being introduced on the market as a supplement because the process is a lot simplified [23]. Thus, many products have been relabelled as food supplements, which are regulated separately from the Directive 2002/46/EC of the European Parliament and the Council from June 10th 2002 concerning Food Supplements [34]. In the case of supplements, even if there are regulations, the safety and efficacy aspects are the producer's responsibility [9, 5]. Thus, non-compliant products (counterfeit, with denatured composition, labels with false or unproven statements) can be introduced on the market [12], whose side effects and interactions are little supervised [34]). Furthermore, when promoting them, it is forbidden to refer to medical aspects, such as: 'prevents', 'heals', 'treats' [15], except the case when such statements have been scientifically proven in accordance with Regulation no. 1924/2006 of the European Commission [8]. The European and Romanian legislation offer the adequate legal framework for the ethical advertising of botanical supplements, thus ensuring their correct use by consumers and in safety conditions, but nevertheless, there are botanical supplements on the Romanian market which do not follow these provisions [8], which can trigger confusion among consumers concerning the phytotherapeutic products and the botanical supplements.

Regarding the use of MAPs in cosmetic products, the EU regulations state that a

cosmetic product should not produce any harm to human health and the producer is held responsible for the safety of the cosmetic products introduced on the market [27]. There are certain rules and regulations which must be applied in order to declare a product as being a natural cosmetic. In general, natural cosmetics should be certified in order to demonstrate that the product has been produced from natural ingredients and it has been made in a way which does not affect the environment. In Europe, there isn't any common certificate and many countries hold their own certificates [17]. A minimum alternative standard is ISO 16128 part I and part II, which covers the definitions and the criteria for natural and organic ingredients and cosmetic products. The ISO standards are an option for small producers for whom certification is too expensive [6].

MAPs used in cosmetic and personal care products can be processed under the form of vegetable oils, essential oils, plant extracts, floral waters, and dyes. The antioxidant, antibacterian and anti-inflammatory effects are among the reported benefits of their use [32, 1]. The use of natural ingredients in skincare products has also been accelerated by the consumers' demand, who have become more and more interested in natural products [32].

Once raising the awareness of health aspects, the consumption of plant supplements has had a great development in Romania [39], being noticed the consumers' positive attitude towards MAPs products [28].

The market dynamics of the MAPs products is influenced by consumers' behaviour and by the public policies to support this sector [31]. Thus, the study of this behaviour becomes an objective necessity, especially in terms of educating the consumers on the correct and effective use of these products.

The consumption behaviour for MAPs products – “green herbal products” has been studied in certain developing countries, where traditional medicine is still intensely practised [20, 26]. Thus, [20] have realized an assessment of the influence of the socio-demographic features on the consumption of these products, reaching the conclusion that

the segment represented by the young population contains the largest number of users of these products. Nevertheless, the hypothesis according to which the socio-demographic factors (gender, age, education and occupation) are influencing the consumption of products obtained from medicinal plants, has not been confirmed in the case of the forementioned study [20].

[14] has performed a segmentation of the consumers of MAPs products in Turkey, thus obtaining three distinctive clusters of consumers: the first, composed of older and less educated persons, who are skeptical about the consumption of these products, due to the possible side effects, but also to the high price; the second, composed of persons with high incomes and education, strongly influenced by brands and commercials of these products, and third, composed of persons highly sensitive to environmental aspects, health and food safety, at the same time being influenced by religious beliefs.

According to the study results obtained by [22], the main purpose of using the MAPs products is to improve the general health state, their use for a cosmetic purpose being a lot more reduced. In addition, there can be noticed a preference to use MAPs under the form of infusion or decoction [22]. MAPs products, identified by [3] as being at the top of consumers' preferences, are teas, balms/ointments/creams and essential oils, but in the research of [36] infusions score first, being followed by tablets/capsules and creams.

Although the popularity of the consumption of products obtained from medicinal plants is increasing in Europe, not only for preventing and treating certain illnesses, but also for other purposes, [11] have remarked a lack of research concerning the consumption behaviour for such products. The same authors suggest the necessity to realize such studies, especially at pan-European level, which would offer some consumption patterns, as well as an assessment of its risks and benefits.

In this context, the purpose of the present research is to perform a segmentation of the consumers of MAPs products in Cluj-Napoca,

depending on the purpose and frequency of their use, and on the socio-demographic features.

