

New Concepts in Nutraceuticals as Alternative for Better Health

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Received: 19.12.2021 | Revised: 24.02.2022 | Accepted: 10.03.2022

ABSTRACT

Nutraceuticals are foods that have been fortified or enriched to provide all of the vital elements needed to sustain good health. Numerous researches have revealed that nutraceuticals may have a link to diet and health. This article provides a brief overview of nutraceutical classifications derived from various sources, reasons for the revolution in nutraceuticals, commercially available nutraceuticals, edible vaccines developed from nutraceuticals, role of research and development agency in nutraceuticals, government agencies that took eye on the nutraceutical's companies, limitations of nutraceuticals. The aim of the review article is to aware people, students about nutraceuticals, so that more and more research work should be done to provide benefits for the society.

Keywords: Phytochemicals, Herbals, Probiotic, Glycoprotein

INTRODUCTION

Stephen L. De Felice invented the phrase 'nutraceutical' in 1989, combining the words 'nutrition' and 'pharmaceutical.' A Nutraceutical is any substance that is a food or a part of food that delivers medicinal or health advantages, including the prevention and/or treatment of disease, according to Stephen defelice (Verma & Mishra, 2017). According to Merriam-Webster, a health-promoting food (such as a fortified food or a dietary supplement). Natural derived bioactive chemicals that are present in foods, dietary supplements, and

herbal items that have health promoting, illness preventive, or therapeutic characteristics, according to the Nutraceuticals Institute (Andrew & Izzo).

REVOLUTION IN NUTRACEUTICALS

The nutraceuticals revolution began in the early 1980s, when clinical studies published in prestigious medical journals confirmed the actual or potential clinical benefits of calcium, fibre, and fish oil, and physicians began to educate their colleagues and consumers about these substances through the media.

Cite this article: Parihar, S., Sharma, D., & Dhingra, G. (2022). New Concepts in Nutraceuticals as Alternative for Better Health, *Emrg. Trnd. Nutr.* 1(1), 18-23. doi: <http://dx.doi.org/10.18782/2583-4606.103>

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Factors that Influence Revolution

- Physicians - Increased physician acceptance of nutritional supplements' medicinal advantages boosted nutraceutical demand.
- Media- The media has arisen as a main source of medical claims, and it has now evolved into a powerful and genuine nutraceutical product promotion agency (Ghani et al., 2019).

1.3 CLASSIFICATIONS OF NUTRACEUTICALS

1. TRADITIONAL NUTRACEUTICALS OR NATURAL NUTRACEUTICALS

- i. Chemical constituents
 - a. Nutrients

- b. Herbals
- c. Phytochemicals
- ii. Probiotic micro-organisms
- iii. Nutraceutical enzymes
2. NON-TRADITIONAL NUTRACEUTICALS OR ARTIFICIAL NUTRACEUTICALS
 - i. Fortified nutraceutical
 - ii. Recombinant nutraceutical (Dudeja & Gupta, 2017)

1.4 COMMERCIALY AVAILABLE NUTRACEUTICALS (Gupta et al., 2015; S.

Dharti et al., 2010; Chaturvedi et al., 2011; Pandya et al., 2010; Sarin et al., 2012; & Keservani et al., 2010).

