

## Review Article

# Survey on Awareness, Perception, and Extent of Usage of Nutraceuticals in Local Region of Uttar Pradesh, India

\*Nitesh S Chauhan, Sanjar Alam, Ashu Mittal, Jagannath Sahoo

KIET School of Pharmacy, Ghaziabad, India

**\*Corresponding author:** Nitesh S. Chauhan, Department of Pharmaceutics, KIET School of Pharmacy, Ghaziabad UP India; Tel: +91-09999536317; Email: nitish.chauhan@kiet.edu

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### Abstract

In recent years there has been growing interest in nutraceuticals which provides health benefits and is providing preventive options for the ageing population worldwide for keeping them away from various lifestyle diseases. Along with the growing healthcare industry in India there is an emerging trend in growing consumerism for 'Fast Moving Healthcare Goods (FMHG)'; worldwide known as Nutraceuticals, which are by definition, ingredients with human health benefits beyond basic nutrition. Global nutraceuticals market is estimated at USD149.5 Billion in 2015 growing at 7.3% (CAGR). The US has been the major market for nutraceuticals with India and China becoming fastest growing markets. According to available estimates, the global nutraceuticals product market reached \$142.1 billion in 2011 and is expected to reach \$204.8 billion by 2017, growing at a CAGR of 6.3%, according to a new market report from Transparency Market Research, Albany, NY. Vitamins, Minerals and Nutrients constitute about 85% of the global market while antioxidants and anti-agents account for 10% other segments such as herbal extracts occupy 5% of the market. To actualize the growth rate and the demand of nutraceuticals in the local region of Uttar Pradesh like Ghaziabad, Noida and Greater Noida, the present survey study has been conducted and the survey data was presented in a pictorial & graphical manner for better understanding.

**Keywords:** Nutraceuticals, FMHG, CAGR, Nutrients.

### Introduction

In recent years, there is a growing interest in nutraceuticals which provide health benefits and are providing preventive options for the aging population worldwide for keeping them away from various lifestyle diseases. Nutraceuticals are found in a mosaic of products emerging from:

- The Food Industry

- Herbal and Dietary Supplement Market
- Pharmaceutical Industry, And
- The Newly Merged Pharmaceutical/Agribusiness/Nutrition Conglomerates

Nutrients, herbals and dietary supplements are major constituents of nutraceuticals which make them instrumental in maintaining health, act against various disease conditions and thus promote the quality of life.

	Class/Component	Source	Potential Benefits
1.	Fatty Acids	Milk ,Meat	Improve Body Compositions,
a.	CLA	Fish oil, birseen and maize	Reduce Cancers
b.	n-FA (DHA,EPA)	fodder, mustard, linseed, rapeseed	Reduce CVD and improve, mental and visual function
2.	Polyphenols	Fruits	Neutralize free radicals, reduce
a.	Anthocyanidin	Tea, babul pods, Mustard	risk of cancers
b.	Catechins	cake, rape seed, salseed	Neutralize free radicals, reduce
c.	Flavonone	Citrus	risk of cancers
d.	Flavones		Neutralize free radicals, reduce
3.	Proanthocyanidine	Fruits, vegetables, soya bean	risk of cancers
a.	Saponins	Cocoa, chocolate, tea, rape seed	Neutralize free radicals, reduce
b.	Probiotics/Prebiotics/Synbiotics	Soyabeans, chick pea	Reduce CVD
c.	Lactobacillus		
d.	Fructo-oligo sacchrides		
4.	Phytoestrogen	Curd, yoghurt	Lower cholesterol, anti-cancer
a.	Daidzein	Whole grains, onions	Improve G.I health
b.	Zenistein	combination of pro & Prebiotics	Improve G.I health
c.	Lignans		
5.	Carotinoids	Soyabean, falax, lentiseed	Reduce menopause symptoms, increases bone health
a.	B-Caroteine		
b.	Tuteine	Flax, rye, vegetables	Reduce cancer and heart disease
c.	Zeoxanteine		
d.	Lycopene		
6.	Dietary Fibers	Birseen & maize fodder,	Neutralize free radicals
a.	Insoluble fiber	carrots, vegetables, fruits Vegetables	Healthy vision

b.	b-glucagon	Eggs, citrus, corn	Healthy vision
c.	whole grain	Tomatoes	Reduce prostate cancer
		Wheat bran, Oats, Cereal grains	Reduce breast cancer, colon, cancer, Reduce CVDs

**Table1:** Examples of functional components

## Broadly Can be Classified As

♦ Nutrients: These are the substance which has established nutritional functions. Eg: Vitamins, Minerals, Amino acids, Fatty acids etc.

