NUTRACEUTICAL IS THE NEED OF HOUR

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ABSTRACT

Nutraceutical was developed because of medicine's growing awareness of the health promoting effects of foods and food constituents and to establish a clear link between 'nutrients' and 'pharmaceuticals. Although by definition nutraceuticals are classed as food products, use of the term nutraceutical and the claims attributed to the properties of the product have lead to some confusion as to whether nutraceuticals should be classed as medicinal products. All therapeutic areas such as anti-arthritic, pain killers, cold and cough, sleeping disorders, digestion and prevention of certain cancers, osteoporosis, blood pressure, cholesterol, depression and diabetes have been covered by nutraceuticals. The greatest scientific need in nutraceuticals pertains to standardization of compounds and/or products, to carefully develop and execute clinical studies/trials to provide the basis for health claims for nutraceuticals that impact consumers as well as companies making strategic investments.

Keywords: Nutraceutical, global regulatory scenario, market and demand.
INTRODUCTION
The term "Nutraceutical" was coined by combining the terms "Nutrition" and "Pharmaceutical" in 1989 by Dr Stephen DeFelice, Chairman of the Foundation for Innovation in Medicine. "Nutraceutical" is a marketing term developed for nutritional supplement that is sold with the intent to treat or prevent disease and thus has no regulatory definition. Hence a “nutraceutical” is any substance that may be considered a food or part of a food and provides medical or health benefits, encompassing, prevention and treatment of diseases. Such products may range from isolated nutrients, dietary supplements and diets to genetically engineered "designer" foods, herbal products and processed foods such as cereals, soups and beverages. Inter-relationship between nutraceuticals and other health products can be observed by Figure 1.

![Fig 1. The relationship between nutraceuticals and other health products](image)

Nutraceutical was developed because of medicine's growing awareness of the health promoting effects of foods and food constituents and to establish a clear link between nutrients and pharmaceuticals.

NUTRIENTS REDISCOVERED AS NUTRACEUTICALS
Traditionally a nutrient has been defined as a constituent of food that nourishes or contributes to the health of the body or according to Milner any substance in the diet that brings about a physiological effect and health. Although these definitions adequately cover all health promoting constituents of foods, the analysis by medicine that they must promote the field of nutrition from quackery to scientific necessitated that a new name be invented for nutrients,
especially those nutrients with new health benefits or nutrients which were traditionally rejected as quackery by main stream medicine and nutrition.

By this means they could distance the new nutrition from its scientifically created reputation of quackery. Ideally the new name should be chosen to link nutrients with drugs or pharmaceuticals because it was expected, in view of the direction of accumulating evidence, that in the future nutrients would be applied like drugs to prevent or alleviate serious diseases.[2-3] Nutraceuticals and functional foods are already exceedingly profitable, but as the newly merged pharmaceutical/agribusiness/nutrition conglomerates emerge we can see a wonderful future with purple carrots, wood pulp in margarine, fish oil in ice cream, and many foods genetically altered. The wonderful new foods which are emerging include orange flavoured drink for heart disease, fortified with folate, Joint Juice with glucosamine, and nutritious mega green and mega antioxidant drinks.[3-4]

HEALTH PROSPECT

Most of the nutraceuticals do possess several therapeutic benefits in various disorders. Nutraceuticals have been claimed to have a physiological benefit or offer protection against the different diseases like, cardiovascular agents, antidiabetics, anticancer agents, antiobese agents, chronic inflammatory, immune boosters, disorders, degenerative diseases.

Several examples of nutraceuticals are there that exhibit the therapeutic values like, buckwheat seed proteins have valuable role in obesity and constipation performing similar to natural fibers present in food.[5] 5-hydroxytryptophan and green tea extract may encourage weight loss.[6] Omega-3 fatty acids have been suggested to decrease glucose tolerance in patients inclined to diabetes.[7] Flavonoids found in citrus fruit appear to protect against cancer by acting as antioxidants.[8] Curcumin from curry and soya isoflavones have cancer chemo preventive properties.[9] Phytosterols in diet have the capability to decrease the morbidity and mortality from cardiovascular disorders.[10] Different nutraceuticals and their role can be seen in the Table 1.

ROLE OF NUTRACEUTICALS IN THE PRESENT ERA[17]

- Higher confidence in product quality and effectiveness.
- Improved market for nutraceutical products.
- Increased public awareness.
Increased healthcare industry awareness.
Establishment of a self-governing agenda
Increase the health value of our diet.
Help us live longer.
Help us to avoid particular medical conditions.
Have a psychological benefit from doing something for oneself.
Be perceived to be more "natural" than traditional medicine and less likely to produce unpleasant side-effects.
May present food for populations with special needs (e.g. nutrient-dense foods for the elderly).

Table 1: Sources and Applications of Minor Nutraceuticals

<table>
<thead>
<tr>
<th>Nutraceutical</th>
<th>Source</th>
<th>Use</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theanine</td>
<td>Camellia sinensis</td>
<td>Relaxation, lowering blood pressure, mental ability.</td>
<td>11</td>
</tr>
<tr>
<td>Polyamines</td>
<td>Soy, tea, mushrooms</td>
<td>Hair growth</td>
<td>12</td>
</tr>
<tr>
<td>Plant sterols/stanols</td>
<td>Food seeds/oils</td>
<td>Reduction of cholesterol absorption/LDL</td>
<td>13</td>
</tr>
<tr>
<td>Superoxide dismutase</td>
<td>Brain, kidney, liver</td>
<td>Heart disease, cancer, ageing, osteoarthritis</td>
<td>14-15</td>
</tr>
<tr>
<td>NADH (Reduced form of nicotinamide adenine dinucleotide)</td>
<td>Yeast</td>
<td>Chronic fatigue syndrome</td>
<td>16</td>
</tr>
</tbody>
</table>

GLOBAL NUTRACEUTICAL MARKET

According to a latest nutraceuticals global markets and processing technologies (FOD013C) from BCC Research, the global market for nutraceuticals was worth $117.3 billion in 2007. This is expected to reach $176.7 billion in 2013, a compound annual growth rate (CAGR) of 7.4%.