S.NO.	MARKETED PRODUCT NAME	CONSTITUENTS PRESENT	BENEFIT	NAME OF COMPANY / MANUFACTURER
1	Avoid (glucosamine)	Beta-Sitosterol, Campesterol, Sigmasterol (avocado and soy)	Maintain healthy joints and cholesterol levels	Cyvexnutririion, USA
2	Abcor		Maintain cholesterol levels	Nutri Pharma
3	Beta factor capsules	Beta-glucan (dietary fibres)	Increase immunity	American International, Inc., USA
4	Bene flora probiotic	Lactobacillus acidophilus, Bifidobacterium bifidum	Enhance immunity and GIT health	Nupro, USA
5	B-Proteins	Vitamins, minerals, casein, soy, proteins, whey	Formation of haemoglobin, nutritional supplement	British biologicals
6	Cod liver oil	Vitamins and minerals, omega 3fatty acids, vitamin-A and D	Increase immunity	Sanofi
7	Calcium plus milk	Carbohydrates, vitamin-D, calcium	Use in osteoporosis	Shamrock farms
8	Cognisant	Proline-rich polypeptide complex (colostrum), fructose, sorbitol	Use in Alzheimer's diseases	Metagenics Inc.
9	Collagen enhance chews	Anti-oxidants, hyaluronic acid	Age- defying properties	Res Vitale
10	EFAGold super lignan capsules	Vitamin D, lignan	Menopausal transition, use in cardiovascular-related health	Nature's Way, USA
11	Ferrol food powder	Carbohydrate, niacinamide, calcium, proteins, iron, zinc, vitamins	Nutritional supplement for adults and children	Pfizer Limited, India
12	Frooti	Antioxidant, sugar, water, mango pulp	Refreshing drink	ParleAgroPvt. Ltd.
13	Glucose -D	Glucose	Energy booster	Heinz
14	Glucose -D	Dextrose monohydrate, calcium phosphate, vitamin D	Energy booster	Dabur
15	GRD	Carbohydrates, vitamin, proteins	Increase growth and repair of tissues	Zydus
16	Muscles optimal	Proteins, vitamins, dietary fibres, xylitol, trace elements	Meal replacement drink	Jarrow formulas, USA
17	Omega women	Vitamins, lycopene, resveratrol, antioxidants	Immune supplement	Wassen, U.K
18	POMx Antioxidant recovery drink	Polyphenols	Speed up muscles recovery	POM Wonderful Ltd, USA
19	PediaSure	Proteins, vitamins, natural supplements	Natural supplement	Abbott Nutrition
20	Proteins	Pre-digested proteins, vitamins, minerals, carbohydrates	Protein supplement	Pfizer Ltd., India
21	Proplus	Mushroom, polysaccharide, folic acid	Enhance immunity	Native remedies
22	Rox	Taurine, caffeine, glucuronolactone	Energy booster	Rox America, Spartanburg
23	Revital	Ginseng, vitamin, minerals	Enhance immunity and energy booster	Ranbaxy
24	Tropicana	Vitamin-B, thiamine, folate	Good source of heart related health and nutrients rich drink	Tropicana product, Inc.
25	Threptin diskettes	Protein, vitamin B	Protein-rich diet	Raptakos, Bret & Co. Ltd
26	Snapple-a-day	Vitamins and minerals	Meal replacement drink	Snapple beverages group, USA
27	Source natural lycopene 10 mg softgel	Lycopene, carotenoids	Antioxidant	Source naturals
28	Vectomega	Omega3 fatty acid	Enhance the absorption of omega-3	Europharma
29	Weight smart	Vitamins, trace elements	Nutritional supplement	Bayer Corporation, USA

1.5 EDIBLE VACCINES

The concept of delivering recombinant vaccines and medicines in edible plant material as 'edible vaccinations' arose from the prospect of rapidly generating medically significant recombinant proteins in plants. There have been a few human clinical trials employing antigen

administration via the mouth. There were no serious safety issues in any of the cases, and the formulations were well tolerated by participants. The LT-B antigen of enterotoxigenic E. coli strains was supplied in transgenic potato for the first human trials (Tacket et al., 1998). Serological and mucosal reactions were

found after eating transgenic potatoes: 91 percent of volunteers developed anti-LT-B specific secretory IgA antibody (IgA) in stool samples. Similar effects were obtained in a later investigation in which volunteers were fed the same antigen in corn (Tacket et al., 2004). The authors point out that maize has a number of advantages over potato when it comes to delivering edible vaccines, including the availability of raw maize preparations or processes choices that require minimal heat or pressure treatments and do not denature antigens (Drake et al., 2017).

In an experiment in which volunteers were fed lettuce expressing hepatitis B surface, antigen-specific blood antibody responses were also identified (Kapuset et al., 1999). After three doses of the same antigen in potato, antigen-specific blood antibody responses increased up to 56-fold in volunteers who had previously received a traditional hepatitis B vaccine (Thanavala et al., 2005).

Rabies glycoprotein and nucleoprotein antigen peptides have been tested in humans (Yusibov et al., 2002). These antigens were fused to the coat protein of the alfalfa mosaic virus (AIMV), and the chimaera was expressed in spinach with the help of a tobacco mosaic virus. When fed spinach infected with the recombinant virus, three out of nine volunteers who had not previously been vaccinated showed measurable levels of rabies virus-neutralizing antibodies. Some plant like Bermuda grass uses as probiotic use and chawanprash of apamarg and goolar plant, these plants provide nutraceuticals useful for betterment of health. The prosopis cineraria vegetable recipe is eaten. (Parihar & Sharma et al., 2021).

