

Review

# A Comprehensive Review of the Benefits of and the Barriers to the Switch to a Plant-Based Diet

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**Abstract:** In recent decades, the food industry has been faced with new challenges, and it has had to develop new types of diets and produce new types of foods that can slow down the spread of chronic diseases. The aim of our research was to identify the characteristics of plant-based nutrition, based on international and Hungarian literature. The comprehensive analysis was performed based on the theoretical model called Theory of Planned Behavior, in the course of which the perceived and objective benefits of and barriers to the conversion to a plant-based diet were examined. According to our results, the main benefits of plant-based nutrition are its many factors associated with a reduction in risk of developing numerous chronic diseases. This is followed by benefits of well-being and satisfaction, followed by ethical and environmental benefits. The most commonly reported inhibitory factor of a vegetarian diet is the enjoyment of eating meat and the difficulty in giving up meat consumption. This is followed by health considerations, e.g., lack of various ingredients in foods. Convenience and taste factors are also important disincentives, as well as the irrelevant nature of some plant-based nutrition information sources. Besides, social barriers, negative discrimination, and negative effect on mental health associated with them can also be a hindrance, as can financial barriers. The classification developed during our analysis can serve as a relevant guideline for decision-makers, and also as a basis for further primary qualitative and quantitative research.

**Keywords:** plant-based diet; benefits and barriers; vegan; vegetarian; consumer attitudes; theory of planned behavior; perceived; objective; comprehensive review; international and Hungarian

## 1. Introduction

The past decades have seen a dramatic worldwide increase in chronic diseases. Obesity, diabetes, cardiovascular diseases, respiratory disorders, and malignant tumors account for 63% of total mortality at a global level annually. Furthermore, chronic diseases represent almost 45.9% of all diseases worldwide [1]. People's health has deteriorated over the past decades, a phenomenon which can be associated with an unhealthy way of life, unbalanced nutrition, and the excessive consumption of discretionary foods and drinks [2]. According to Tóth [3], throughout their lives, people consume more than one and a half tons of food per capita, the composition of which is of particular importance, since 40–60% of illnesses depend on diet to a great extent. Hungarians spend 23.1% of their income on food, alcoholic beverages, and tobacco, and this percentage can be regarded as a significant proportion [4]. Thus, the composition of our daily diet does indeed make a difference.

Parallel to the rapid spread of chronic diseases, the population of developed countries is ageing at an increasing rate; consequently, the numbers of inactive people and those requiring medical treatment

is growing. Moreover, average life expectancy at birth is also increasing, and, together with ageing, this will impose an ever-increasing burden on healthcare systems in the future. As a general rule, the longer people live, the more expensive their medical treatment is, which, among other things, can be attributed to higher levels of inactivity, as well as stressful lifestyles [1,5]. Among the numerous components of sustainability (social, ecological, and economic), the dimension of health also has a major role [6]. Tilman and Clark [7] claim that the proper selection of our diet and the sustainability of the environment and human health are closely related factors. Managing them presents a global challenge and is of high priority in terms of the environment and public health. The factors outlined above have obviously posed new challenges to the food industry. It has become necessary to develop nutritional habits and produce foods which, because of their positive impacts on health, are able to slow down the spread of the chronic diseases afflicting humankind and lay the foundations for a longer healthy life expectancy for the ageing population [1]. Therefore, health is of outstanding value for the majority of the society. To specify the barriers to the conversion to a health-conscious lifestyle, we need to define health behavior and examine the factors influencing it.

Consumers, in most cases, draw a parallel between a switch to a healthy lifestyle and a change in their dietary habits. According to Fürediné Kovács [8], there are three potential ways which lead to a conversion to a healthy diet. On the one hand, a healthy diet can be regarded as a way to cure illnesses, while on the other hand, a new type of health consciousness can be observed which offers the chance to achieve well-being and highlights the health-promoting functions of nutrition.

Between the abovementioned two approaches, a third way can also be observed, which focuses on consumer behavior aimed at reducing and avoiding risks. When adopting this approach, the consumer consciously chooses foods with which certain negative effects on health can be prevented.

A change has taken place in nutrition research that can be characterized by diseases relating to malnutrition (bulimia and anorexia), by sociocultural embeddedness and by an intra-active vision of human beings (nutrition as part of a way of life). Consequently, nutrition as a preventive and therapeutic method at the same time can be considered an integral part of the practical toolkit of health psychology. Vegetarianism (a plant-based diet) can be linked to the intra-active vision of human beings, emphasizing a conscious way of life, and health-consciousness in the life of consumers [9,10].

McManus [11], a contributor to the Harvard Medical School claims the following: “Plant-based or plant-forward eating patterns focus on foods primarily from plants. This includes not only fruits and vegetables, but also nuts, seeds, oils, whole grains, legumes, and beans. It does not mean that you are a vegetarian or a vegan and never eat meat or dairy. Rather, you are proportionately choosing more of your foods from plant sources”. It should also be added to the definition above that the plant-based diet can be used at every stage of an individual’s life cycle [12]. People using vegetarian (plant based) diets can be classified into different subgroups. Vegans do not consume any products of animal origin; therefore, they avoid such types of products in their everyday lives, and this attitude is not restricted to their meals. Lacto-vegetarians consume milk and dairy products, as well. Semi-vegetarians predominantly use a plant-based diet, which, however, may be moderately supplemented with the consumption of poultry and fish. Flexitarians are similar to the previously mentioned subgroup; they mostly eat vegetables and fruit, but they do not have to give up on meat and fish. Pesco-vegetarians are considered to be one of the most permissive users of a plant-based diet, apart from ingredients of plant origin, milk, dairy products, eggs, and fish also feature in their diet [2,13,14].

