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Products of Vegan probiotics – a present time challenge or the newest demand in the functional foods

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Abstract: Consumers of Vegan indicates the interesting economic point for the industry of food with the demand of products which provides benefits to the health like products of probiotics. This review demonstrated the products of Vegan probiotics via giving an outline of products of commercially and examine the products and also their associated in vitro / in vivo health promoting results and explain the effects of probiotics on the properties of technological as well as sensory in the cutoff of products. There are so many factors that have impact on the survival of probiotics, the main challenges and the niche of thus market are also presented. Products of vegan probiotics may upgrade the profile of lipid and the immune system, controlling the diabetes, also reduces the diseases of *Helicobacter pylori* and also have the properties of anti carcinogenic and refine the general well – being. Beverages which are made from the fermentation and non – fermentation . The duration of culture of probiotics are mainly based on the steps of processing matrix of food, strain of probiotics and the form of federation into the matrix, conditions of storage and also the components of probiotics. Probiotics have tendency to change the chemical composition, colour, acidity as well as acceptance of Vegan foods and also the beverages but products with survival of suitable probiotics, phytochemical Character technological properties as well as sensory acceptance will be secured. Therefore, the strain source will accommodate the Vegan status after all most of those not discover from the matrices of vegetable . However, strategies of short – term marketing should target not only on the Vegan public but also on those consumers who want to decrease the consumption of products of derivatives of animals, alongside searching the new non – animals derived strains.

Keywords: Probiotics, marketing, public, consumers, vegan products, derivatives of animals and so on.

Objectives

- Beverages which are made by the process of Fermentation and non-fermented are the main vegan probiotic carriers
- Survival of Probiotic in the vegan products mainly depends upon the processing as well as matrix of food
- Vegan probiotic products are able to improve the lipid metabolism and immune system
- Probiotics are responsible for alterting acidity, color, and acceptance of vegan foods
- The source of strain often compromise the vegan status in the probiotic foods

INTRODUCTION

One of the most common challenge that we face in the 21st century is the requirement to feed on the ever – upgrading population of human with upgrading the limited natural resources. It is approximately that one out of nine people in this world are undernourished mainly due to PEM (Torres-Tiji et al., 2020). These are the vast role which are usually responsible for balanced nutrition in the maintainence of health is the interest of scientific community and several researcher reveals that presentation of several foods are responsible for the risk of many diseases. Therefore, there was a growing in the study of new natural constituent and the evolution of new products, allowing revolution in the food zones and the formation of niches of new market, majorly compare with functional products (Pimentel et al., 2015). In certain studies, there was an upgrading in the vegetarianism and in consumers probing for products which have high nutritional and functional status. The illusion of products which are derived from animals (vegetarian and vegan) may flatter the upgrading trend in our modern lifestyle. However, some consumers order plant – based milk which have potential to alternate for the sustainability, health – related lifestyle and sometimes dietary reasons or via advanced concerns of social or politics. As a result of which there is an abundance of products, commonly based upon the nuts, seeds, beans and so on (Tangyu et. al., 2019; Ploll, Hetritz & Stern, 2020). As per Vegan Society (2020), there is an order of food which are without meat grew by 98 % in 2017 in the United Kingdom. In Brazil, about 30 million people do not consume meat that shows 14% of all country inhabitants. Even, 55 % of population of Brazil would love to consume

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more " Vagan products " , 49 % believe that these products having some quality of products of animals and also 60 % do not eat more vegan products because of their prices, which are considered higher than the animal – based ones (Ibope, 2018). Alongside, over the years, the worldwide market for the non – diary mill alternatives (or Analogues of Milk) can become a multi – billion dollar business and may compare to about 26 billion USD via 2023 (Tangyu et al., 2019).

Now – a – days, several studies demonstrated that the development of products which are very nutritionally balanced and also upgrading their value which have practical – use. Products of probiotics must have highlight because of their efficacy and also it proves healthiness and the workability of culture of the probiotics to the different matrices of food (Açik et al., 2020; Behera & Panda, 2020; Grom et al., 2020). The efficiency of probiotics is related with its viability in the products of food and certain factors which claimed to be required for declining it. However, certain studies are take up to improve and encourage matrices of food. The evolution of combinations of symbiotic is the different approach to trigger the probiotics growth (Sengupta et al., 2019).

