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FEASTING ON FUNGI: EXPLORING FUTURE PERSPECTIVES OF CONSUMERS PREFERENCES AND COMMERCIAL PRACTICES ON THE GROWING MARKET OF PLANT-BASED FOODS

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Abstract

Consumer's dietary preferences are an ever-evolving mechanism subject to a series of dynamic factors, including their growing consciousness towards healthier food alternatives and sustainability. As industry's focus tends to extend beyond conventional plant-based options, innovative results shed light on something deep beneath the surface, rooted in mycology. This study aims to investigate the intricate factors influencing the preferences and commercial behaviour of the Romanian consumer and how likely they are to accept and integrate Mycelium-based products into their current diet. The research involved collecting data through a questionnaire, which was subsequently completed by a target group, forming the representative sample. By interpreting the results obtained from data processing and statistical evaluation, we gained access to valuable insights regarding both the burgeoning field of alternative protein sources and how they link to the broader context of emerging trends in consumer behaviour.

Key words: *behaviour, healthier food, mycelium based, plant-based, protein.*

INTRODUCTION

The modern man is facing a handful of dilemmas when it comes to his dietary choices. It is a well-known fact that agriculture, that is to say, conventional protein-producing systems, entails vast areas of land that are left unavailable to natural ecosystems. The influence of Anthropogenic factors is pivotal to the increasing statistical data regarding water pollution, greenhouse gas emissions, and land depreciation. Over the past decades, it has become increasingly clear that large-scale agriculture operations come with the heavy cost of durable development and prove to be less and less viable. The multifaceted nature of the present issues extends beyond the business strategy of big agricultural conglomerates, presenting itself as a shared challenge that confronts the health of our global community. Dietary risk factors, such as insufficient intake of vegetable fibre coupled with elevated intakes of processed red meat, play a significant role in the prevalence of chronic non-transmittable diseases, especially type II diabetes and coronary heart disease and some cancers (Pan, 2012; Popkin, 1994; Micha, 2010; Key, 1999; Fung, 2004).

The Rockefeller Foundation-Lancet Commission on Planetary Health suggested that there is major potential for dietary changes to improve health and reduce the environmental impacts of food production, while the United Nations Food and Agriculture Organization (FAO) defines sustainable diets as those that are healthy, have a low environmental impact, are affordable, and are culturally acceptable (Burlingame & Dernini, 2010; Whitmee et al., 2015).

Interplays of psychological factors influencing taste preference, sociological factors, and the economic component dictating accessibility and affordability are the main drives behind consumers' choices and ultimately decide what sort of products will stand the test of time on the market. The emergence of various individual lifestyles and trends promoted in both urban and rural communities have generated in the last decades a plethora of eating regimes (Poșan et al., 2022), with flexitarian (a fusion between "flexible" and "vegetarian", referring to an individual who follows a primarily but not strictly vegetarian diet) gaining significant traction. Nonetheless, protein intake is important in achieving a well-functioning and balanced organism because it facilitates the development and repairing of muscles and tissues and the transportation of nutrients (Barbu, 2022; Popa, 2019).

In response to aforementioned conditions and consumers expectations, the food industry has started placing a greater emphasis on developing products that feature vegetable protein as a traditional meat analogue. It is estimated that the plant-based food market will further grow from approximately $US 30 billion in 2020 to $US 160 billion by 2030. (https://www.foodmarket.com).

Although the plant-based market has seen a stagnant year for meat substitutes in the United States, the European customer is only beginning to familiarise with alternative protein sources thus projecting an upward trajectory of sales and increase in demand.