The history of plant-based diets goes back hundreds of years. Several historical figures, including Pythagoras, Plato, George Bernard Shaw, Mahatma Gandhi, Albert Einstein, Leonardo da Vinci, and Leo Tolstoy followed such a diet [15]. However, these diets have become widespread nowadays, a phenomenon which can be attributed to health-consciousness becoming increasingly popular among the general population. These dietary habits, however, cannot be considered fashion diets, because the majority of them have been designed on the basis of scientific facts. Thus, the plant-based diet is a nutritional trend where foodstuffs of animal origin, such as eggs, meat, meat products, milk and dairy products, and highly processed foods, such as oil, sugar, and flour, are limited to the background.

Most of these diets comprise mainly raw, unprocessed or minimally processed foods of plant origin, such as cereals, tubers, legumes, vegetables, and fruit. It is important to point out that this type of diet cannot be regarded as uniform or standardized, since the particular dietary trend is usually chosen by the individual, possibly after having consulted a specialist (usually a dietician). People may convert to a plant-based diet for different reasons, including animal protection, or political, economic, ethical, ecological, and spiritual motives, or because a traditional diet has a negative effect on health. Plant-based diets have been of increasing significance to nutritional science, and to wider medical science, as it deals with nutrition [15–20]. Among the attitudes (motivations) of vegetarians, priority is attributed to perceived health benefits. People using a plant-based diet do not consider meat a necessary and integral part of their daily nutritional needs. Some individuals may choose simply to limit the amount of animal product consumed rather than removing it completely from the diet [9,21,22].

The precise proportion of consumers following a vegetarian diet is particularly difficult to assess, since several types of plant-based diets are differentiated a priori by the profession and they may vary even across countries. In addition, there are no standardized surveying methods valid across countries that would make it possible to differentiate among those following a vegetarian diet in the whole population. It must definitely be taken into account that the number and proportion of individuals adopting a plant-based diet may be higher as compared to the actual situation, due to the different methodology research reports used. Below, some major tendencies are highlighted which are based on data and information provided by vegetarian organizations in different countries. The highest proportion of vegetarians can be found in India, where 30–40% of the population follows such a diet [23,24]. In Europe, the proportion of vegetarians is the highest in Italy, the UK, and Germany (9%), while in the Netherlands it is 4% [15]. It is also worth highlighting Austria and Switzerland, where the proportion of vegetarians is 3–3% [15,25]. Cramer et al. [26] carried out a nationally representative questionnaire in the USA entitled the “National Health Interview Survey”. Only 4% of the participants reported using a vegetarian diet and 2% a vegan diet for health reasons within the past 12 months.

These people were typically aged from 30 to 65 years, were female, college educated, chronically ill, and physically active. They were less likely to be in a relationship. Only 6% of them consulted a specialist concerning their health problems (being overweight or obese were the problems most often mentioned). Twenty-six percent of them started to follow the special diet because of a specific health problem [26]. The number of Hungarian vegetarians is estimated by experts to be approximately 150,000, which represents 1.5% of the population (to the best of our knowledge, no representative survey has been carried out in this area) [14]. According to the Ahimsza Hungarian Vegetarian Association, 43% of Hungarian vegetarians are ovo-lacto vegetarians, 46% are lacto vegetarians, and 11% are vegans [14].

The key objective of our research was to identify the characteristics of plant-based diets within different special dietary trends, with the help of relevant Hungarian and international literature sources and to specify the benefits of and barriers to converting to and sustaining a new vegetarian diet. Our research was conducted to identify the benefits and barriers concerning plant-based diets, which were already dealt with in several previous research studies [21,22,27–32].

In addition to presenting international literature on the topic, we also considered it important to introduce the situation in Hungary, from the perspective of consumer behavior. It has been determined to what extent Hungarian consumers follow global cultural and consumer trends as concerns plant-based diets.

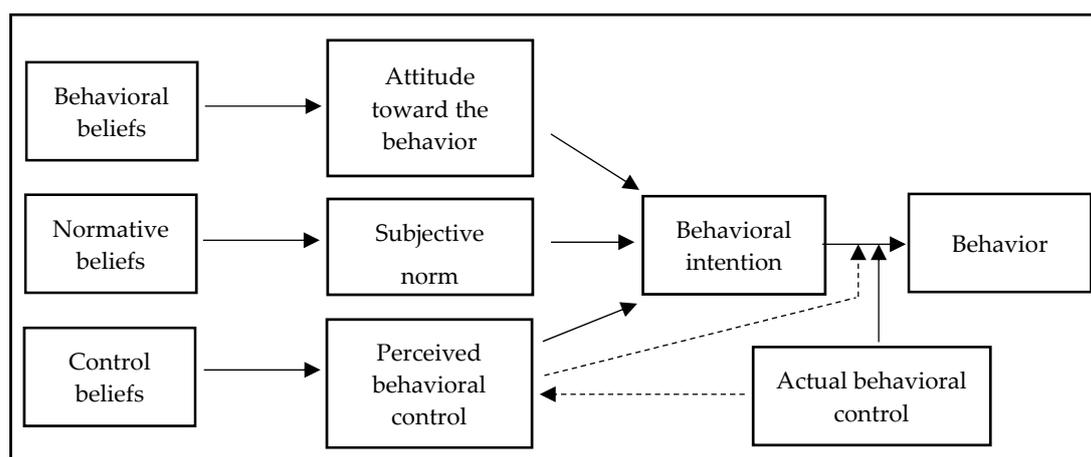
The logical structure of the literature research was based on international sources examining the benefits of and barriers to a plant-based diet. The uniqueness of our analysis lies in the Theory of Planned Behavior Model, in which we have integrated the perceived and objective benefits and barriers. We believe that the theoretical model has not been used in the literature reviews published to date, and this model can provide a framework for future research.

