

Comparative Analysis of Flexitarian, Vegetarian and Vegan Diets: A Review

Keywords: healthy diet, flexitarian, vegetarian, vegan, special nutrition, sustainable agriculture

1. Abstract

Background: Healthy eating is one of the main factors of maintaining health. Certain diets such as flexitarian, vegetarian and vegan can be associated with a healthy lifestyle. These diets have recently become more common.

Aim: This review aims to summarize the characteristics of a flexitarian, vegetarian, and vegan diet by comparing these specific nutritional trends through the processed literature.

Methods: Electronic searches were performed on the Google Scholar database, Medline, PubMed, and Science Direct. The manuscript summarizes publications on flexitarian, vegetarian, and vegan diets. Furthermore, it examines the relationships between different nutritional trends as well.

Result: The summarized vegan (100% plant-based diet), vegetarian (plant-rich diet), and flexitarian (plant-based with high-quality meat consumption diet) have become the focus of results through this literature.

Conclusion: Flexitarian, vegetarian and vegan diets contribute to a healthy lifestyle and sustainable agriculture by following nutritional recommendations. The common basis of diets is to appreciate natural values and maintain health.

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2. Introduction

Healthy eating contributes greatly to a healthy lifestyle and disease prevention [1, 2, 3]. Several recommendations for healthy eating have now been described by nutritionists. Of these, the latest recommendation is the Healthy Eating Plate (**Figure 1**).

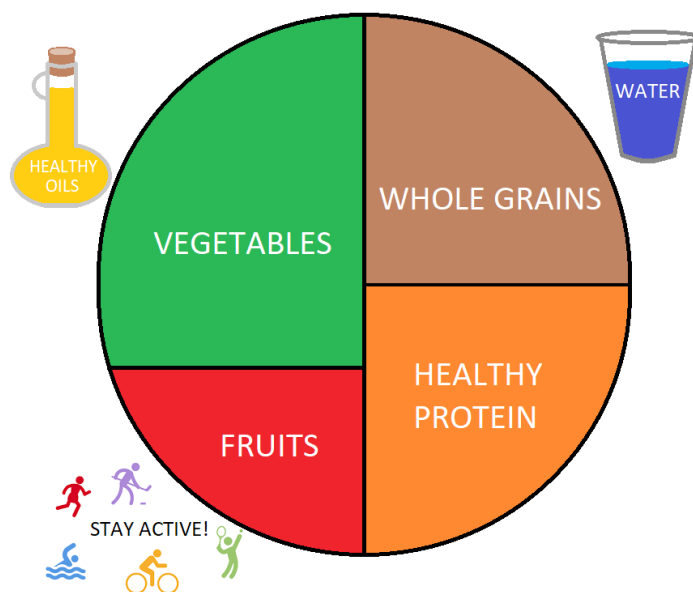


Figure 1. Healthy Eating Plate for a balanced meal (Modified scheme) [4]

Most of the Healthy Eating Plate (1/2 of the plate) is filled with vegetables and fruits in varied and colourful forms. Potatoes don't count as vegetables on the Healthy Eating Plate because of their negative effect on blood sugar in the human body [4].

Whole grains also have a big role in healthy eating (1/4 of the plate). The whole and intact grains like whole wheat, barley, wheat berries, quinoa, oats and brown rice have a significant effect on health balance (for example, blood sugar and insulin balance) [4].

The protein sources (1/4 of the plate: fish, poultry, beans, nuts) are all healthy. Most protein sources can be mixed with salads in healthy eating plans. It is also recommended to limit the consumption of red meat or processed meats (bacon, sausage). In addition, consumption of healthy vegetable oil such as olive, canola, soybean, corn, sunflower and peanut in moderation is recommended. Furthermore, drinking water is better than other alternatives such as sugary drinks or juices [4].

However, the main message of the Healthy Eating Plate (Smart Plate) is to focus highly on diet quality, for example, the types of carbohydrates or healthy oil people use [4].

In addition to the principles of healthy eating, several specific nutritional trends have been the focus, of which flexitarian [5], vegetarian [6] and vegan [7] are the most significant. These widely known and followed nutritional trends, in a well-structured form, maximize human energy and nutrient needs. Furthermore, the flexitarian, vegetarian and vegan dietary trends and their guidelines are closely related to the importance of organic farming, environmental friendliness and sustainable agriculture [8, 9].

The purpose of the manuscript is to present the characteristics of flexitarian, vegetarian, and vegan eating trends. Furthermore, the manuscript considers it important to have a comparative analysis of the presented nutritional trends and the characteristics of a healthy diet.

