

# An Introduction on Nutraceuticals and Dietary Supplements

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## Abstract

As we know that "Health is Wealth". Our responsibility is being healthy by having adequate amount of nutrients or complete food which meet all the requirements of our body. Nutraceuticals and Dietary supplements are products derived from natural sources which provide health benefits that have become widely available over the last two decades. The impressive growth trends observed in the nutraceuticals and supplements market is unlikely to continue and it is expected that the market growth will normalize in the near future.

**Keywords:** Nutraceuticals • Dietary supplements • FSSAI

**Abbreviation:** DSHEA: Dietary Supplements Health and Education Act; WHO: World Health Organization; D&C Rules, 1945: Drug and Cosmetic Rules 1945; FSSAI: Food Safety and Standards Authority of India

## Introduction

### Definitions

#### Diet:

1. Diet refers to the foods we consume on a regular basis.
2. Diet refers to how much food a person or other organism consumes in total.
3. The term "diet" typically connotes the restriction of one's nutritional consumption for the sake of health or weight loss (with the qualifier "with the qualifier "with the qualifier "with the qualifier "with the two are frequently linked).
4. A balanced diet consists of eating the right kinds and amounts of food and beverages to offer sustenance and energy to body cells, tissues, and organs, which aid in regular development and growth.

**Dietary supplements:** Dietary supplements are products that are taken in addition to a healthy diet to provide additional health benefits, such as additional nutrients.

A dietary supplement is a product that is designed to complement the diet and contains one or more of the following nutritious elements, (DSHEA) according to the Dietary Supplement Health and Education Act: herb, mineral, vitamin or other botanical, amino acid, as well as their concentrations, components, extracts, or metabolites.

**Dietary:** Dietary processing includes intake, digestion, absorption, distribution, and excretion of food and beverages.

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**Nutrition:** Nutrition is the science of food and its relationship to health," according to the World Health Organization (WHO).

1. Protein, carbs, and fats/oils are referred to as macronutrients in clinical nutrition. Vitamins, minerals, and water are micronutrients. Deficits at the cellular and tissue levels cause organ and gland dysfunction, which eventually leads to disease or disorder.

2. A nutrient is a feed component that should be present in the form and at a level that will support an animal's existence. Proteins, lipids, carbs, minerals, and vitamins are some of the feed nutrients.

## Nutraceuticals

A nutraceutical is a substance that is regarded a food or a portion of a food that, in addition to its regular nutritional content, provides health advantages such as disease prevention or promotion is any non-toxic dietary component that has been proven to be beneficial to one's health in a scientific study. It includes disease treatment or prevention. The functional component of the food must be standardized and manufactured in the nutraceutical product.

GMPs refer to good manufacturing practices. Herbal extracts and concentrations are manufactured from herbs and botanical components. That provides a wide range of acute and chronic sickness therapies.

### Nutraceutical applications

- Arthritis
- Antidiabetic
- Oxidative stress
- Cancer
- Allergic condition
- GI disease
- CVS disease
- Inflammation

**Nutraceutical Concept:** Nutrition is essential for maintaining healthy health. Pharmaceuticals are medicines that are used to treat illnesses and injuries.

Nutraceuticals as a kind of preventive medicine Dietary supplements are concentrated extracts or extracts that can be taken in a variety of forms, including tablets, capsules, soft gels, gel caps, liquids, and powders. Prior

to marketing, DS does not require FDA approval. The FDA has tested the product's safety and efficacy, and more testing are required, as well as labelling requirements, such as a label claim stating that it is not intended to diagnose or cure any condition. The high cost of medicines, such as allopathic treatments, has prompted an increase in the production of nutraceuticals, resulting in a rise in global demand.

### The state of nutraceuticals around the world

Vitamins and minerals account for more than 85 percent of the global market, while antioxidants make up about 10%. Around 5% of the overall market is made up of herbal extracts. The largest market for nutraceuticals is the United States, followed by the United Kingdom.