## 2. Material and Methods

We conducted a comprehensive literature review during the analysis. In the first step, relevant articles connected to the plant-based-diet topic were collected. Our aim was to collect not just international sources but Hungarian sources too. As a second step, we categorized the relevant literature in two steps: First, we examined the potential perceived and objective benefits, and then the potential perceived and objective barriers to the switch to a plant-based diet.

The behavior of an individual is influenced both by the perceived benefits and barriers of a particular action. Perceived benefits refer to the individual's assessment of the value and effectiveness of a particular behavior, in order to reduce the risks of action. If the individuals believe that, by taking an action, they are able to reduce the potential risks, they will be likely to engage in that behavior. Perceived barriers are factors identified during the change of behavior of an individual, which may prevent behavioral change that appears to be fundamentally optimal by the perceived benefits. For behavior change to actually happen, the perceived benefits must outweigh the perceived barriers [33–35].

In order to give a systematic description of the benefits and barriers related to plant-based diets, we used the Theory of Planned Behavior (TPB) model (Figure 1) [36–40]. The TPB model is a theoretical approach which examines, among others, the belief in the manageability of health. Perceived behavioral control depends on personal and external factors that directly influence behavior, and also, together with subjective norms and attitudes toward action, have an effect on behavioral intention.



**Figure 1.** Theoretical research model based on the Theory of Planned Behavior. Source: Authors' own editing, based on Ajzen [36], Ajzen [37], Ajzen-Fishbein [38], Cheung et al. [39], and Fishbein [40].

Certain elements of the process are based on different beliefs (such as behavioral, normative, and control beliefs). These are followed by attitudes toward a particular action (behavior), subjective norms, and perceived behavioral control. The elements of the TPB model described above affect the behavioral intention and through this, affect behavior. The perceived benefits and barriers are part of the beliefs in the TPB. They represent antecedents of the attitude, subjective norm, and perceived behavioral control and indirectly the behavioral intention and behavior. The objective benefits and barriers appear in the “actual behavioral control” component. When individuals feel, to a certain extent, able to control their behavior, (they are at the level of controllability of the behavior—threshold of stimulation), they are expected to act if the favorable opportunity arises. Consequently, the actual behavioral control refers to the level, which, considering the abilities, tools, and resources, is sufficient for the individual to feel able to implement that particular behavior (they are already aware that they are responsible for their own health). Thus, the successful implementation of the behavior depends not only on positive intent, but also on a sufficient level of behavioral control. If the perceived behavioral control is of adequate level, that is the individual feels maximally able to implement the behavior, then, optimally, the level of actual and perceived behavioral control is the same (which results in

action) [37,38,40]. This theoretical structure provided the framework for research, making it possible for us to systematically represent the factors identified during the analysis.

We made a comprehensive overview of the benefits of the plant-based diet and differentiated our findings in three categories: (1) factors beneficial to health; (2) benefits linked to well-being and contentment; and (3) ethical and environmental benefits. On the other hand, we highlighted our results about the barriers to switch to a plant-based diet and determined seven categories: (1) the enjoyment of eating meat; (2) essential nutrient deficiency risks; (3) convenience and taste factors; (4) difficulty in obtaining information; (5) social constraints and negative discrimination; (6) negative effect for mental health; and (7) financial constraints.

Various relevant search expressions' combinations were used in our analysis: "plant-based"; "vegetarian"; "vegan"; "diet"; and "consumer attitudes". We used international databases (EBSCO, Emerald Insight, ScienceDirect, and Web of Science) for data and information gathering, without limiting the publication date of articles. The oldest article included is from 1974, and the most recent one is from 2019. During the search, only the sources relevant to our research aim were retained.

Altogether, 101 literature sources (14 Hungarian and 87 international references) were collected. We collected literature both with primary and secondary data; in some cases we analyzed other review articles too. We studied 81 academic articles, 16 books, and 4 other sources from the internet.

Based on our results, the information about the plant-based diet has risen over recent years. For the 1970s and 1980s, we found just five publications, and for the 1990s, there were just nine publications. The number of publications on the subject has increased dramatically in the 2000s (39 publications) and 2010s (48 publications).

### 3. Results

#### 3.1. Plant-Based Diets and Influencing Factors

In nutritional science, there are two ways to differentiate the so-called special diets. One approach includes special diets that are adopted because of a particular illness, such as a food intolerance or a food allergy. These diets are beyond the scope of the present study and are not discussed here in detail. The other differentiation is based on special diets adopted by individuals on their own initiative (a plant-based vegetarian diet and its specific forms).

A plant-based diet has already been defined above; however, it is worth adding that it can be considered a collective term, including diets ranging from a strict plant based one to semi-vegetarian or pesco-vegetarian. Plant-based diets consist of vegetables, fruit, legumes, oilseeds, and whole grain cereals. These components may be supplemented with milk, dairy products, and eggs in some alternative vegetarian diets or in rare cases by poultry and fish. It is also important to stress that those following a vegetarian diet mostly prefer their meals with ingredients which have been changed as little as possible and which have undergone only minimal industrial preprocessing as compared to their original form. In this way, phytonutrients (compounds in plants having a positive effect on health) can be more efficiently preserved [20]. The general recommendations for a plant-based diet regarding the food categories above are shown in Table 1.