3. Material and method

Electronic searches were conducted on Google Scholar database, Medline, PubMed and Science Direct. A further search was conducted on internet. The search items included flexitarian, vegetarian, vegan, healthy

nutrition, sustainable agriculture, organic farming. This review was conducted to demonstrate the importance of flexitarian, vegetarian, and vegan diets for healthy living and healthy eating.

4. Results

4.1. The flexitarian diet

The term flexitarian was first used in 1992 and has recently become an increasingly popular nutritional trend. The flexitarians ('flexible vegetarian') choose mainly plant-based food products. However, they also eat meat and other animal-based products. This diet doesn't subscribe to a rigid set of rules but pay attention to reduce quantity and frequency of meat consumption. The flexitarians don't limit the type of meat on their eating plan [10]. Furthermore, the vegan diet is very different from the flexitarian diet. The vegans eat only plant-based foods. The flexitarian diet, following the principle of a healthy diet, allows the necessary intake of all macro –and micronutrients (for example: complex protein or B₁₂) into the human body with the completeness of meat consumption and moderation (Figure 2).

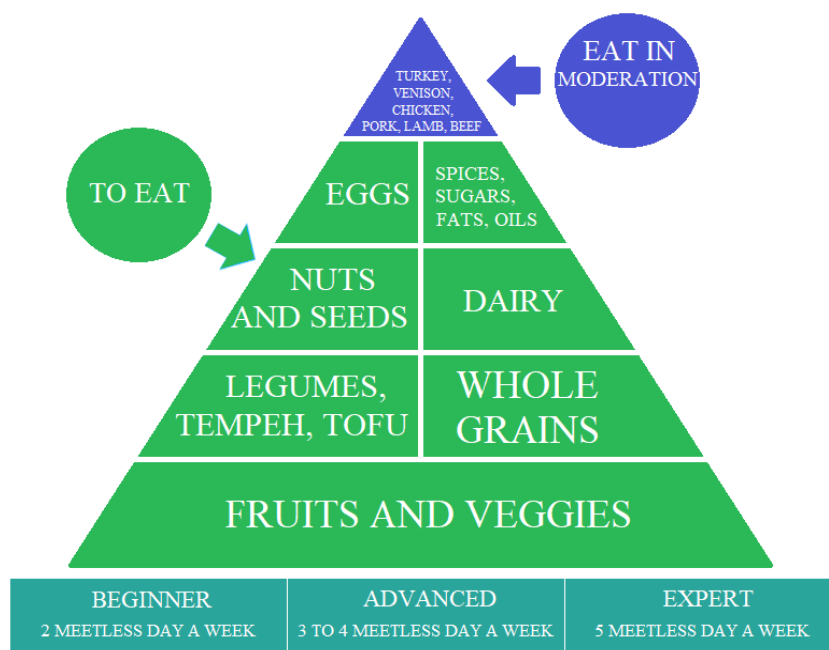


Figure 2: Flexitarian eating pyramid (Modified scheme) [11]

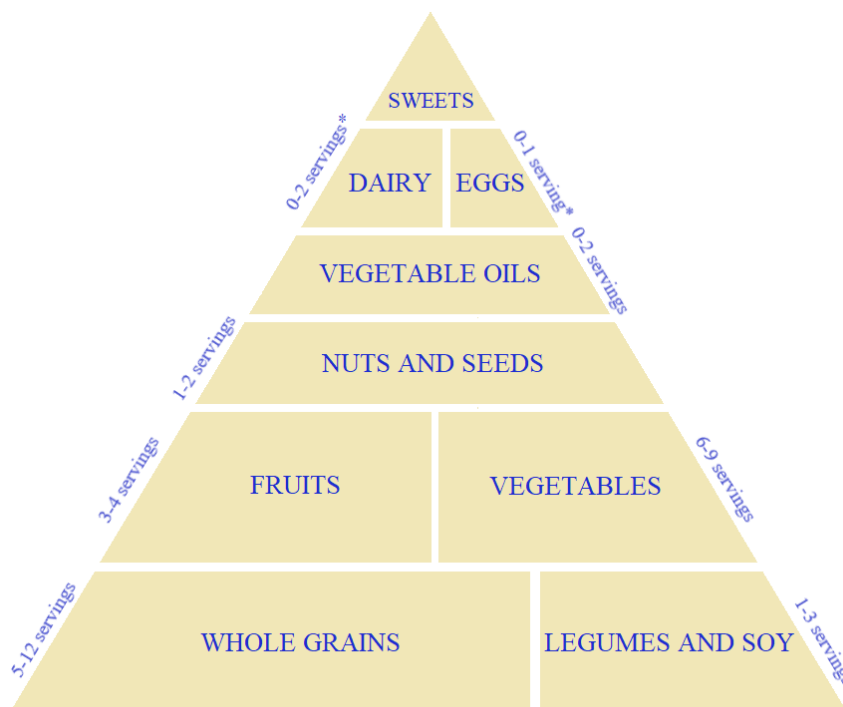
A number of studies have been conducted to explore the flexitarian diet, some of which are summarized in Table 1.