♦ Herbals/ phytochemicals: Herbs or Botanical products.

♦ Dietary supplements: probiotics, prebiotics, antioxidants, enzymes etc.

Consumers are increasingly becoming health conscious and realizing the importance of dietary supplement to help them deal with fast changing lifestyle, which has put them at risk of diabetes, cholesterol, heart problems. Nutraceutical products play a vital role in such a scenario.

## Market Segmentation

Indian nutraceutical market is composed of food supplements, vitamins and mineral supplements. Food supplement includes protein powder, pediatric nutrition and clinical products. The nutraceutical market in India is estimated to be at least INR 44 billion with functional food forming largest category with 54%.

Indian Pharmaceutical Market (43.9)	Functional Food (23.9)	Nutrition Fortified Food
	Functional Beverages (6.0)	Probiotics
		Sports & Energy Drinks
		Fortified Juices
		Glucose Powder
	Dietary Supplements(14.0)	Vitamins Supplements
		Mineral supplements
		Macronutrients
		Antioxidants
		Tonic

**Table 2:** Depiction of Indian Nutraceutical Market

## Functional Food

The major share is held by food products and supplements, valued at INR 5.63 billion in 2007. The next major pie is held by malted beverages (Horlicks, Complan, Boost and Red Bull), valued at INR 3.38 billion.

## Nutrients

Most common nutrients used/ supplemented as nutraceuticals are minerals and vitamins or in combination with other antioxidants.

## Health Benefits of Different Common Nutrients

### Vitamins

Fat soluble vitamins

**Vitamin A:** Act as antioxidants, essential for growth and development, maintains healthy vision, skin and mucous membranes, may aid in the prevention and treatment of certain cancers and in the treatment of certain skin disorders.

- **Vitamin D:** Essential for formation of bones and teeth, helps the body to absorb and use calcium.
- **Vitamin E:** Antioxidants, helps to form blood cells, boost immune system.
- **Vitamin K:** Essential for blood clotting.

Water soluble vitamins

- **Vitamin C:** Antioxidants, necessary for healthy bones, gums, teeth and skin. Helps in wound healing, prevent from common cold.
- **Vitamin B1:** Helps in carbohydrate metabolism, essential for neurological function.
- **Vitamin B2:** Energy metabolism, maintains healthy eye, skin and nerve function.
- **Vitamin B3:** Energy metabolism, brain function.
- **Vitamin B6:** Helps to produce essential proteins to energy.
- **Vitamin B12:** Help in producing genetic material formation of RBC, maintenance of CNS, synthesis of amino acids, involved in metabolism of proteins, fats and carbohydrates.

**Folic Acid:** Helps in RBC formation, formation of genetic material of cell, very much essential during pregnancy.

**Pantothenic Acid:** Aids in the synthesis of cholesterol, steroids and fatty acids, crucial for intra-neuronal synthesis of acetylcholine.

### Vitamins like Compounds

- **L-Carnitine:** Helps in oxidation of fatty acids, role in oxidative phosphorylation.
- **Choline:** Lipotropic agents, used to treat fatty liver and disturbed fat metabolism.
- **Inositol:** For amino acid transport and movement of potassium and sodium.
- **Taurine:** Helps in retinal photoreceptor activity, bile acid conjugation, WBC antioxidant activity, CNS neuro-modulation,

platelet aggregation, cardiac contractibility, sperm motility, insulin activity.

### Minerals

- **Calcium:** Essential for bone and teeth, maintaining bone strength, nerve muscle and glandular function, blood clotting.
- **Iron:** Energy production, Hemoglobin, oxygen transport.
- **Magnesium:** For healthy nerve and muscle function, bone formation.
- **Phosphorus:** Energy production, phosphorylation process, bone and teeth, for genetic material.
- **Cobalt:** Components of vitamin B12 coenzyme.
- **Copper:** Hemoglobin and collagen production, function of heart, energy production, absorption of Iron.
- **Iodine:** Proper function of Thyroid gland.
- **Chromium:** With insulin it helps in conversion of Carbohydrate and Fat into energy, treatment of Diabetes.
- **Selenium:** Antioxidant, functioning of heart muscle, parts of GPx enzyme.
- **Zinc:** Essential for cell reproduction for development in neonates, wound healing, production of sperm and testosterone hormone.