Unlike soy, peas or wheat protein, mycelium-based products have long fibrous filaments that mimic muscle structures, an important sensory characteristic that can ease the preparation process and by so attract a broader range of customers. Additionally, they present a highly nutritious profile consisting of vitamin B12, fibre and complete protein that varies up to 15g per 120 g of classic steak, lacking only in saturated fats (Watson, 2023)

The paper's main objective is to examine critical aspects of fungal protein that play an essential role in determining consumer acceptance of the end product. The primary focus is on the marketing aspects and the collective image associated with terminologies such as plant-based protein, alternative meat, and fungal proteins. The study is centred on the Romanian retail market. While Romanian consumers have historically integrated mushrooms into their diets, our cultural and empirical observations suggest a lingering attachment to traditional meat sources, particularly in rural communities where meat remains a component of subsistence agriculture. However, owing to the globalisation of the food market, there is a growing demand for innovative and eco-friendly products. Our purpose is to explore the factors that specifically influence the acceptance and purchase of plant-based products, emphasising the look and feel of traditional benchmark items such as steaks, burger patties, sausage, and bacon.

This study aims to investigate the intricate factors influencing the preferences and comercial behaviour of the Romanian consumer and how likely they are to accept and integrate Mycelium-based products into their current diet.

MATERIALS AND METHODS

Materials

The study conducted by us involved 138 individuals interviewed; of these, 89 were female and 48 were male (one person chose the response option "I prefer not to specify"), with representation from both urban (105 individuals) and rural community (33 individuals). To determine if the objectives pursued in the study vary by age, one of the items targeted this characteristic. The participants in this study fall into the following age categories: 18-21 years old (43.5%), 22-30 years old (30.4%), 31-40 years old (5.1%), 41-50 years old (7.2%), and over 50 years old (13.8%). Additionally, the level of education represents an influential factor in assessing our consumers' profiles. For this item, we had six response options: ongoing/completed high school studies (2.9%), ongoing/completed vocational studies (2.9%), and ongoing university studies (60.2%). completed university studies (15.2%) ongoing or completed postgraduate studies (18.8%).

Methods

The research instrument used is represented by the questionnaire. Sixteen items were developed, grouped into 2 sections: socio-demographic data (5 items) and consumer profile (11 items).

Data processing methodology

The data were processed according to descriptive statistical methodology, and the results are presented using adequate techniques. It is important to note that the variants derived from a questionnaire inherently reflect a categorical spectrum, illustrating the diverse intensity of responses. When respondents categorically express their interest, it indicates a clear and unequivocal inclination toward the subject matter. As the likelihood of interest increases, the nuances become more apparent, suggesting a high degree of engagement. Moving along this continuum, the acknowledgment that there is a possibility of interest signifies a potential but not definitive involvement. Conversely, when respondents answer that they wouldn't be interested, it represents a decisive and unambiguous disinterest in the subject matter.

RESULTS AND DISCUSSIONS

As expected, the major force driving consumer's decision to try out a new food product is taste with a score of 54.34%, followed closely by personal experience and familiarity with the respective product at 44.2%. In terms of external influences, respondents answered in proportion of 70.29% that friends 'sometimes' affect their decision to try out a new product, confirming former studies that suggest people are more likely to adapt their eating behaviour similarly to their peers (Figure 1).