**Table 1.** General recommendations for a plant-based diet.

Groups of Ingredients	Recommended Daily Allowances
Vegetables (with the exception of starchy vegetables)	"Ad libitum", aiming at diversity
Fruit	2–4 portions (1 portion = 1 medium-sized piece or 1/2 cup)
Whole grain cereals (e.g., oat, brown rice, quinoa)	6–11 portions (1 portion = 1/2 cup of cooked cereals or one slice of whole wheat bread)
Legumes (lentils, peas, beans, soybean)	2–3 portions (1 portion = 1/2 cup of cooked legumes)
Leaf vegetables (e.g., broccoli, lettuce, kale)	At least 2–3 portions (1 portion = 1 cup raw or 1/2 cup of cooked leaf vegetables)

Table 1. Cont.

Groups of Ingredients	Recommended Daily Allowances
Oilseeds (e.g., pistachio, almond, walnut)	30–55 g
Seeds (e.g., chia, linseed, hempseed)	1–3 tablespoons
Vegetable milk (e.g., cashew, soy, almond)	2–3 cups
Fresh herbs	“Ad libitum”

Source: Authors' own editing, based on Hever [41] and Szabó et al. [20].

The ability to sustain plant-based dietary habits is influenced by several factors. Personal factors (habits and physical feedback) and the characteristics of the social network (vegetarian relatives or acquaintances, organized groups of animal rights supporters, those active in environmental protection, and those interested in healthcare) play a crucial role in this respect. The availability of the ingredients of a plant-based diet is also considered essential (in shops and in restaurants) [9,42].

Overall, it can be concluded that a vegetarian way of life is appropriate for all kinds of activities (intellectual and physical work, and sport) and suitable for all ages, as long as it is well planned in advance and properly sustained later on [14,43].

### 3.2. The Emergence and History of the Plant-Based Diet

Research by Kökény [14] shows that plant-based diets are long-established dietary practices, as vegetarianism in the East has existed since the beginning of history. In India, cows and other animals are considered sacred, and their protection has always been taken for granted (Ahimsā); thus, India has always represented the strongest base of vegetarian diets. The Egyptians had a predominantly plant-based diet and consumed mainly grain crops [44]. In ancient Persia, priests used a vegetarian diet [45]. The plant-based diet of the Western world can be traced back to the Ancient Greek culture (Socrates and Hippocrates). Given the above factors, several religious trends (e.g., Judaism, Brahmanism, Adventism, and Hinduism) prefer meat-free or mostly meat-free diets [20].

The first official organization was the Vegetarian Society, which was established in Great Britain in 1847, and the word “vegetarian” originates from the name of this society [46,47]. Scientific research into vegetarianism started in the 1950s and was mainly aimed at examining the adverse effects of this type of diet. Due to the positive findings, in the 1960s and 1970s, research focused more on the health benefits. It was around the turn of the millennium that the first studies on the preventive and therapeutic objectives of plant-based diets appeared, and these were concerned with the different physiological and pathological conditions of individuals [14,20,48,49].

The history of vegetarianism in Hungary dates back to 1883, when the Vegetarian Society of Hungary was established (later renamed the Hungarian Vegetarian Association). The society was formed with the aim of developing action plans and contributing to maintaining and improving people's health, with a healthy way of life. The first vegetarian restaurant was opened in 1991, in Budapest [14,50]. The 1980s saw a new boost in the emergence of plant-based diets in Hungary and it was then that new trends toward a natural lifestyle and ‘reformed’ diets started to develop. The “esoteric boom” in the 1990s prompted the government of the time to issue legal regulations. As a result, vegetarianism, naturopathic medicine, esotericism, and the ‘reformed’ lifestyle evolved into an increasingly profitable business and an important element in the economy [43]. The next most important change was the separation of naturopathic medicine and vegetarianism. Naturopathic medicine was able to gather more support from the very beginning, and it had political influence as well, while the followers of vegetarianism formed separate associations and societies [14].

### 3.3. Benefits of the Plant-Based Diet

Research shows that the most important benefits of vegetarian diets can be associated with positive health factors [21,22,29,51,52]. The findings of a representative survey carried out in the USA suggest that the prevalence, patterns, and other related factors of vegetarian and vegan diets, are

more significant among Americans when they make these dietary changes to protect their health [26]. Dyett et al. [53] questioned 100 people in the USA about how their health beliefs motivate them toward a switch in their lifestyle behavior and in changing their dietary patterns. Nutrient intake was assessed based on “Dietary Reference Intakes”. Health (47%) proved to be the main reason for making a dietary change. The second most significant reason for a switch to a plant-based diet can be linked to well-being and satisfaction. Compared to these, connections to animal welfare and environmental sustainability were factors less-frequently preferred and reported [28–30]. Jabs and Devine [54] looked at the preferences of vegetarians related to health and animal welfare. They conducted personal interviews with 19 vegetarians. They subdivided vegetarians into two categories. The main motivation for health-oriented vegetarians is associated with the health benefits of the diet and, through these, the avoidance of health risks. The key considerations of ethical vegetarians are moral ones and connected to maintaining animal welfare. Hoek et al. [55] carried out a nationally representative survey and interviewed Dutch consumers over the age of 18 in their research entitled the “National Food Consumption Survey”. It was revealed that, besides health-related and social factors vegetarian consumers had a positive attitude toward the importance of product information, specialty shops, novelties, and ecological products. A detailed analysis of factors mostly supporting plant-based diets are presented below. The analysis is based on the classification given by Corrin and Papadopoulos [27], Rosenfeld [56], and Ruby [57]. Factors supporting the plant-based diet are shown in Table 2.