### Herbals

- **Aloe Vera:** Anti inflammatory, emollient, wound healing.
- **Primrose oil:** Dietary supplement of linolic acid, treatment of ectopic eczema.
- **Garlic:** Antibacterial, antifungal, antithrombotic, anti inflammatory.
- **Ginger:** Carminative, antiemetic, treatment of dizziness.
- **Ginseng:** Adaptogen.
- **Green tea:** Antioxidant reduces risk of CVDs, enhance humoral and cell mediated immunity.

Vegetables, fruits, whole grain, herbs, nuts and various seeds contains an abundance of phenolic compounds, terpenoids, sulphur compounds, pigments etc that has been associated with protection /treatment of certain disease conditions.

### Phytochemicals

#### Health Benefits

- Substrate for Biochemical Reaction.
- Cofactor for Enzymatic Reactions
- Inhibitors of Enzymatic Reactions.
- Absorbents That Binds To And Eliminate Undesirable Constituents In The Intestine.

- Scavengers of Reactive or Toxic Chemicals.
- Enhance The Absorption And/ Or Stability Of Essential Nutrients.
- Selective Growth Factors for Beneficial Bacteria.
- Selective Growth Factors for Beneficial Bacteria.
- Fermentation Substrate for Beneficial Bacteria.

Phytochemicals	Source	Role
Tocotrienols & tocopherols	Grains	Suppressed the growth of diverse tumors cell lines via inhibition of apoptosis and concomitant arrest of cells in the G1 phase of cell division.
Carotenoids	Fruits and vegetables	Antioxidants, protects against uterine, prostate colorectal, lung & digestive tract cancer and protection to other antioxidants.
Limonoids	Citrus fruits	Inhibiting phase 1, enzymes and inducing phase2 detoxification enzymes in liver, provide protection to lung disease.
Glucosinolates	Cruciferous	Activation of liver, detoxification enzymes inhibits the neoplastic effects of various carcinogens.
Fiber	Vegetables & fruits	Protect against colorectal disease.

**Table 3:** Various Phytochemicals their Source and Roles

## Nutraceutical Market Overview

### Global Market Overview

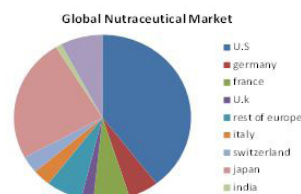
Nutraceuticals and functional food ingredients are by definition, ingredients in pharmacological activity for human health benefits beyond basic nutrition as they are sold as isolated, purified components in pharmacological doses for specific ailments. Health is one of vital importance to consumer of all ages, demographic groups and countries, so one would expect a strong demand for nutraceutical foods & beverages which provide specific health benefits. The international market for nutraceuticals is expanding and new research is constantly being conducted. Nutraceuticals is an evolving concept with varying definitions across countries: Definition of nutraceuticals as per various legislation around the globe

- **USA**
- **Known as-** Dietary Supplements
- **Governed By-** Food & Drug Authority
- **Implemented in-** 1994

Definition Covers- Vitamins, Minerals, Herbs, Amino Acids, Metabolite

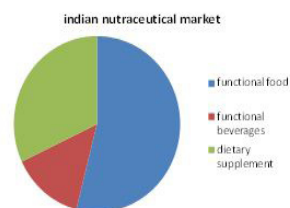
- **India**

- **Regulation-** Food Safety & Standard Act (FSSA)
- **Effective from-** Passed in 2006.
- **Definition Covers-** Plant or Botanicals, Minerals, Vitamins, Amino Acids & Enzymes, Substances from Animal origin, Dietary Supplements.



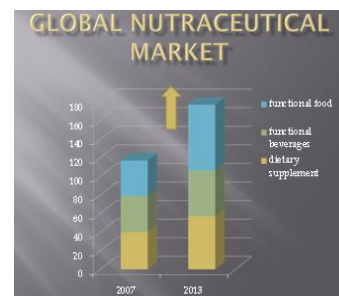
**Figure 1:** Global Nutraceutical Market

Indian Nutraceutical market in 2008 in USD 1 billion



**Figure 2:** Indian Nutraceutical Market

Globally, this market is expected to reach USD 180 billion in 2013 growing at a CAGR of 70% driven by the fastest growing dietary supplement category.