The evolution of sustainable food leads to broad welfare for the planet and a plant – based diet indicated the opportunity to complement traditional agriculture, developing the more – efficient way to follow the world's food supply (Torres-Tiji et al., 2020; Ploll, Hetritz & Stern, 2020). In this paper, we demonstrate the Vegan probiotics products via giving outline of commercial and studied products and also their similar in vitro / in vivo effects which promotes the good health and also demonstrates the effect of probiotics on the properties of technological and sensory in a rank of products. Moreover, there are many factors which effect on the survival of probiotics, the main objective and the trends of the market are zones conferred. The conferred knowledge will help the researchers and the industries to associate with consumers to upgrade the eating of vegan food products. Moreover, this is the way to promote the discussion about the market for the Vegan probiotics which are based on the restrictions which are imposed via the source of strain and regulatory labels on such products.

2. VEGANISM AND MARKET TRENDS FOOD OPTIONS CAN BE A METHOD FOR PEOPLE TO REVEAL THEIR SUITABILITY AND IDENTIFICATION, PARTICULARLY FOR THOSE THAT DETERMINE THEMSELVES AS A VEGETARIAN.

Vegan people, in a basic see, are those that don't consume items from pet beginning. Veganism is one of the most severe kinds of veganism and is an expanding pattern in contemporary life. The veganism idea banishes any pet item or their by-products from the diet plan. (Ploll, Hetritz & Stern, 2020)

Therefore, the animal-based product is not consumed by vegans (e.g., meat, eggs etc.) and does not take animal-based products. (e.g., leather). There are also lacto-vegetarians (vegetarians who eat dairy products), egg-vegetarians (vegetarians who eat eggs), and became restrictive consumers. (Nezlek & Forestel, 2020).

People can accept this vegan life can be because of moral and ethical issues, for some individuals this vegan life can be stretched to other life of areas like spiritual characteristics, environmental and ethics. (Carfi, Donato & Schiliro, 2018; Bryant, 2019).

The change of consumer's choices is a dynamic procedure and customers have ended up being more health mindful and worried regarding the advantageous worth of food and the sustainability of the food chain; therefore, owning producers to highlight the promotion of useful foods. For that reason, the essential for effective advertising and approval of unique foods depends upon the food's high quality and the idea of included worth based upon the food performances. (Bryant, 2019)

The success of vegan life is taken up by environmental benefits from outside the animal defense movement sources. Vegan life also increases by universally recognized institutions who are increasing moments about animal welfare and increase coverage mainstream. And the result of consuming animal products has become an environmental concern in the public sphere. (Niederle, 2018; Ploll, Hetritz, & Stern, 2020).

As a result, understanding the ecological repercussions of animals manufacturing and associated locations draws in higher exposure to vegan items that have become an essential reaction to the ecological crisis.

Vegetarian consumption targets on the food industry and big companies devoted more promotion to vegan and organic products. (Bryant, 2019).

Particularly, it is essential for customers to accessibility the traceability of vegan items, therefore they can confirm the absence of any type of connection with animal manufacturing. Services to motivate customers to select vegan food might live in 6 interactions guided to various other sections and consist of info regarding the nation of beginning, which shows up as an incentive for selecting a food. While the variety of people declaring to be vegan or vegetarian continues to enhance, the legal structure is in some cases uncertain and enables deceptive info to show up on tags, complex consumers (Alves & Varella, 2016).

Together with nationwide vegan and vegetarian organizations, Safe Food Advocacy Europe was advocating for a remove meaning of what vegan and vegetarian food are, in addition to a require the development of European vegan and vegan logo designs. In the UK there's no authority's legislation controlling the identifying of vegan foods. Nevertheless, the Food Standards Company, which is a federal government company, provides the main direction for businesses and companies that wish to tag food as vegan or vegan. The direct provides the meanings of the various diet plans, the

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appropriate permissions in situations of mistake of info on the tag, and corresponding and comparable regulations. (SAFE, 2019).