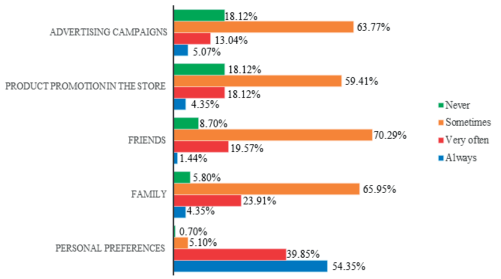

Figure 1. The frequency of factors influencing the testing of a food product

Notably, despite the fact that product promotion in stores and advertising campaigns conventionally have a significant impact on consumers choice, our respondents have shown a significant disinterest in both, scoring only a flat 18.12% (Boateng, 2015). This aspect can be explained by the fact that consumers consider their own experience with the product more than advertising campaigns. When asked if they were willing to try out this type of product if it would receive public endorsement from a trusted source or public person, almost half of our respondents (49.6%) said the likelihood is very high depending on the source and 24% categorically agreed. This information is in concordance and reflects the cultural shift that social media has generated and the outsourcing of varying information consumers are being exposed to. Public figures and institutions can influence food choices through policies, health campaigns or just general advocacy for specific products, diets and lifestyles (Kamboj & Sharma, 2022; Vithayathil et al., 2020). Bearing in mind the financial considerations and how price can represent a substantial barrier in purchasing food, the need for a balanced price-quality ratio is a calibrating factor in the psyche of the Romanian consumer. 44.93% of our respondents said they 'always' take this criterion into account. Food preferences are strongly influenced by product characteristics such as labeling and packaging (Loose, 2012) The manufacturer (Bahaciu, 2019), price (Barbu, 2023) discounts and package design (Loose & Szolnoki, 2012) equally accounted for 31.88% (Figure 2).

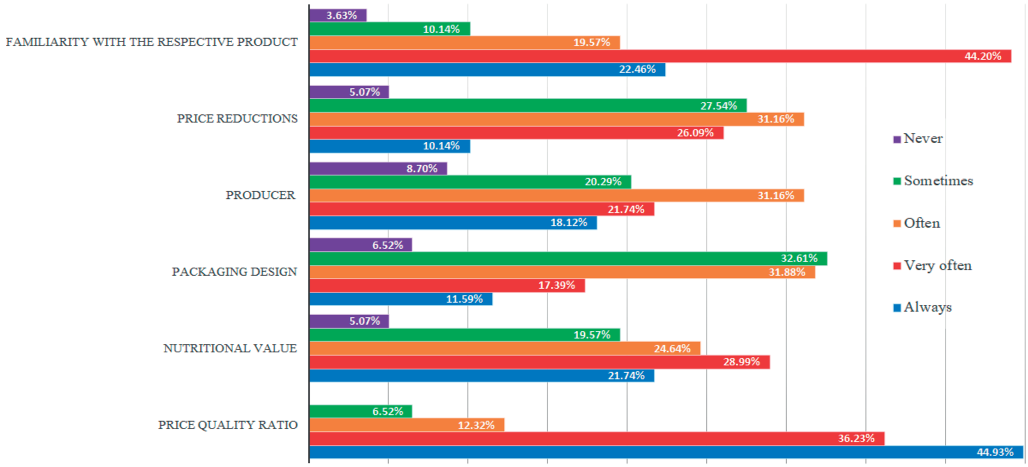

Figure 2. The frequency of factors influencing the acquisition decision

Consumers have different opinions regarding testing or consuming innovative products. Some of them may have reservations regarding the food safety of said products or may be resistant to change, preferring products that are more familiar. Another category is interested in new culinary experiences. Additionally, many consumers appreciate innovative food products because obtaining them has a low environmental impact. The majority of respondents (40.9%) stated that they are aware, and concerned about the environmental impact. Approximately one-third of the study participants mentioned: "Yes, I am aware, but I am not concerned about this aspect". Surprisingly, one-fifth of respondents specified that they do not have a clear opinion on this matter. Only 5.1% of study participants are not aware or interested in this issue (Figure 3).

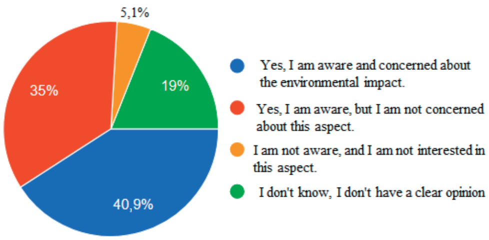

Figure 3. The level of awareness of the environmental impact

More recently, individuals have found themselves in the situation where their schedules are increasingly dominated by their professional commitments.