Table 1: Explore the flexitarian diet with different studies

	The topic of the publications	References
Flexitarian diet	Motivations and future intentions in flexitarian diet	[12]
	Finding flexitarians from consumers	[13]
	Health and environmental effect of flexitarian diet	[14]
	Flexitarian diet for health planet	[15]
	Cost, environmental and health effect of flexitarian and vegan diets	[16]
	Flexitarian, vegetarian and pescatarian diets	[17]
	Flexitarianism in Netherlands	[18]

4.2. The vegetarian diet

Vegetarianism is a plant-rich special diet. Generally, vegetarianism is understood as the exclusion of meat and meat-based products from an individual's diet. However, vegetarianism has different types such as ovo-vegetarian, lacto-vegetarian, and lacto-ovo-vegetarian diet, when people consume products of animal origin such as eggs, milk or dairy products (for example: cheese). In most cases, the choice of a vegetarian diet has positive effects on the human body such as better physical health. In contrast, vegetarianism also could have a negative effect on the quality of life (for example: iron or B₁₂ deficiency) because of the avoidance of meat or lack of animal product consumption. It is important to mention, different reasons can lead to the adaptation of a vegetarian diet such as ethical considerations, beneficial effects to human health of vegetarianism or environmental impact [6] (Figure 3).



* A reliable source of vitamin B12 should be included if no dairy or eggs are consumed.

Other lifestyle recommendations: daily exercise, water, sunlight

Figure 3: Vegetarian eating pyramid (Modified scheme) [19]

A number of studies have been conducted on the vegetarian diet, some of which are also summarized in **Table 2**. In some cases, these sources also include a comparison with the vegan diet.

Table 2: Explore the vegetarian diet with different studies

	The topic of the publications	References
Vegetarian diet	Vegetarian diet and diabetes	[20]
	Vegetarian diets and health	[21]
	Vegetarian diets in infants, children and adolescents	[22]
	Plant-based diet and weight	[23]
	Plant-based diet and brain health	[24]
	Vegetarianism and diabetes I type in children nutrition	[25]
	Correlation between vegetarianism and blood pressure	[26]
	Vegetarianism and cardiovascular disease	[27]
	Vegetarian children and adolescents in Germany	[28]
	Indian vegetarian diets	[29]

4.3. The vegan diet

Veganism prohibits the consumption of animal products. The vegan diet is becoming more visible in social media thanks to new information, experiences and open discussions regarding this topic. It has several useful health benefits such as reduced risk of cardiovascular diseases, type II diabetes and cancer. Furthermore, veganism is a product of strong ethical beliefs in individual lifestyles. Poorly 100 % plant-based diet can predispose individuals to macronutrient such as protein, and micronutrient including vitamin B₁₂, vitamin D, iron, zinc, calcium and iodine deficiencies. These macro -and micronutrients are necessary to implement in diets. However, vegan diets have a potential effect in human health with antioxidants (polyphenols), micronutrients (vitamins C, E) and carbohydrate-rich food [30] (Figure 4).