SAFE advised the European Compensation to act upon the basis of Article 36.3 of the Policy (EU) 1169/2011 Food Info to Customers, which plainly specifies that: "Compensation will embrace executing acts on the application of the demands for food info offered on a volunteer basis to the info relates to the suitability of a food for vegetarians or vegans". The function of this activity was to offer a listing of the essential demands that vegans and vegetarians anticipate being connected with food that appropriates for them. Simply put, what are the important qualities that make an item appropriate to be labeled for vegans and/or for vegetarians. The European vegan describes food suitable for a vegan individual are those which are not founds as products of animal origin. Moreover, that has not been added as ingredients (carriers, flavoring, and enzymes) or substances that are not using as food additives and are used in some way and with processing aids that are of animal origin. (SAFE, 2019).

Brazilian Vegetarian Society (SVB) offers vegan stamp this type of labelling is used to meet the demand. Therefore, to fulfil the demand in a satisfactory way respecting the rights and principles of the Brazilian Consumer Protection Code.

For that reason, it can be observed from the legal structure evaluated that the classification of the vegan item still doesn't have an official interpretation or policies for processing and labelling. As a result, vegan customers are unable to distinguish truly vegan probiotic items and those which contain components of pet resource or beginning. (Alves & Varella, 2016).

This triggers unpredictability in the market and customers, with an ensuing unfavourable effect on the advancement of vegan probiotic items and the free motion of products. The main policy would certainly profit the market, as they might interact in their items the lack of components of pet beginning, targeting at accomplishing the target public. 8 At the exact same time, the danger of deception by customers might be diminished. Besides the legal structure, various other efforts might enhance the info evaluation regarding the probiotic items by vegan customers, like using applications, such as Code Check, where customers might inspect the vegan high-top qualities of the items. Additionally, info regarding the items (table of components, producer, and clear tag info) might be consisted of in social networks. (Leialohilani & Boer, 2020).

In view of the scarcity of studies that characterize the growing diversity of the products that serve the vegan market, the information summarized in this review may assist in the development of strategies for functional vegan products. The information generated can be useful for vegan food traders (Lawo et al., 2020).

3. CHARACTERISTICS AND CONSTRAINTS OF VEGETARIAN PROBIOTICS PRODUCTS

The growing search for healthy diet has helped the growth of new foods with functional properties, particularly bio - active compounds sources and probiotics (Marrero et al., 2019). Probiotics are micro - organisms that benefit the host when consumed in adequate quantities (Hill et al., 2014). These microorganisms are related to gastrointestinal health (Floch, 2018) and immune systems (Kristensen et al., 2016) and also to diabetes (Razmpoosh et al., 2019), obesity (Ejtahed et al., 2019), hypercholesterolemia (Sangwan & Singh, 2018), cancer (Dasari et al., 2017) etc. The global probiotic market has attracted the attention of the food industry to produce new products like probiotics as well as researchers to study the unique characteristics of probiotics and their effects on human health (Behera & Panda, 2020; Tangyu et al., 2019). Fermented foods can be added to or supplemented by the process of fermentation (Aspri, Papademas & Tsaltas, 2020; Behera & Panda, 2020; Tangyu et al., 2019). For decades, the probiotics market has been focused on dairy products (dairy and other fermented products), although increasing the intolerance of veganism and lactose and/or high - cholesterol individuals demanded changes in the scenario (Nguyen et al., 2019). Thus, vegetable matrices as potential probiotic vehicles have been suggested (Kandylis et al., 2016; Panghal et al., 2017). Consumers are looking for products that sell major strategies of the milk and food industry such as almonds, coconut, gram, oats, rice and soybean based water soluble extracts (Rincon, Botelho & Alencar, 2020). The plantation material is mainly studied in fermented foods as the fermentation process attaches greater importance to probiotic culture (Min et al., 2018). Certain studies represent the main vegan probiotic products of cereals, sorghum, oats, millets, millet, sorghum, sorghum, rice, quinoa and cereals (Salmerón et al., 2015). In addition, tea and fruit juices or fermented drinks are matrices of bioactive compounds such as vitamins, minerals and polyphenols (Amorim, Piccoli & Duarte, 2018; Pereira & Rodrigues, 2018), that offer interesting matrices for adding probiotics. However, there is always a need to assess the existence of probiotic culture and its impact on product quality features. Over the years it was believed that the presence of phenolic compounds in other plant matrix prevents probiotics, although studies have shown that the prebiotic effect of phenolic acid, flavonoid and betadine promotes the growth of probiotic bacteria (Luciano et al., 2018; Morais et al., 2019). As a whole, the fruits can enhance bio accessibility and enhance functionality of external compounds by the metabolism of probiotics (Morais et al., 2019). A class of lactic acid bacteria (LABS) species is commonly identified as a safe (NRS) and include the most commonly used probiotic species of supplement or food matrices (Hill et al., 2014; WGO, 2017). Together with *Bifidobacterium genus (B. animalis, B. longum, B. lactis, B. bifidum, B. infantis, B. breve), species of Lactobacillus (L. acidophillus), Lacticaseibacillus (L. casei, L. rhamnosus), Lactiplantibacillus (L. plantarum), Ligilactobacillus (L. salivarius), and Limosilactobacillus (L. fermentum, L. reuteri)* are most commonly used as probiotics. In addition, ye*ast*