Frequently, preparing lunch and dinner at home is reserved for the weekends, while on weekdays the prevailing practice is to order food via food service delivery Currently, the restaurant industry needs to adapt to consumers' preferences for competitive pricing, convenience, and reliable food delivery (Teo et al., 2024). Following our results, the response options integrating alternatives for situations when a meal cannot be prepared in house were:

a. Restaurant/bar/café: 17.39% of respondents specified that they do it "always". Those who "never" choose to eat at a restaurant are in a relatively small proportion (9.42%). The majority of respondents mentioned that they "sometimes' opt for this choice (Figure 4).

b. Food delivery services: - Approximately half of the interviewees (45.65%) use this type of service only "sometimes". About one-third of the study participants "usually" use these services. Those who "never" or "always" use food delivery services are approximately equally distributed.

c. Snacks that can provide me with an optimal number of calories - For this variant, opinions were somewhat evenly split between those who "usually" or "sometimes" take into account having an efficient calorie intake through snacks, and those who mentioned that they "always" ensure their calorie intake is balanced out through snack were twice as many compared to those who specified that they "never" do this.

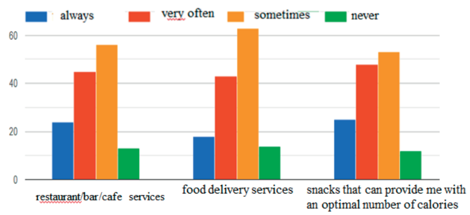

Figure 4. Options for meal service

In order to make a clearer analysis of consumer acceptability of replacing animal products with plant products, we investigated how often consumers eat vegetables or products made using only plant-based ingredients, and the results showed the following: 46.38% of respondents eat vegetables daily, and 34.06% eat products derived from plant-based ingredients several times a month. Also, 52.17% of the respondents ticked "several times a month" when asked how often they eat mushrooms, which indicates that our innovative product could incite our consumers' interest (Figure 5).

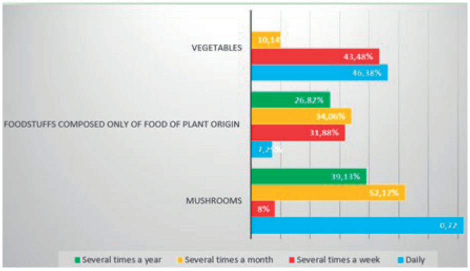

Figure 5. Frequency of consumption for plant-based foods

When asked "why would you replace animal dishes with similar vegetable dishes", consumers answered "very often" in the case of them being tastier (32%) and "sometimes" if the products looked more appetising (35%). Based on this, we can observe that sensory stimuli are an important factor to consider when creating a new product (Figure 6). Abdelaziz (2022) conducted a study in 2000 aiming to ascertain whether attitudes could be formed involuntarily during the categorization of a new hybrid product under the influence of associated sensory stimuli (smell and taste). The study's results indicated that study participants were able to form both implicit and explicit attitudes towards the tested product after exposure to sensory stimuli.

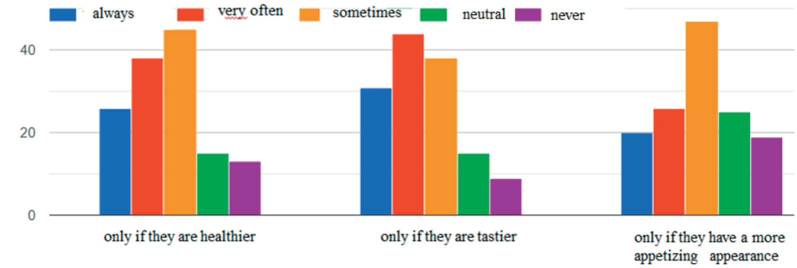

Figure 6. The reason for replacing animal-based dishes

For item 15 our respondents were shown an image depicting a clearly tender, juicy piece of steak and were asked how does the image affect their appetite. The appetite is deeply connected to the sensory experience - in our case cutting through the steak and witnessing its texture and flavour. We took into consideration the data resulting from item 14 which reflected that for our consumers the top characteristics of products like steak, burger patties and bacon are most frequently taste, smell and texture (Figure 7).