India and China are the world's two largest economies. Soy-food has risen in popularity as a result of its antidiarrheal, hypolipidemic, and anticarcinogenic effects. Properties that are anti-osteoporotic and anti-osteoporotic Prebiotics are also popular since they aid in the prevention of diseases such as cancer, osteoporosis, and others. You can prevent allergies and type-2 diabetes by lowering your cholesterol. 10-13, 19, 21 the market for nutraceutical components has exploded in recent years. To \$ 15.5 billion, there was a 5.8% annual increase. China and India are the fastest-growing nutraceutical markets. Herbal medicine is used by doctors.

### Classification

- Nutraceuticals (Table 1).
- Dietary supplements (Table 2).

### Use of supplements

Multivitamins were the most commonly used supplement from 2010 to 2021, with 60 percent of men and women reporting that they use one every day.

Between 2003 and 2021, 61 percent of women over 60 took calcium supplements, up from 28 percent in the previous survey. Calcium is required for bone health and the prevention of osteoporosis, a brittle bone disease.

The use of folic acid supplements remained steady between the two polls. Folic acid is thought to protect women of reproductive age against neural tube birth defects. Folate is found in a variety of foods, including green leafy vegetables, beans, and legumes (a natural form of folic acid). Many breads, cereals, flours, maize meals, pastas, rice, and other foods now include folic acid (Table 3).

### Advantages/Disadvantages

#### Advantages of Nutraceuticals:

1. Reduced side effects
2. Increases health benefits
3. Provide dietary supplements naturally
4. Easily available and cheap

Table 1. Nutraceuticals.

Dietary Supplements		Food & Beverages		
Vitamins & Minerals				
Herbals	Ayurvedic extract Algae extract Plant extract	Probiotic fortified	Omega fatty acid Fortified Protein bars and others	
Protein supplements	Protein powder	Energy drinks	Sports drink	Fortified juices
Probiotics	-	-	-	

Table 2. Dietary supplements.

Dietary Supplements	Example Substance
Amino acids	L-arginine
Enzymes	Lactase Papain
Prebiotics and probiotics	Inulin <i>Lactobacillus acidophilus</i> <i>Bifidobacterium</i> species Yeast
Essential non-saturated fatty acids	γ-Linolenic acid Fish oil (DHA/EPA) Flaxseed oil ( <i>Linum usitatissimum</i> ) Borage seed oil ( <i>Borago officinalis</i> )
Plant-origin ingredients	Aloe ( <i>Aloe vera</i> ) Ginkgo ( <i>Ginkgo biloba</i> ) Ginseng ( <i>Panax ginseng</i> ) Garlic ( <i>Allium sativum</i> ) Green tea extract ( <i>Camellia sinensis</i> ) <i>Garcinia cambogia</i> extract Guarana Extract ( <i>Paullina cupana</i> )
Other substances	Lycopene Lutein Coenzyme Q10 Taurine Carnitine Inositol Glucosamine Chitosan Spirulina Soy isoflavones

**Table 3.** Uses of different dietary supplements.

Dietary substance	Benefits	Use as
Natural Lycopene	Reducing risk of prostate and cervical cancers	Anticancer
Natural Purified Lutein Esters	Dietary Supplement	
Garlic	Cholesterol lowering and prevention of cardiovascular diseases.	Antilipidemic
Green Tea	Prevention of cardiac diseases, cancer prevention and weight management.	CVS disease Anticancer Anti-obese
Gymnema, Momordica	Diabetic control	Antidiabetic
Glucosamine	Arthritis treatment.	Arthritis
Gingko biloba	Allergy relief.	Antiallergic
Digestive enzymes	Digestive support.	GI disease
Ginseng	Immunomodulator	Immune disorder

5. It provides food for populations with special needs (e.g.: nutrient-dense foods for the elderly)

### Disadvantages of nutraceuticals:

**Bioavailability:** Nutraceuticals are being eliminated from the body and do not provide any medicinal benefit with poor bioavailability.

**Impact of Placebo effect:** Consumers may not use nutraceuticals accurately for healing illness, when the body is often able to recover on its own.

**Product quality issues:** Nutraceuticals from the international market may claim to use organic ingredients, but the lack of regulation may compromise the safety and effectiveness of products.

**Safety and interactions with other drugs:** The problem is that many of these products do not provide consumers with proper information about their safety and effectiveness, possible side effects, interaction with prescription medicines or the effect they have on existing medical conditions.