MATERIALS AND METHODS

The study was performed by administering a questionnaire during June-September 2020 among the population of Cluj-Napoca, resulting in 620 valid answers. The questionnaire answers envisaged the use frequency of MAPs products, namely: teas, essential oils, tinctures, maceration extracts, capsules containing herbal dried extracts or powders/tablets/gel capsules with volatile oils, floral waters, juices/syrups, creams/ointments/balms with herbal ingredients, cosmetic products (soap, shampoo, balms, creams, perfumes, etc.) containing herbal ingredients and spices. Another set of questions referred to the purpose of using these products: phytotherapeutic, cosmetic and food. The questionnaire also comprised socio-demographic questions. Descriptive statistics was used to describe the consumers profile. Following, the K-means clustering analysis was performed to classify consumers based on the purpose and frequency of their use, and on the socio-demographic features. ANOVA test was used to identify the variables that best contribute to the construction of clusters. A p-value of 0.05 was considered as statistically significant. All data analyses were conducted using SPSS version 24.

RESULTS AND DISCUSSIONS

Table 1 presents the sample structure, according to gender, age, education, occupation and income. Thus, from the total of 620 participants, 46.1% were women and 53.9% men. The distribution according to age was the following: 19.5% of the participants were under 25 years old, 26% between 25-34 years old, 26.5% between 35-44 years old, 15.3% between 45-54 years old and 12.7% over 55 years old. High school graduate respondents (40.2%), university graduate respondents (32.9%), as well as those with low incomes, between 1,000-4,000 lei, were

predominant. Concerning their occupation, more than half participants are employed (58.1%), followed by students (17.6%), self-employed/freelancers (15.5%), retired persons (6.1%) and housepersons/unemployed (2.7%).

Table 1. Sample structure

Variable	No. of consumers	% of consumers
Gender		
Male	334	53.9%
Female	286	46.1%
Age		
< 25 years	121	19.5%
25-34 years	161	26%
35-44 years	164	26.5%
45-54 years	95	15.3%
> 55 years	79	12.7%
Education		
No education	4	0.6%
Professional, vocational school	41	6.6%
High school	249	40.2%
Post-secondary school for masters	28	4.5%
Graduate studies		
Post-graduate studies	204	32.9%
	94	15.2%
Main occupation		
Student	109	17.6%
Houseperson, unemployed	17	2.7%
Retired, unable to work	38	6.1%
Employed	360	58.1%
Self-employed, freelancer	96	15.5%
Income		
No income	13	2.1%
Maximum 1,000 lei	25	4.0%
1,001-2,000 lei	128	20.6%
2,001-3,000 lei	179	28.9%
3,001-4,000 lei	139	22.4%
4,001-5,000 lei	61	9.8%
5,001-6,000 lei	30	4.8%
> 6,000 lei	45	7.3%

Source: Own calculation.

From a gender perspective, as compared to other studies in which, in general, the female respondents are predominant (81%) [36, 3], the sample used in this study is more balanced, 53.9% of the participants being men and 46.1% women. A similar distribution has been observed in the research realized by [22] in which 56.62% of the consumers involved in this study were men and 43.38% women [22].

There can also be noticed a larger preponderance of the age segment between 25-44 years old, similar to the research realized by Sanchez et al. (2020), in which respondents aged between 18-44 years old represent 62.6%.

This aspect can be explained due to the online application of this questionnaire, the old ones

being less active on the socialization networks.

Table 2 presents the questions that generated significant statistical correlations and were further included in the cluster analysis.

Table 2. Questionnaire items used in the analysis

Q1. How often do you use the following MAPs products [teas, essential oils, tinctures, maceration extracts, capsules with herbal dried extracts or powders/Tablets/Gel capsules with volatile oils, floral waters, juices/syrups, creams/ointments/balms with herbal ingredients, Cosmetic products (soap, shampoo, balms, creams, perfumes, etc.) with herbal ingredients, spices] : once or several times a day, once or several times a week, once or several times a month, once or several times a season, once or several times a year, never?
Q2. For what purpose do you use MAPs (multiple answer): for phytotherapeutic purpose (to prevent and/or treat certain illnesses), for cosmetic purpose and/or personal care?
Q3. On a scale from 1 to 5, where 1 means 'to a very little extent' and 5 means 'to a very large extent', to what extent do you use them in order to prevent health problems?
Q4. On a scale from 1 to 5, where 1 means 'to a very little extent' and 5 means 'to a very large extent', to what extent do you use them in order to treat some health problems?
Q5. On a scale from 1 to 5, where 1 means 'to a very little extent' and 5 means 'to a very large extent', to what extent do you use them for personal care and cosmetic purpose?
Q6. On a scale from 1 to 5, where 1 means 'to a very little extent' and 5 means 'to a very large extent', to what extent do you use them to slow down the aging process?
Q7. Do you use MAPs products for the prevention and/or treatment of several illnesses?
Q8. Do you use MAPs products for cosmetic and personal care purposes?
Q9. Gender
Q10. Education (the last graduated school)
Q11. What is your personal income level on a monthly basis?