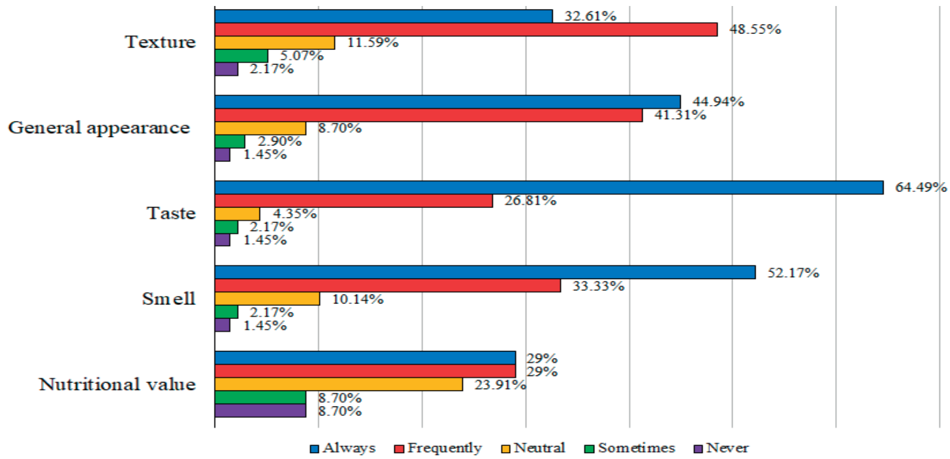

Figure 7. Specific characteristics of steak, meatball, or bacon-type products

This combination of characteristics is more likely to heighten the sense of appetite among consumers and is associated, according to almost 50% (67 respondents), with a savoury meal.

Item 16 represents the final questions that concludes our survey and a conceptual exercise we asked our respondents to complete: how would their perception change if they were to find out that the product shown previously is entirely made out of mycelium. Subsequently, respondents are prompted to reflect on how this unexpected revelation influenced their perception of the product. Almost 38% of them

(52 respondents) would categorically be interested to try it out, while 55 respondents claimed it is very likely they would be interested in cooking it themselves. A similarly high percentage of respondents would rather purchase it in store, already cooked. These results collectively suggest that there is a substantial segment of the population willing to embrace and incorporate innovative plant-based products into their diets, with preferences ranging from hands-on cooking experiences to the convenience of pre-prepared options available in stores (Figure 8). These insights can be valuable in assessing food consumption patterns and ultimately for product development. It is important to keep in mind that other factors such as proper labelling and marketing positioning will have a great impact on the acceptance of this new-wave of products (Constantin et al., 2009). Safety regulations that mandate clear and accurate labelling not only empower consumers to make informed choices but also foster a sense of security and confidence in the products they purchase.