**Table 2.** A comprehensive overview of perceived and objective benefits of plant-based diets.

Benefits	Types of Benefits <sup>1,2</sup>	Author(s), Year of Publication
Factors Beneficial to Health		
May reduce body fat and thus the degree of obesity	Objective	Berkow and Barnard, 2006; CJDPR, 2003; Cummings et al., 2002; Friedewald et al., 2011; Szabó et al., 2016
Decreased intake of saturated fat	Perceived	Lea and Worsley, 2003a; Lea et al., 2006a
	Objective	Kökény, 2009
Having levels of serum albumin with a more favorable effect on balanced nutritional status	Objective	Benzie and Wachtel-Galor, 2009
The essential nutritional ingredients can be found in a greater amount	Objective	Antal, 2005; CJDPR, 2003; Dwyer, 1988; Pomerleau et al., 2002
Reduces the risk factors for developing chronic diseases	Perceived	Graça et al., 2015; Knutsen, 1994; Melina et al., 2016; Lea and Worsley, 2002; Lea and Worsley, 2003a; Lea et al., 2006a; Weinrich, 2019
	Objective	Berkow and Barnard, 2005; Barnard et al., 2009; Dwyer, 1988; Leroy and Cofnas, 2019; Micha et al., 2010; O'Connor et al., 2017
Reduces the likelihood of developing cancer	Objective	IARC, 2015; Nechuta et al., 2012; Pérez-Cueto and Verbeke, 2012; Richman et al., 2010; Szabó et al., 2016
Benefits Linked to Well-Being and Contentment		
Has a positive effect on the development of well-being and on achieving peace and contentment	Perceived	Kökény, 2005; Lea and Worsley, 2002; Lea et al., 2006b
May contribute to a decrease in social dysfunction	Perceived	Judge and Wilson, 2015
Improves the quality of life	Objective	Kökény, 2009; Meyer et al., 2006

Table 2. Cont.

Benefits	Types of Benefits <sup>1,2</sup>	Author(s), Year of Publication
Ethical and Environmental Benefits		
May result in more effective exploitation of economic resources	Perceived	Weinrich, 2019
	Objective	Candy et al., 2019; Oláh et al., 1985; Sabaté, 2001
Reduces the effect of global warming and environmental pollution	Perceived	Mylan, 2018; Schenk et al., 2018
	Objective	Candy et al., 2019; Kökény, 2009; Leitzmann, 2003
More favorable results concerning indicators measuring environmental impacts	Perceived	Mullee et al., 2017; Vanhonacker et al., 2013
	Objective	Castané and Anton 2017; Goldstein et al., 2016; Könczey and Nagy, 1997;
Prioritizing the protection of animals as individuals and as species	Perceived	Janssen et al., 2016; Kenyon and Barker, 1998; PADADC, 2003; Schenk, 2018; Weinrich, 2019
Increased willingness to contribute to animal welfare organizations	Perceived	Backer and Hudders, 2015

<sup>1</sup> The perceived or objective assessment of the benefits shown in the table may be subjective, depending on the individual. <sup>2</sup> Perceived benefits were based on consumer surveys, and objective benefits were based on objective measurements (e.g., laboratory and clinical studies). Source: Author's own development, 2020.

### 3.3.1. Factors Beneficial to Health

A plant-based diet may reduce body fat and thus the degree of obesity [43,58]. It must be added, however, that if total body mass is lower as well, one might have lower total fat mass, but the degree of adiposity is not necessarily lower. This has been stated by a research study conducted by Berkow and Barnard [59], who assessed the body weight of vegetarians and that of non-vegetarians. Evidence suggests that vegetarian men weighed 4.6–12.6 kg less and vegetarian women weighed 2.9–10.6 kg less than their non-vegetarian peers. By using a well-constructed diet, cardiovascular diseases, which mainly develop as a result of obesity or risk factors leading to obesity, could be prevented [20,60]. Decreased intake of saturated fat is also considered an important health benefit of vegetarian diets [14,21,29]. By conducting human trials, researchers demonstrated that individuals using a plant-based diet had levels of serum albumin with a more favorable effect on their balanced nutritional status than those using a mixed diet [61]. The quantity of important nutritional components such as magnesium, potassium, folic acid, fibers, antioxidants including vitamins C and E, and phytochemicals is higher in people with a plant-based diet [43,62,63]. The absorption of iron of plant origin can be facilitated with a proper amount of vitamins [64]. Plant-based diets are able to reduce risk factors leading to the development of diseases, which is an outstanding health benefit [65]. Fewer people have been found to die of heart diseases, and the occurrence of type 2 diabetes, dementia, gallstones, kidney diseases, rheumatoid arthritis, and different types of allergies has decreased [12,21,62]. In addition to the above, it should be emphasized that a number of nutrition guidelines stress the risk factors of consuming red and processed meat in the development of primarily cardiovascular diseases. However, it has been suggested by an increasing number of research studies, that it is only excessive meat consumption that can be considered a real risk factor [66–68]. Even so, the overall negative view in relation to meat consumption supports the opinion of those who have chosen plant-based nutrition, which is considered healthier [66–68]. The cholesterol level and blood pressure in most vegetarians are found at the lower end of the normal range [21,28,29,51,62,69–71]. Reducing meat consumption and the preference for plant-based diets can be effective methods for reducing the likelihood of developing some (not all) types of cancer. According to the International Agency for Research on Cancer (IARC), red meat is “probably carcinogenic to humans”, while processed meat products are “carcinogenic to humans” [20,72–75].