Source: Own calculation.

Final clusters were reached after 10 iterations. Table 3 presents the final cluster centers based on the standardized scores.

Table 4 shows the number of cases in each cluster. As we can notice in Figure 1, there have resulted 3 clusters of consumers, according to the statistically significant variables: gender, education, income, purpose of using the MAPs products and consumption frequency of the different products. The three clusters have been named as follows: Cluster 1- "Heavy users", Cluster 2 – "Rarely users" and Cluster 3 – "Occasional users" (Figure 1). Choosing different names for the three clusters was based on the consumers' "intensity" to use the MAPs products. Cluster 1 "Heavy/green consumers/users" are the ones who most often use MAPs products, the use frequency being weekly or more often. These products are used not only for

phytotherapeutic purposes, but also for cosmetic purposes.

Table 3. Final cluster centers

Zscore	Cluster number		
	1	2	3
Q1_8. Creams/Ointments/Balms with herbal ingredients	0.97042	-1.01073	0.12035
Q1_9. Cosmetic products (soap, shampoo, balms, creams, perfumes, etc.) with herbal ingredients	0.89268	-1.03510	0.20048
Q1_2. Essential oils	0.93884	-0.84361	0.00202
Q1_5. Capsules with herbal dried extracts or powders/Tablets/Gel capsules with volatile oils	0.96838	-0.80210	-0.05592
Q1_3. Tinctures	0.95077	-0.82148	0.02595
Q1_1. Teas	0.87180	-0.80060	0.01656
Q1_4. Maceration extracts	0.87732	-0.74644	0.03381
Q1_6. Floral waters	0.87922	-0.73996	0.04079
Q3. For prevention of some health problems	0.92426	-0.64763	0.15388
Q5. Personal care and cosmetic purpose	0.72566	-0.80321	0.13040
Q4. For treatment of some health problems	0.83153	-0.64037	0.08925
Q2_2. For cosmetic purpose and/or personal care	0.56145	-0.72632	0.19027
Q6. Slowing down the aging process	0.73929	-0.57996	0.07030
Q1_7. Juices/Syrups	0.59691	-0.64739	0.09592
Q8. Do you use MAPs products for cosmetic and personal care purposes?	0.48949	-0.69079	0.21495
Q7. Do you use MAPs products to prevent and/or to treat certain illnesses?	0.64582	-0.56537	0.01135
Q2_1. For phytotherapeutic purpose (to prevent and/or treat certain illnesses)	0.64700	-0.50895	0.06034
Q1_10. Spices	0.46041	-0.55205	0.11891
Q9. Gender	0.30461	-0.38878	0.09873
Q10. Education (last graduated school)	0.32497	-0.33454	0.03695
Q11. What is your level of personal income on a monthly basis?	0.24833	-0.32225	0.08500

Source: Own calculation.

Table 4. Number of respondents in each cluster

Cluster	Cluster 1	181.000
	Cluster 2	202.000
	Cluster 3	237.000
Valid		620.000
Missing		0.000

Source: Own calculation.

Consumers in this cluster mostly use them for the prevention of health problems, for personal care, for cosmetic purpose, for treating some health problems, and for slowing down the aging process. They declare

that they use, to a large extent, MAPs products for cosmetic and personal care purposes, and to an even larger extent to prevent and/or treat certain illnesses. They are generally women, persons with a high level of education and higher incomes.

Cluster 2 “Rarely users” are the ones who most rarely or never use MAPs products, the use frequency being seasonal or less frequent. They are generally men, persons with lower education and incomes.

Cluster 3 “Ocasional users”. They are the ones who occasionally use MAPs products. Products with a pretty high use frequency are creams/ointments/balms with herbal ingredients and soaps. These products are more often used for personal care, for cosmetic purpose, and less often for treating some health problems. In general, consumers belonging to this cluster are of both sexes, with medium education and incomes.