### Regulation and regulatory requirements

Regulation for nutraceuticals: According to the Indian definition of nutraceuticals, it must contain the substances specified as well as the general requirements properties. Traditional foods are not included in nutraceuticals. Nutraceuticals are food supplements that contain a medicinal component or are tailored to meet a specific nutritional need. These are notified in such a way that all of the required elements in the cuisine must differ from the Indian standards given as such, from regular food stuffs. If any type of food exists, it must contain one or more of the following compositions or ingredients. As an example, these have been defined as follows: These are parts produced from plants and notably botanicals in the form of liquid extract, dry powder, or extract in the form of ethyl alcohol and hydro alcoholic. They may in the form of combination or singly added from the plants and namely botanicals. Enzymes which not be more than the limits. Vitamins, minerals, proteins and amino acid or their components of metals should not exceed more than the limits which has been mentioned in the recommended daily allowance (RDA) for the Indian rules and regulation.

### FSSAI

In 2006 parliament passed food safety and security ACT.

Then in 2008, FSSAI came into existence. For implementation of FSSAI Act process of prepublication consultation in 2006 has been conducted where various rules and regulation are drafted.

So that by the end of September 2010 these drafted regulations will be sent for notifications.

a) As framed in the FSSAI act, 2006 various rules and regulations related to nutraceuticals has been framed.

b) Food obtained from processing of organic production and their standards considering the proprietary and novel food which are not safe but also not mentioned in the act. are also included rather than the Food ingredients composed of or containing obtained through from modern biotechnology the food obtained like, genetically modified or engineered organisms which may also contain the same has also been included in the act.

c) This FSSAI act consists of twenty-one chapters and in that the fourth article that means 22 of the act says about nutraceuticals, dietary supplements and various functional foods, and these products can be produced/manufactured, marketed that means sold or distributed that means imported can be done by any of the company. And these products may include nutraceuticals, dietary supplements, functional food, organic food, unprocessed food, can food, novel foods, and irradiated foods.

d) Packaging and labelling of nutraceutical and their claims including restrictions in advertisement about the nutraceuticals has been addressed in the article 23 and 24.

e) This kind of nutraceuticals can be permitted by the regulations made under this Act; which do not claim to cure or mitigate any specific disease, disorder or condition.

f) Rules which are made under the act that's the substances listed in Schedules E and EI of the D&C Rules, 1945; it does not include a narcotic drug or a psychotropic substance as defined in the Schedule of the Narcotic Drugs and Psychotropic Substances Act, 1985 and.

g) The FSSAI Authority would also have to come up with the hilarious task of putting in place the various minimum levels of compliance of food laws,

h) Rules and regulation which are made under the new regime by the food safety commissioner of each state will be very difficult to control both the claims as well as the quality and their force role should be expedited.

i) Food ingredients composed of or containing obtained through from modern biotechnology the food obtained like, genetically modified or engineered organisms which may also contain the same has also been included in the act.

j) "food for special dietary uses" these kinds of labels are meant for functional food or nutraceutical dietary supplements that is not mainly for obtaining as conventional food such products may be formulated in the form:

- Powders
- Granules
- Tablets
- Capsules

**Regulation for dietary supplements in India:** You must first register with the Food Safety and Standards Authority of India to sell dietary supplements in India (FSSAI). To be registered as a dietary supplement in India, the FSSAI has a number of steps that must be followed. Due to the rigorous laws and regulations, companies are finding it increasingly difficult to have their dietary supplements authorized.

However, for the purpose of public safety, all registration procedures and laws must be followed. Before a product may be sold, many forms, such as FORM A and FORM B, must be completed and approved. A flow chart for seeking approval is shown below: When registering and applying for jobs, the FSSAI has a set of rules that must be followed [1-5].

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## Conclusion

End customers are choosing minimally processed foods with added

nutritional benefits, as seen by the growing nutraceutical business. This trend has spread all over the world. Many scientists believe that enzymes represent another exciting frontier in nutraceuticals that the use of nutraceuticals in sports is appealing, that carotenoids will play a critical role in nutraceutical product development, that Lycopene offers tremendous nutraceutical opportunities, and that it is also used in the field of sports medicine for athletes to help them recover quickly when they are injured. Dietary supplements and nutraceuticals provide all of the essential elements that should be necessary for human healthy lives.

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