### 3.3.2. Benefits Linked to Well-Being and Contentment

It has previously been elaborated that the improvement in the health condition of the individual is the main driving force in the changes in dietary patterns and in the shift to a plant-based diet. Thus, the individual seeks to reduce health risks and seeks well-being, which makes the feeling of maximum contentment attainable. Well-being and contentment, in turn, are associated with the increased amount of time devoted to physical activity and recreation. Consequently, a plant-based diet has a positive effect on well-being, enabling the achievement of peace and contentment [9,28,30]. Judge and Wilson [76] carried out a questionnaire-based survey with a sample of 506 New Zealand university students. They presented a vision which symbolized a society in 2050, where consumers predominantly followed plant-based, i.e., vegetarian or vegan diets. The findings suggested that vegetarianism could promote a decrease in social dysfunction. Individuals adopting a plant-based diet usually spend less money on health and health care, and at the same time, the quality of their lives improves [14,77].

### 3.3.3. Ethical and Environmental Benefits

Evidence suggests that a plant-based diet may result in more effective exploitation of economic resources, which may reduce environmental impacts [50,65,78,79]. Concerning environmental protection, the ameliorating effects on global warming and environmental pollution are mostly reported by researchers [14,15,32,78,80]. It has been confirmed by a growing number of studies that excessive meat production and meat consumption and factory farm conditions impose an unreasonable burden on the natural environment [52,81,82]. Indicators measuring environmental impacts were found to show more favorable results concerning all the factors in the case of plant-based products than in the case of Mediterranean diets (meat-based products and fish) [83]. In Denmark, so-called life-cycle assessments (LCA) were used to compare traditional diets with vegetarian and vegan diets, based on factors related to environmental impact. The two plant-based diets (vegetarian and vegan) turned out to produce significantly better results than the mixed diet. However, there were no notable differences between the two plant-based diets [84]. The protection of life is of particular importance; this is understood as prioritizing the protection of animals as individuals and as species [32,65]. With the aim of protecting animals, for moral reasons, individuals are reluctant to contribute to the existence of factory farm conditions that torture animals and then kill them (the ahimsa principle) [85,86]. Backer and Hudders [87] examined the relationships between animal and human well-being attitudes and the willingness to donate, and the connections between moral issues and the choice of diets among meat consumers, flexitarians, and vegetarians. Donating behavior was assessed by examining the respondents' willingness to contribute to charitable organizations working for the protection of animals and humans. Their studies revealed that vegetarians showed more willingness to donate to animal protection organizations than those using a mixed diet. In their research, Janssen et al. [88] identified a vegetarian consumer group, which may also be open to the processing of products of animal origin, where the aspects of the well-being of animals are taken into consideration.

### 3.4. Barriers to Consuming Plant-Based Diets

The enjoyment of eating meat and the immense difficulty in giving it up are suggested by surveys to be the biggest barriers to the switch to a plant-based diet [21,30,51,89]. Compared to the popularity of eating meat, factors associated with health and convenience have been found to be less important [22,29–31,51,89]. Similar to the previous section, the following analysis was based on the classification made by Corrin and Papadopoulos [27], Rosenfeld [56], and Ruby [57]. The barriers to consuming plant-based diets are summarized in Table 3.

**Table 3.** A comprehensive overview of perceived and objective barriers to plant-based diets.

Barriers	Types of Barriers <sup>1,2</sup>	Author(s), Year of Publication
The Enjoyment of Eating Meat		
Excessive commitment to eating meat and the difficulty in abandoning it	Perceived	Graça et al., 2015; Kenyon and Barker, 1998; Lea and Worsley, 2003a; Lea and Worsley, 2003b; Pohjolainen et al., 2015
Essential-Nutrient-Deficiency Risks		
Risk of low protein intake	Perceived	Lea and Worsley, 2001; Lea et al., 2006b
	Objective	Dwyer, 1988; Kókény, 2009; Szabó et al., 2016
Low intake of micronutrients for example, vitamin B12 and vitamin D, as well as that of riboflavin, iron, calcium and zinc	Objective	Balk et al., 2005; Candy et al., 2019; Dwyer, 1988; Kókény, 2009; Watanabe, 2007
Convenience and Taste Factors		
The preparation of meals is too complicated	Perceived	Lea et al., 2006b; Pohjolainen et al., 2015
The availability of meals to choose from is limited in restaurants	Perceived	Lea and Worsley, 2001; Lea et al., 2006a; Lea et al., 2006b; Vanhonacker et al., 2013
It easily becomes boring and tasteless	Perceived	Lea and Worsley, 2001; Povey et al., 2001
Difficulty in Obtaining Information		
The range of relevant and available information is very limited	Perceived	Lea and Worsley, 2001; Lea and Worsley, 2003a; Lea et al., 2006a
Social Constraints, Negative Discrimination		
It may lead to eating disorders	Perceived	Povey et al., 2001
	Objective	Dwyer, 1988; Glasauer and Leitzmann, 2005
Negative associations, stereotypes	Objective	Szabó et al., 2016
The preservative effect of family habits	Perceived	Kenyon and Barker, 1998; Lea and Worsley, 2003a; Lea et al., 2006b; Taren and Wiseman, 2003
	Objective	Kókény, 2005;
Motivation based on imitation	Perceived	Hodson and Earle, 2018
	Objective	Kókény, 2005
Negative Effects on Mental Health		
Vegetarians are more neurotic and depressed than omnivores, causing them poorer mental health	Perceived	Baines et al., 2007; Forestell and Nezelek, 2018
Financial Constraints		
Daily meals and raw materials are too costly to obtain	Perceived	Kenyon and Barker, 1998; Lea et al., 2006b; Povey et al., 2001; Taren and Wiseman, 2003

<sup>1</sup> The perceived or objective assessment of the barriers shown in the Table may be subjective, depending on the individual. <sup>2</sup> Perceived barriers were based on consumer surveys, and objective barriers were based on objective measurements (e.g., laboratory and clinical studies). Source: Author's own development, 2020.