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Saccharomyces cervisae and some *Streptococcus* species are also used as probiotics and *Bacillus* species are found to be included in non-dairy foods (Alves et al., 2016; WGO, 2017). *Lacticaseibacillus, Lactiplantibacillus, Ligilactobacillus and Limosilactobacillus* genus, which was earlier classified as *Lactobacillus*, was reclassified in excess of the large genomic diversity and continuous growth of new species in more than 260 species related to the genus *Lactobacillus*. Their reclassification was based on phenotypic, genotypic, and ecological features (Salvetti et al. 2018; Zheng et al. 2020). This study summarises the main thread that has been included in laophilized strain, supplement, or non - dairy foods. In order to ensure the beneficial effects on the host, at least the living probiotic cells must come into the intestine. The bacterial minimum concentration suggests 8 log cfu/g. M come or min lee About 8 people at the time of consumption of food (WGO, 2017). Despite difference between the daily amount recommended by us or European agencies to introduce health claims, proposal Daily intake of the number around 9 log ufc probiotic/g. or ml. is effective (Grom et al., 2020; Ranadheera et al., 2019). However, the quantity required for specific health effects may be reduced and the strain is specific (Hill et al., 2014; WGO, 2017). Probiotics need evidence of their safety and effectiveness for their use in foods. Evidence of safety should be taken through scientific studies showing a history of safe use, absence of adverse events, absence of a viral disease-causing agent, absence of such substances or metabolites, at least two cause the risk of antibiotics (Brasil, 2018). Although there is evidence to corrode the beneficial relationship with living microorganisms, particularly fermented (fermented) food and some of the diseases, it is not possible to clearly distinguish the contribution of microorganisms to the food matrix. Also, potentially beneficial microorganisms can represent a diverse community that is not well defined as the structure and stability of stress. As a result, it is reported that fermented foods can only be considered probiotics when they meet the recommended criteria and suggest that foods should be "living and energized" but not as probiotics. However, these products may represent promising sources of new strains with probiotic potential. Many products resemble the "probiotic" label without adequate viable calculations at the end of shelf life and proof of health benefits (Hill et al., 2014). Using the probiotics of the vegan population is the origin of this kind in controversial subjects: 1) since most commercially available strains were kept away from animals or production products. "Vegetarian nature" of probiotic materials, once many probiotic breeds are processed on animal or dairy material. Supplements may include animal materials such as artificial bind or filler. Hence, there is a need to check the contents list of both active and passive in various products to prove whether they are really vegan products. The most appealing option is to take vegan foods as a source of probiotics, such as soy/almond/coconut based fermented foods and kier, and vegetarian friendly fermented vegetables like saorkraut, kimchi, pickling, grapefruit, and fermented rice (Açik et al., 2020). In addition to fruits and vegetables, presently, a vegetarian source of probiotics having the most research potential is rice and soy extract (Lopes et al., 2020; Manzoni et al., 2017).