**Figure 3:** Global Nutraceutical Market and Expected Growth

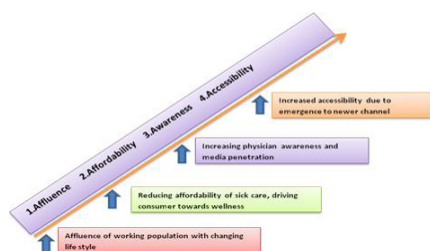
### Indian Market Overview

- Nutraceuticals is an evolving segment in India, more & more Pharmaceuticals, FMHG; FMCG companies are entering in to this segment.
- Companies are focusing on this segment as preventive therapy rather than curative therapy.
- Consumers are increasingly becoming health conscious and realizing the importance of dietary supplements to help them deal with fast changing life styles.

- The Nutraceuticals Market in India is estimated to be INR 44 Billion with functional food forming largest category with 54% share.

S. No	Type of Product	Leading Brand	Company	Market Size
1	Food Product	Sugar free	Zydus Well-ness	INR 5.63 billion
2	Malted beverages Fruit based	Dekrice Horlicks	Wockhardt GSK	INR 3.38 billion INR 0.68 billion
3	products	Complain	Heinz	INR 0.56 billion
4	Pediatric nutrition	Bourn vita	Cadbury	INR 0.56 billion
5	Protein powder	Boost Red bull	GSK Red bull	INR 0.23 billion INR 0.23 billion
6	Sports product	Real	Dabur	
7	Clinical product	Tropicana	Pepsi food	
		Lactogen	Pepsi food	
		Lactodex	Nestle	
		Dexaloc	Raptakos Wockhardt	
		Pediasure	Abott	
		Protenex	Wockhardt	
		GRD	zydus	
		Glucon D glucose D	british bio- logical Heinz	
		ORS	Dabur	
		Revital	Ranbaxy	
		Electoral	FDC	

**Table 4:** Indian food supplement segmentation

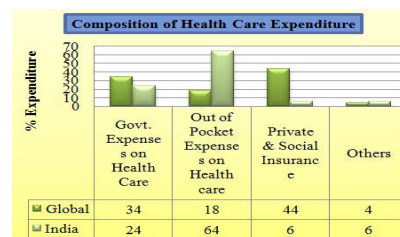


**Figure 4:** Growth in market in India is driven by several factors

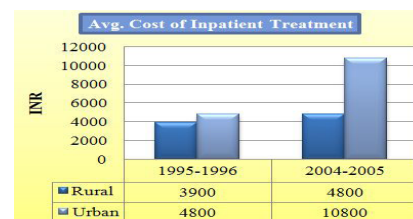
There are many factor which are governing the growth of Neutra-ceuticals

**Affluence:** Increased affluence of ever growing working popula-tion with changing life styles is leading to change dietary habits. Increase of working population by 30 million from 2005-2015 + increasing income level of the Indian population

**Affordability:** Reduced affordability of sickness related expen-diture is driving consumers towards wellness. Out of pocket ex-penditure constitutes 64% of health care expenditure in India as compared to 18% globally.

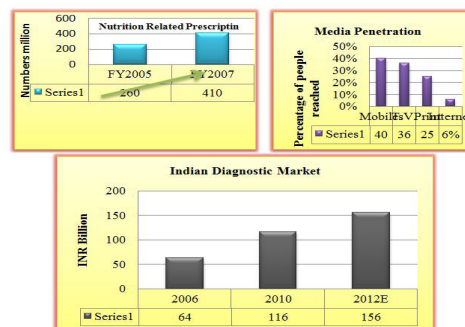


**Figure 5:** Average cost of inpatient treatment both in rural and urban India has doubled in last decade.



Source- WHO 2008

**Awareness:** While increased physician awareness is driving pre-scriptions of nutrition supplements, penetration growth of media & diagnostic centers is helping to create awareness Physician aware-ness about health benefits of nutraceuticals has fuelled growth in nutrition related prescription at 26% CAGR in recent years. High media penetration is improving Consumers awareness With grow-ing diagnostic centers the awareness about health disorders and defi-ciencies is increasing.