### 3.4.1. Enjoyment of Eating Meat

Graça et al. [51] examined the decline in meat-based diets and the growth in the proportion of plant-based diets, which, in their view, represent a positive step forward in increasing sustainability, in developing public health, and in minimizing the suffering of animals. They conducted a questionnaire-based research study among a sample of 410 meat consumers, with the aim of assessing the potential conversion to a plant-based diet. During the analysis, the sample was broken up into three

clusters, and one major cluster included those supporting meat consumption. It has been confirmed by numerous studies that excessive commitment to eating meat and the difficulty in giving it up are of prime importance among the potential barriers to changing dietary patterns [21,22,31,86].

#### 3.4.2. Essential Nutrient Deficiency Risks

Opponents of plant-based diets often argue that these diets run the risk of low protein intake. It must be noted that experts are divided on the protein content of plant-based diets. Researchers claim in several studies that no significant difference can be found between plant-based diets and diets of animal origin in terms of protein supply [12,90]. However, nowadays there is a wide range of new alternatives available to address this problem. There is a considerable selection of plant-based protein-rich foods such as soy products, tofu, seitan, and tempeh [14,20,30,62,89]. The low intake of micronutrients, for example, vitamin B12 and vitamin D, as well as that of riboflavin, iron, calcium, and zinc, may easily lead to nutrient deficiency in vegetarians [78]. Vitamin B12 is of particular importance since it can be introduced to the body with water-soluble foods of mostly animal origin (e.g., liver, meat, milk and dairy products, and eggs) [14,62,91]. However, according to the findings of a research study in 2014, nori sheets made of dried algae, which are very popular in Japan, may function as a source of vitamin B12, to a considerable degree. Other functional foods of a similar type or dietary supplements can also contribute to vitamin B12 intake [20,92].

#### 3.4.3. Convenience and Taste Factors

A potential barrier to vegetarian diets may be associated with the fact that they are too complicated to prepare [30,31]. Restaurants do not provide good opportunities for vegetarian diets, because the availability of meals to choose from on the menu is limited and the preparation of meals is not appropriate [29,30,82,89]. A vegetarian diet may easily become boring and tasteless [89,93]. Mullee et al. [52] conducted an online questionnaire-based survey among Belgian consumers (N = 2436), with the aim of exploring attitudes and beliefs associated with vegetarianism and meat consumption. The sample included only 38 vegetarians, 288 semi-vegetarians, and 2031 omnivores. The most important reasons for rejecting a vegetarian diet were the following: lack of interest and willingness, bad taste, and a lack of cooking skills.

#### 3.4.4. Difficulty in Obtaining Information

There is little relevant and available information about what dishes are worth preparing and about how to prepare them in a vegetarian diet, and about which types of food are mostly suitable for replacing meat [21,29,89].

#### 3.4.5. Social Constraints, Negative Discrimination

Individuals try to keep their body mass balanced by using a plant-based diet; however, this carries the risk of developing eating disorders and may lead to various illnesses [62,93]. For this reason, vegetarians may suffer from certain deficiency diseases [94]. The negative associations, stereotypes (malnourishment, vitamin or mineral deficiency, poor nutrition, and protein deficiency) previously established in relation to vegetarian diets are still persistent among the public nowadays [20]. Another barrier is that the family of the individual adopting a plant-based diet is reluctant to follow this type of diet [30]. Owing to the already established dietary habits and attitudes, the preservative effect of family habits can be a barrier, mainly for women and the elderly, during conversion to a plant-based diet [86,95]. Dietary attitudes are largely determined by different personal habits and by habits arising from close social relationships and family ties. These relationships become more pronounced with age [9,21]. Motivation based on imitation is strongly evident in connection with plant-based diets. If a popular actor or media personality adopts a vegetarian diet, his or her fans are likely to find it an example to be followed. In this way, the health and ethical considerations of the change in the dietary pattern are overshadowed by an external control [9]. The consumer habits of

former and current vegans were examined in a largely representative US community sample involving 1313 people in a questionnaire-based survey. A conservative attitude was considered an important issue. Findings revealed that the adoption of a vegan diet was less incited by justice concerns (animal rights, environment issues, and the starvation of the poor) [96].

#### 3.4.6. Negative Effect on Mental Health

Baines et al. [97] compared the health status of vegetarian and omnivorous young Australian women. Their findings indicate that vegetarians experienced poorer mental health at their own discretion. Forestell and Nezelek [98] also reached a similar conclusion; according to their results, people following a plant-based diet are more open to novelties; however, they are also more prone to depression. It should be emphasized, however, that scientific views on the impact of plant-based nutrition on mental health are divided. In addition to the negative effects presented above, several researchers believe that, in a number of cases, plant-based nutrition can also have a positive effect on the individual's mood [99–101].

#### 3.4.7. Financial Constraints

A further perceived barrier to a plant-based diet may be the fact that the daily meals of vegetarians are too expensive and, in addition to this, the accessibility to food ingredients of plant origin is difficult [30,93]. Similar research also examined the perceived barriers to the conversion to a plant-based diet, and beside the change in taste and convenience, price was also found to be a potential barrier [86,95]. We believe that meat prices have a clear impact on the willingness to convert to a plant-based diet.