The market is broken down into nutraceutical supplements, foods and beverages. Nutraceutical foods were the leading market segment in 2007, worth $39.9 billion. This is predictable to increase $56.7 billion in 2013, for a CAGR of 6.9%. The nutraceutical
industry in the US is about $86 billion. This figure is slightly higher in Europe and Japan. It represents about a quarter of their $6 billion entire annual food sales- 47% of the Japanese population consume nutraceuticals.[18]

GLOBAL REGULATORY SCENARIO OF NUTRACEUTICALS
The approach to regulating and marketing nutraceuticals is remarkably diverse on the world level. This is widely due to the challenges in classifying these products, absence of a appropriate regulatory category for these hybrid products, and varying views on what is considered sufficient scientific substantiation to conclude the functionality. At this juncture, there are no regulations and no regulatory processes that define and explicitly deal with nutraceuticals.[19]

In most countries these hybrid products are forced under an existing categorized of either foods or medicines, and are to be found into a lot of existing regulatory categories having their own unique regulatory framework. For example, nutraceuticals in the USA are regulated as dietary supplements, a particular category of products classified under the general umbrella of foods; while they are regulated as natural health products classified as a subset of drugs in Canada. The official recognition of these products and regulatory category across the selected regulatory regime is shown in Table 2.

Table 2: Nutraceuticals Statutory Position and Regulatory Category[20]

<table>
<thead>
<tr>
<th>Country</th>
<th>Statutory position of nutraceuticals</th>
<th>Regulatory category under which nutraceuticals are regulated</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>No legal status or formal definition.[21]</td>
<td>“Dietary supplements” as defined by the dietary supplement health and education act of 1994.[22]</td>
</tr>
<tr>
<td>European Union</td>
<td>No legal status or formal definition.[23-24]</td>
<td>“Food supplements” as defined in directive 002/46/EC.[23] “food with health claims” including</td>
</tr>
</tbody>
</table>
“foods with nutrient

Canada

No legal status or formal definition.\textsuperscript{[25]}

“Natural health product” as health product regulations of the food and drug acts.\textsuperscript{[26]}

Japan

No legal status or formal definition\textsuperscript{[27]}. Function claims” (FNFC) and “foods for specified health uses” (FOSHU) \textsuperscript{[27]}

Codex

No Legal Status or formal definition

Vitamin and mineral supplements,\textsuperscript{[28]}

\textbf{AREA COVERED BY NUTRACEUTICAL PRODUCTS}

Advance research and awareness in the field of the nutraceutical products fascinate attention towards various therapeutic areas (Figure 2), such as anti-arthritis, pain killers, sleeping disorders, cold and cough, digestion and prevention of certain cancers, osteoporosis, blood pressure, cholesterol, depression and diabetes have been covered by nutraceuticals. Percentage area covered by nutraceutical products\textsuperscript{[29].}

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure2.png}
\caption{Percentage area covered by nutraceutical products}
\end{figure}

\textbf{RESEARCH AND DEVELOPMENT}

The greatest scientific requirement in nutraceuticals pertains to standardization of compounds and/or products, to carefully develop and execute clinical studies/trials to provide the basis
for health claims for nutraceuticals that impact consumers as well as companies making strategic investments powerful market forces are fueling the interest in nutraceuticals[30].

- Technical advances in the food industry that are allowing the development and advancement of health promoting foods that can be marketed to health-conscious consumers at a premium.
- Advances in scientific knowledge supporting the vital role of diet in health and disease prevention.
- Skyrocketing health care costs.
- An aging population.
- The changing regulatory environment.

TODAY’S PROBLEM[31]

- Most raw materials are imported and lack government/industry control on product quality and contamination.
- U.S. healthcare costs are the highest in the world, while morbidity and mortality measures are not correspondingly the highest.
- Supply of certified products is limited and demand exceeds supply.
- Consumers dissatisfied with drug costs and conventional healthcare are turning to unproven and untested natural products, nutraceuticals, for treatment and prevention.

FUTURE OF NUTRACEUTICALS

The 21st century is often referred to as Nutraceutical. Using Nutraceutical tools, the physician of the future would be better source to offer personalized approaches to preventive medicine. Advances in Nutraceuticals would facilitate individualized diets customized to a person’s profile to maximize health and well being.

Nutraceutical market indicates that end users are looking minimally processed food with extra nutritional benefits and organoleptic value. This progress, in turn, is propelling expansion in the nutraceutical markets globally. The emerging nutraceuticals industry seems destined to occupy the landscape in the new millennium. Its tremendous growth and development has implications for the food, pharmaceutical, healthcare, and agricultural industries.

As research efforts across the world continue to unravel the links between diet and health.
CONCLUSION

Nutraceuticals are intended to play an significant role in future therapeutic developments. Community health authorities consider prevention and treatment with nutraceuticals as a powerful tool in maintaining health and to act against nutritionally induced acute and chronic diseases, thereby promoting most advantageous health, endurance and quality of life. A place for nutraceuticals in clinical practice is emerging, but important pharmaceutical and clinical issues must to be addressed by advance research.

REFERENCES

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