**Figure 6:** Awareness of Nutraceutical

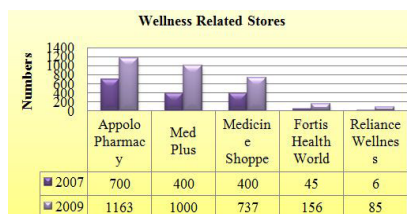
Source- FICCI, CYGNUS

**Accessability:** Emergence of newer distribution channels is fuel-ing accessibility to Nutraceuticals



Emergence of wellness products and services related retail outlets is also driving accessibility of nutraceuticals

Growing organized retail has emerged as a new channel for distribution of nutraceuticals.



**Figure 7:** Accessibility

Source- Company Websites

### Many new players

- Alkem Laboratories: Alkem Laboratories has invested over INR 1 billion to create exclusive manufacturing facilities for their health food business.

Alkem Health Foods is expected to generate a turnover of over INR 3-5 billion Annually, in a few years.

- Plethico: The Company recently acquired a USD 100 million nutraceutical companies named Natrol Inc. in the US and is planning to launch its 700 odd products in India and other global market.
- Divi's Laboratories: Divi's Laboratories has set up a INR 350 million nutraceutical plant and has a separate arm, Divi's Nutraceuticals.
- Mission Vivacare: Mission Vivacare is investing over INR 800 million in modern manufacturing facilities to launch its products globally under the brand name- Mission Vivaprime

### Regulations

- The food sector in India is governed by a multiplicity of laws under different ministries , a number of committees , including the standing committee of Parliament on Agriculture in its 12th report submitted in April 2005, have emphasized the need for a single regulatory body and food integrated food law.
- The Indian Food Safety and Standards Bill 2005 have been signed into law, promising a major impact on the Indian food processing industry.
- The Food Safety and Standard Act aims to integrate the food safety laws in the country in order to systematically and scientifically develop the food processing industry and paradigm shift from a regulatory regime to self compliance.

### The main objectives of the Act are:

- To introduce a single statute relating to food , and
- To provide for scientific development of the food safety processing industry.

### Highlights of the Act:

- The Food Safety and Standards Act consolidate eight laws governing the food sector and establish the Food Safety and Standards Authority (FSSAI) to regulate the sector and other allied committees.
- The FSSAI would consist of a Chairperson and 22 members. The Chairperson would be either an eminent food scientist or a civil servant not below the rank of secretary. Seven of the members would be ex-officio, not below the post of Joint Secretary from various ministries. Five members would be appointed by rotation every three years from the states and Union Territories. The authority would have two representatives each from the food industry and consumer organizations, three food technologists, and two members from a former organization and one from retail organization.
- Everyone in the food sector is required to get a license or a legislation that would be issued by local authorities.
- The law will be enforced through state commissioners of food safety and local level officials. The Act empowers the FSSAI and state food safety authorities to monitor and regulate the food business operators.
- The Act provides for a graded penalty structure where the punishment depends on the severity of the violations.
- New Judicial Process : in order to judge cases related to breach of specified regulations , the state government has the power to appoint an adjudicating officer , not below the rank of Additional District Magistrate , any person not satisfied by the decision an Adjudicating officer has the right to appeal to the Food Safety Appellate Tribunal.
- Food Recall Procedures: every distributor is required to identify any food article to its manufacturer and every seller to its distributor. Anyone in the sector should be able to initiate recall procedures if he finds that the food sold has violated specified standards.

### Research Methodology





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## Conclusion

- Nutrition is fundamental need, various risk factors related to health results from imbalance nutrition.
- India is developing country with average food supplements, which reach to the countryman. Therefore, it is important everyone to consider & include Nutraceuticals in our proper balance diet.
- Data indicates that HAJMOLA has got the highest unit sale of 43560 Sachets followed by GLUCON-D (HEINZ) 40460 & then ELECTROL (FDC) of 29280.
- SUGARFREE & REVITAL Annual unit sale is more than 12000 units.
- The Total Growth in sales from 2009-10 to 2010-11 is 26%.
- Data indicates that there is a high demand of Branded product rather than the Generic one, & ultimately it's the health issue.
- Conclusion can be drawn & can be said that it is the Brand Era of Nutraceuticals.

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