1.6 DEVELOPMENT AND RESEARCH

The most pressing scientific requirement in nutraceuticals is the standardization of chemicals and products, as well as the meticulous development and execution of clinical studies/trials to support health claims for nutraceuticals that affect

consumers and companies making strategic investments. Rapid breakthroughs in scientific knowledge supporting the critical role of nutrition in health and illness prevention are increasing interest in nutraceuticals.

R & D's Function in Nutraceuticals

- A. To ensure that products are safe, pure and effective.
- B. To find more effective and efficient ways to make ingredients for usage in products.
- C. To create testing techniques for establishing and validating the dosage uniformity of constituents in the company's goods.
- D. Create new product existing substances used in nutritional supplements. Identifying new components or taking supplements. Its possible to use it in dietary supplements (Pandya et al., 2010).

1.7 DELIVERY OF NUTRACEUTICALS HAS ITS OWN SET OF PROBLEMS AND LIMITATIONS.

The nutraceutical composition are consumed as food rather than medicine. As a result, unlike pharmaceutical preparations, nutraceuticals must meet a slew of additional requirements. The components utilized in the production of nutraceuticals, which include nutritional supplements, functional foods, and other products, and other products, must be of food grade. This limits the options available to researchers and reduces the scope of nutraceuticals materials include herbal extracts, proteins, peptides, vitamins, and hormones, all of which decay quickly. The formulation's stability is a factor that cannot be overcooked. Furthermore, the active ingredient should only be released in response to external stimuli such as pressure, pH, or temperature. As a result, a suitable delivery method must be chosen based on its ability to properly deliver the food product and exert the intended effect. Following the production of the formation, the items must be chosen based on its ability to properly deliver the food product and exert the intended effect. Following

the production of the formulation, the items must be tested again. The *in vitro* studies used for this purpose allow us to learn more about the pharmacokinetic process, as well as the pace and extent of the core active ingredient's release. These assays, however, have limitations in that they cannot provide information on the active absorption of the product, metabolic reactions, or biological variability of the nutraceutical product. As a result, extensive testing is essential to determine the impact of elements such as diet on the product's response (Dev et al., 2011). Nutraceuticals is a topic that is not well known among the general public, and it still requires public awareness. The lack of market recognition, along with a lack of marketing and distribution, results in a shortage in food research investments, posing a significant obstacle to the expansion of India's nutraceutical industry. Because of this lack of knowledge about nutraceutical, several companies' manufacturing producers pay little attention to product extraction, shelf-life augmentation, storage of crude and prepared material, following ingredient quality standards, and containing prevention (Sharma et al., 2017).

GOVERNING NUTRACEUTICAL REGULATION

Because nutraceuticals are not a distinct category of foods and the name has no regulatory meaning, the FDA regulates them in the same way as all other foods. The National Academy of Sciences, Institute of Medicine, and National Research Council organised a Blue-Ribbon Committee in 2005 to provide a framework for the Federal Food and Drug Administration to examine dietary supplements without separating nutraceuticals as separate commodities. The DSHEA, 1994, is the fundamental set of guidelines that govern the human nutraceutical market. This statute prohibits FDA from classifying a new product as a "drug" or "food additive" if it meets the

criteria of a "dietary supplement," which covers any feasible dietary component, as well as concentrations, constituents, extracts, or metabolites of these components. The DSHEA regulations do not apply to animal nutraceuticals. In a nutshell, the federal government has cited differences in substance metabolism between humans and animals, as well as potential safety concerns with nutraceuticals used in food-producing animals, as reasons to exempt animals from the DSHEA's restrictions. Clause 22 of the Food Safety and Standards Act (FSSA) of 2006 defines nutraceuticals in India. However, many issues remain unanswered on the regulatory front. Labelling standards and health claims are one of these difficulties. Due to a lack of regulatory framework, low-quality businesses join the market, lowering product quality (Ali et al., 2021).

CONCLUSIONS

Nutraceuticals are bioactive compounds that have important health benefits in addition to basic nutrition. These are primarily extracted from nutrients, genetically modified foods or processed food. Furthermore, they are less expensive to produce and deliver. Nutraceuticals are not only attracting the food companies, but also pharmaceutical and biotechnology industries. Furthermore, research into the safety and efficacy of nutraceuticals is required. However, the pharmaceutical industry as a whole must win a major war by focusing on nutrition as a key component for illness prevention and treatment by both consumers and health professionals in order to live longer and better lives.

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[https://doi.org/10.1016/s0264-410x\(02\)00260-8](https://doi.org/10.1016/s0264-410x(02)00260-8)