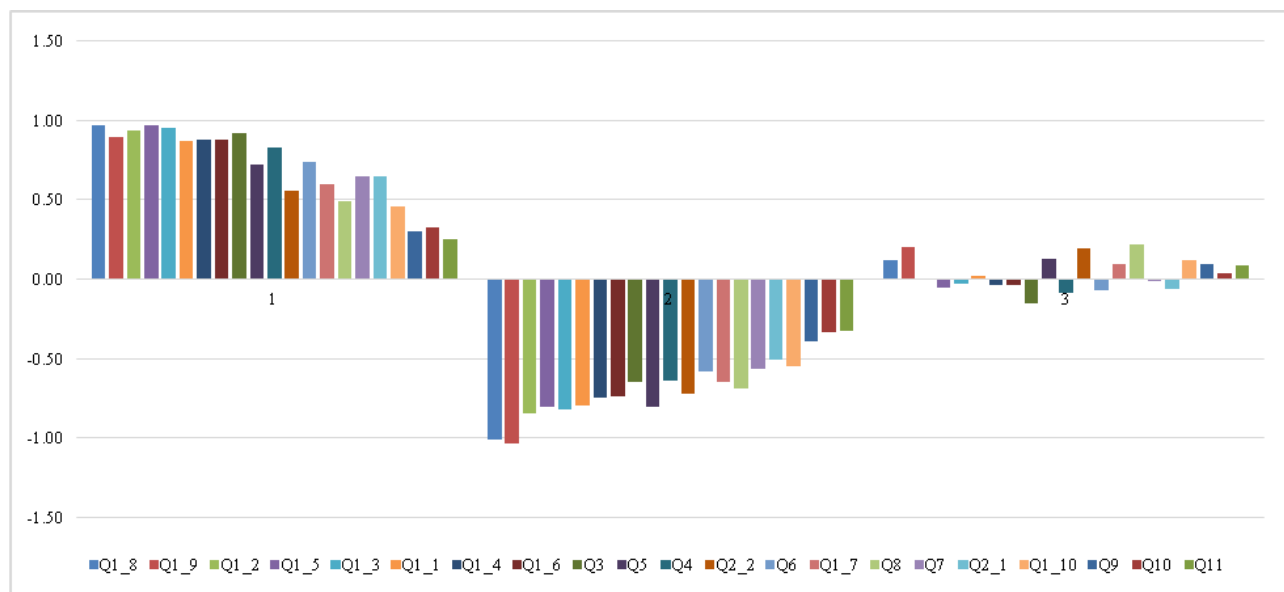


Fig. 1. Clustering results
 Source: Own calculation.

The results of this research show that the consumption frequency of MAPs products is influenced by socio-demographic factors (gender, education, income). Thus, the ones who rarely use (at least seasonally) MAPs products, the representatives of cluster 2 are men, persons with lower education and incomes; the ones who use them occasionally are persons with medium education and incomes, of both sexes.

Frequent consumers of such products, the representatives of first cluster are generally women, persons with higher education and a somewhat higher income. Similar associations between the consumption frequency and the socio-demographic features have also been identified in other researches in the field, the consumption being increased along with the level of education and income [30, 35, 21]. Also, both for phytotherapeutic [30] and

cosmetic uses [2], women use these products more often, an explanation being their greater concern with health [30].

In addition to the high consumption frequency, there can be noticed, among consumers from cluster 1, the use of a wide range of products, such as: teas, essential oils, tinctures, maceration extracts, capsules with herbal dried extracts or powders / tablets /gel capsules with volatile oils, creams/ointments/balms with herbal ingredients, cosmetics. According to other researches which have studied the consumption of MAPs products, the forms preferred by consumers are generally teas and infusions [36, 3, 22].

Among occasional consumers from cluster 3, there can be noticed a more frequent use of MAPs products for cosmetic and personal use purposes, most frequently being used the

cosmetic products (soap, shampoo, balms, creams, perfumes, etc) and creams/ointments/balms with herbal ingredients. The representatives of cluster 1 use them not only for prevention and treatment, but also for cosmetic and personal care purposes. The results of some similar studies have shown that the main purpose of using MAPs products is to ensure health [22, 25], as well as to prevent or treat certain illnesses [36].

CONCLUSIONS

The results of segmentation of MAPs products consumers indicate the existence of three distinctive clusters, characterized by different behaviours concerning the manner of use and consumption frequency of these products. Gender, education and income are important predictors of consumption behaviour of MAPs products. Thus, women with a higher level of education and incomes are the ones most frequently using these products, not only to prevent and treat certain illnesses, but also for cosmetic and personal care purposes.

The ones who very seldom or never use MAPs products are generally men with a lower level of education and modest incomes. A possible explanation for this behaviour could be the lack of constant preoccupation for a healthy lifestyle, based on “green products” consumption, as well as the lower access to information. The third category of consumers occasionally use MAPs products, especially for cosmetic and personal care purposes. In the case of this segment, we can neither necessarily refer to a gender influence on the consumption behaviour, nor to a preoccupation with aspects connected with health. The practical implications of the results of this research are represented by a better understanding of the consumption behaviour of MAPs products, necessary for creating some corresponding marketing strategies. The study results can serve to a better orientation of public policies in the field, to organise some information and education campaigns for consumers in order to safely and efficiently use MAPs products,

as well as to adapt the producers’ offer to the consumers’ needs.

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