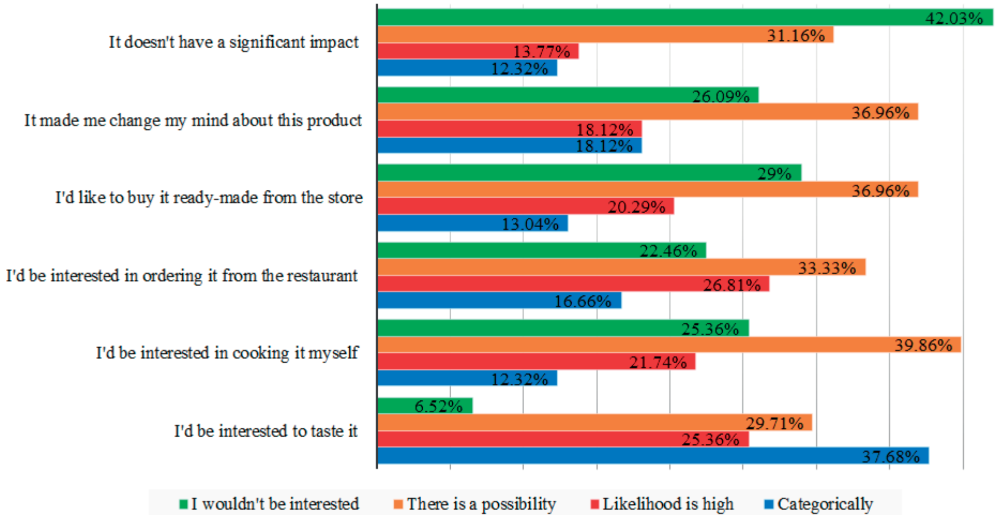

Figure 8. Consumer perception

CONCLUSIONS

The principal objective of our study was to assess the attitude and degree of acceptance exhibited by Romanian consumers toward mycelium-based products - an innovative category within the spectrum of sustainable food alternatives. The analytical exploration via a questionnaire of 16 items encompassed diverse dimensions of consumer behaviour and preferences, yielding insights into the prospective trajectory of mycelium-based products within the Romanian market.

Over 50% of our respondents confirmed they consume mushrooms monthly, suggesting a potential openness towards products derived from fungal protein. A noteworthy segment of our respondents displayed concern about the environmental repercussions of their food choices, revealing an emergent trend towards eco-conscious consumerism. This trend converges with the escalating popularity of plant-based alternatives, underscored by dual considerations of environmental sustainability and a proclivity for novel sensorial experiences. However, the primacy of taste and overall sensory experience prove to be the main agents in shaping consumers choices. This particular aspect might suggest an openness to trying novel tastes and textures as long as the product maintains its savoury and flavourful profile and it is as easy and convenient to integrate into daily consumption habits as a home-delivered burger. The sustained emphasis on a balanced price-quality ratio many respondents opted for stays consistent with previous findings wherein financial considerations occupy a central position in the scheme of the consumer decisionmaking tree. This underscores a pivotal tenet for brands operating with mycelium-based products: the imperative to provide consumers with a compelling value proposition that delivers both affordability and product quality.

This dual consideration introduces a strategic dilemma for developers and market strategists. On one hand, there is an avenue to position these products as a more economical alternative to conventional meat, thereby catering to a broader consumer base. This approach involves a deliberate effort to offer price points that are not only competitive but also significantly lower than traditional meat options. By doing so, developers can effectively tap into the market segment characterised by cost-conscious consumers, thereby expanding the reach and accessibility of mycelium-based products.

On the other hand, there lies an opportunity to position mycelium-based products in the high-end segment, vouching for superlative quality. In this scenario, developers can leverage the unique qualities of mycelium-based products - whether it be their sustainability, nutritional profile, or distinct sensory attributes - to justify a premium price point. This strategic positioning could target consumers who are willing to invest in products that align with their preferences and values. The impact of social networks on consumer decisions, coupled with a palpable receptiveness to products endorsed by trusted entities, delineates a degree of reliance on social circles and influential public persons, consolidating once again that identity validation exists within our food choices. These insights imply that strategic endorsements and social validation could play a pivotal role in fostering acceptance for mycelium-based products, aligning with broader societal trends.

In the end, while our study provides valuable insights into the acceptance of mycelium-based products among Romanian consumers, it is essential to acknowledge certain limitations. The sample size and demographic representation may not capture the full spectrum of consumer diversity, and the reliance on survey responses introduces potential biases. Additionally, the dynamic nature of consumer preferences poses challenges in offering a definitive and timeless analysis. Nevertheless, we perceive these limitations not as constraints but as opportunities for further research refinement. The information uncovered in this study creates a groundwork for more nuanced investigations. Despite these considerations, we remain cautiously optimistic about the prospect of integrating mycelium-based products on the Romanian market and into our dietary choices. We believe the modern man might find the solution to his handful of dilemmas through an integrative approach rather than opting strictly for plant-based or traditional steak.

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