4. HEALTH EFFECTS OF VEGETARIAN PRODUCTS INCLUDED PROBIOTICS

Certain studies indicate that evaluated the in vitro/in vivo physiological effects of eating of various vegetarian products including probiotics. Many researchers shows that tomato and feijoa juices which are fermented with *Lactiplantibacillus plantarum LP DSM20205* (former Lactobacillus plantarum LP DSM20205) should have an crucial effect on the barrier integrity as well as adherence, being the effect more pronounced for the fermented tomato juice. Tomato juice also indicated the highest survival rate of probiotic after in vitro digestion comparatively feijoa juice (77.8 and 61.9% respectively). Eventually, both juices must not cytotoxic to Caco-2 cells (Valero-Cases et al., 2017). In this study , we demonstrated that the different kinds matrix of food which have impact on the potential health effects of the probiotics. Cultures of Probiotic which are obtained from the vegetarian products may also have in vitro health effects. *Pediococcus pentosaceus SC28* and *Levilactobacillus brevis KU15151* (former *Lactobacillus brevis KU15151*) which are obtained from the traditional Korean food (octopus jeotgal and radish kimchi) represented adhesion rates of 4.45% and 6.30%, respectively to HT-29 cells, that is a human colon adenocarcinoma cell (Yan et al., 2020). LAB obtained from the process of fermentaction of cocoa juice and their metabolites reveals antagonistic activity against *Helicobacter pylori*, that is related to gastric ulcers. The cell free supernatants of one of the evaluated LAB have responsible for inhibited the growth via releasing bacteriocin and the other isolates acted via releasing different compounds, such as organic acids (Mabeku et al., 2020). However, the isolated cultures of probiotic must have beneficial effect on *Helicobacter pylori*-associated diseases and properties of aanticarcinogenic. Products of Vegetarian probiotics must have in vitro hypocolesterolemic as well as effects of anticarconigenic . The addition of *Lacticaseibacillus rhamnosus* GG (former *Lactobacillus rhamnosus GG*) and *Lactiplantibacillus plantarum-1* (former *Lactobacillus plantarum-1)* in blueberry pomace water resulted in potential benefits in decreasing cholesterol in an in vitro system. The results were associated both to the probiotic features of the drink and to the presence of anthocyanins that reduce cholesterol Via binding of hydrophobically, upgrading cholesterol excretion (Yan et al., 2019). Date juice fermented by *Lactobacillus acidophilus* and *Lactilactobacillus sakei* (former *Lactobacillus sakei*) indicated the activity of anti-proliferative against the cells of Caco-2 and Hep-2 (types of human cancer cell lines), showing that it can be preferable as natural and therapeutic agent of safe laryngeal cancer (Mostafa et al., 2020).Despite many in vitro research gives knowledge about potential health effects of products of vegetarian probiotic , in vivo research are required to improve their effectiveness. From the in vitro and in vivo Research, it was possible to note that the vegetarian products which are consisting the probiotics may

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have many health benefits, like improve the lipid profile, improve the immune system, help in the management of diabetes, reduce the risk of diseases which are caused by *Helicobacter pylori*-, properties of anticarcinogenic, and also need with general well-being. All of these benefits may be advantageous to the vegan public as their dietary characteristics which have potential to generating the greater attention and care for their nutritional status and also health. Moreover, although the possible restriction for vegan status in the products added which are added with the classical strains due to their animal (or derived products) origin, the current information showing the health-promoting effects of vegan matrices showing their potential regardless strain source and arouse the urgent need for research in this area.

CONCLUSION

Thus was the first Research to demonstrate the role of products of Vegan probiotics and describe that they can improve the profile of lipid and immune system, controls the diabetes, decline the rate of diseases which are generally caused by *Helicobacter pylori* and well-being. Their evolution must be considering the strain source but also the effect of the steps of processing, matrices of food, form of probiotics addition, effects of specificity of strain, storage conditions and also incorporation of components of probiotics. Thus, the products with good quality must be taken. Such types of research performed (with animals) and the most probiotics sources of strains (like animals or derived products) impose the desperate restriction on short – term industrial evolution of Vegan products which are fictionalized via probiotics. However, vegan probiotics reveals the newest industrial opposition to cover an upgrading and also ensuring markets niche which plainly order strict conditions for their products. The strategies of marketing must be target on such consumers who want to decline the consumption of animal- derived products to rise the benefits of the industry of food and the regulatory aspects require improvements to prevent the possibility of Vegan consumers but also to be practice as well as significant for the industries . Eventually, matrices must be studied to upgrade the number of Vegan probiotics products.

Abbreviations

PEM : Protein Energy Malnutrition

LAB : Lactic Acid Bacillus

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