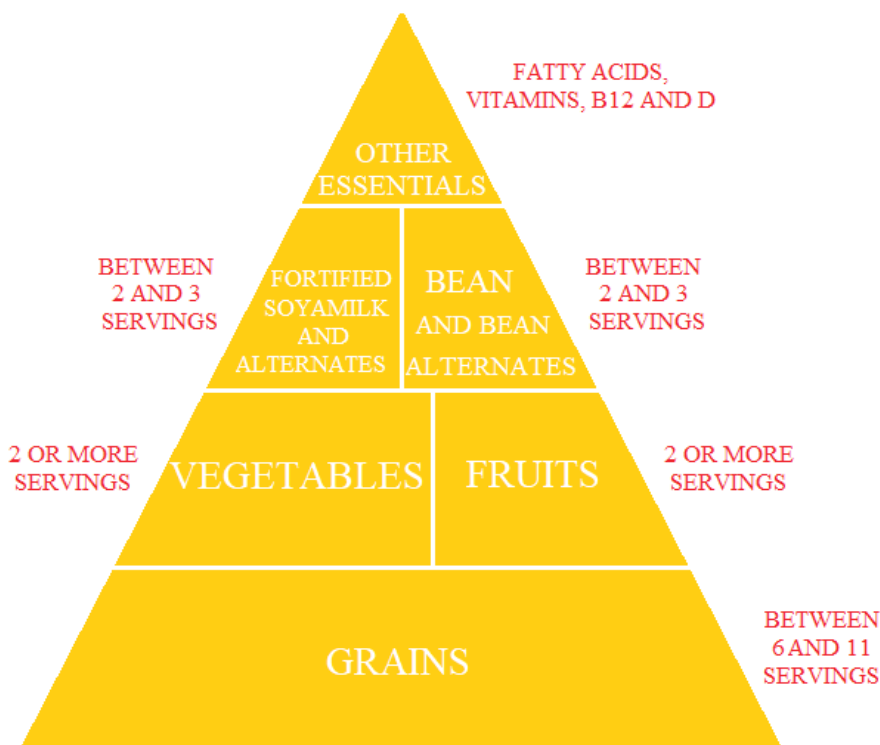


Figure 4: Vegan eating pyramid (Modified scheme) [31]

In the remainder of the manuscript, we collected some relevant manuscripts about the vegan diet **Table 3**.

Table 3: Explore the vegan diet with different studies

	The topic of the publications	References
Vegan diet	Analysis of vegan eating	[32]
	Information about vegan diet	[33]
	Gender differences between vegans/vegetarians	[34]
	Psychopathology of vegetarians and vegans	[35]
	Vegan men	[36]
	Veganism and paediatric food allergy	[37]
	Veganism and men's	[38]

The following is a comparison of plant-rich diet and 100% plant-based diet through the eating pyramid for vegan and vegetarian people (**Figure 5**).

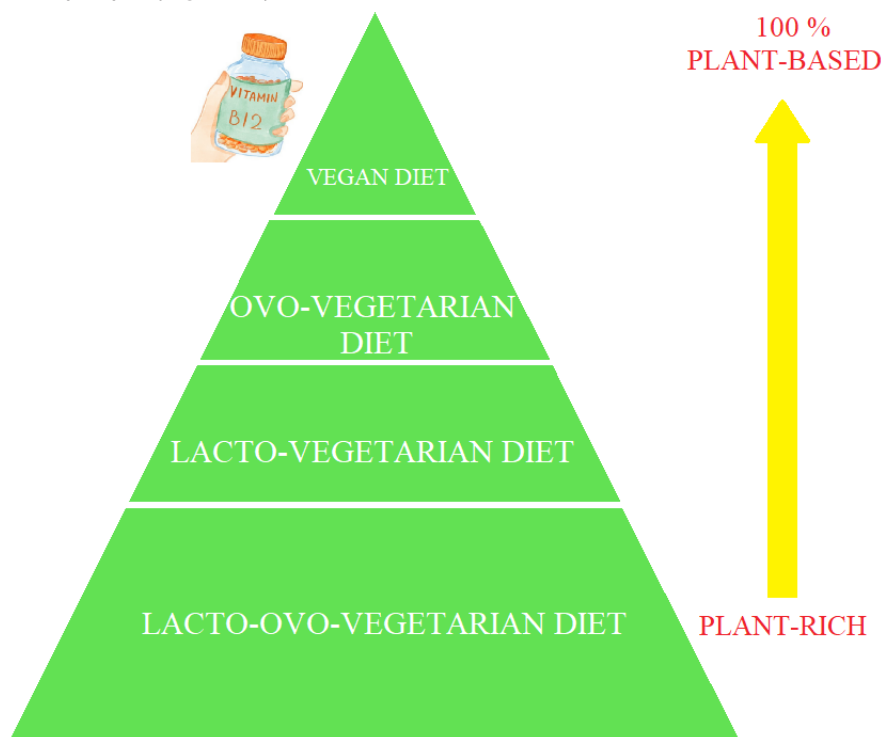


Figure 5: Plant-rich diet and 100% plant-based diet (Modified scheme) [39]

5. Conclusion

Among the diets compared, flexitarian provides the safest nutrient intake for the body through high-quality meat intake. Some types of vegetarian diet (e.g., ovo-lacto) also contribute to the full satisfaction of macro- and micronutrient requirements in the human body. Followers of a vegan (100% plant-based) diet may have protein, vitamin B₁₂ and iron deficiency in addition to many beneficial effects. In the case of a vegan diet, it is necessary to supplement these components. In addition, all three diets play a key role in modern, sustainable nutrition, sustainable agriculture and environmental protection.

6. References

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