### 4. Conclusions

The main objectives of the present study were to identify the most important characteristic features of a plant-based diet and to define the perceived and objective benefits of and barriers to converting to and sustaining a vegetarian diet, based on Hungarian and international literature sources.

The past decades have seen a dramatic increase in the spread of chronic diseases worldwide. Consumers' health has deteriorated over the past decades, something which can be associated with an unhealthy way of life, involving the excessive consumption of discretionary foods and drinks, with unbalanced nutrition. The development of diseases is largely dependent on the quality of nutrition. Consequently, the food industry is facing new challenges, and it has become necessary to produce foods which, because of their positive impact on health, are able to slow down the spread of the chronic diseases afflicting humankind [1]. Healthy eating can be considered a way to "heal" diseases and a tool to achieve well-being, as well as a preventive method to combat health problems [8]. Following the paradigm shift in nutritional science, nutrition can be considered an integral part of the health industry, both as a preventive and a therapeutic method.

The plant-based (vegetarian) diet—which cannot be regarded as being uniform—is an effort to change nutrition habits, during the course of which foods of animal origin and highly processed foods are avoided and replaced with raw, unprocessed, or minimally processed foods of plant origin. The reasons for an individual to convert to a vegetarian diet can be health concerns, animal rights, or economic, political, ethical, and spiritual concerns. Research into plant-based diets is becoming increasingly important from a nutritional, as well as a medical, point of view [20]. Vegetarian diets can be divided into several subcategories (vegan, lacto-vegetarian, ovo-lacto-vegetarian, semi-vegetarian, and pesco-vegetarian). A vegetarian diet can be important at any stage of life, as long as it is sufficiently well planned and maintained [14].

The health benefits of a plant-based diet (decreased rate of body fat and obesity, increased presence of essential nutritional ingredients, and reduced risk factors leading to diseases) have been found to be the primary reasons for converting to and sustaining a vegetarian diet.

Health benefits are followed by benefits related to well-being and contentment (improved quality of life and positive effects on the individual and social environment, as well as on the development of well-being). Finally, there are ethical and environmental benefits (a more efficient exploitation of economic resources, which promotes the protection of life on Earth) [27,56,57].

The biggest barrier to a vegetarian diet is the enjoyment of eating meat and the difficulty in abandoning it. Health concerns come second, among which the most frequently mentioned reason is the lack of certain ingredients (nutrients), for example, a lack of important vitamins. As regards convenience and time, evidence suggests that the preparation of meals is too time-consuming, and a plant-based diet may become tasteless and dull. In restaurants, the choice of vegetarian food tends to be rather poor. Moreover, it may become inconvenient if the individual's family does not follow the rules of a vegetarian diet. There seems to be relatively little reliable information available about this type of diet, and this may also hinder the conversion to a plant-based diet. The vegetarian way of life may generate social constraints and negative discrimination (i.e., that it may lead to the development eating disorders and it has negative associations) and the occurrence of motivation based on imitation. Financial constraints may also arise, since the purchase of certain raw materials of a plant-based diet may be too expensive [27,56,57].

In terms of plant-based nutrition, Hungarian consumers have also been found to follow the trends typical of countries with more developed consumer cultures. Demand for plant-based nutrition is on the increase in Hungary, as well, and this trend will continue in the near future [14]. We assume that these trends do not qualify as a purely Hungarian feature; they are also more or less prevalent in the other countries of the Central and Eastern European region. However, this claim still needs to be confirmed by further research.

A certain degree of uncertainty can clearly be noticed concerning the perceived and objective benefits of and barriers to plant-based nutrition, both in the international and the Hungarian literature. The objective benefits of the plant-based nutrition have been confirmed by numerous laboratory and clinical studies [59,62,66–70,73,75,77,83,84]. Nevertheless, the communication of results has not been so successful. Because of the often-contradictory findings, consumers find it difficult to interpret these pieces of information, so they rather tend to rely on their preconceived beliefs concerning plant-based nutrition [21,29,89]. The classification (perceived and objective categories) established in our analysis may serve as a relevant guideline for decision-makers. Decision-makers may include governmental, industrial, and other organizations connected to health and food economy. Market operators, by emphasizing the benefits and by breaking down the barriers can do a lot to shift consumers to a healthier diet, especially if opinion leaders are also identified.

We are, of course, aware of the limitations of the research, which at the same time determine future research directions. While conducting the present literature review, we did not use special tool-supported methods (such as PRISMA), which would have enabled us to provide a systematic analysis of the topic. For the systematization of information, a Theory of Planned Behavior model (TPB) was used that was developed by [36–40]. We believe that, with this method, we were able to give a relevant picture of the benefits of and the barriers to plant-based nutrition. We are fully aware that the literature on plant-based nutrition is extensive, and in the present research, we were unable to map the entire literature. The differentiation of the perceived and objective benefits and barriers in the present paper has exclusively been based on literature used for and cited in the manuscript. Nevertheless, we are aware that the perceived or objective assessment of the benefits and barriers provided in the study may be subjective, depending on the individual.

It can be stated that the results of the research may be expanded in the future. In our study, we did not aim to examine consumer behavior by using primary qualitative and quantitative market research procedures. Consequently, the testing of the theoretical model (TPB), which was the basis for our analysis, by using primary research methods, can be considered a potential direction for future research. The structure of the analysis and classification developed in the paper creates an opportunity for us to identify the peculiarities of the Hungarian consumer market in terms plant-based nutrition by

a national representative questionnaire-based survey to be conducted in the near future. The practical applicability of the theoretical model (TPB) can be confirmed by that survey. A research study like that would, at the same time, fill a gap, since we believe no such surveys on a representative sample of the population have been conducted to date in Hungary.

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