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Role of antioxidant enzymes in beta thalassemia major

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TREATMENT
Requires regular
transfusion



Bone marrow
transplants may
not be an option
for patients

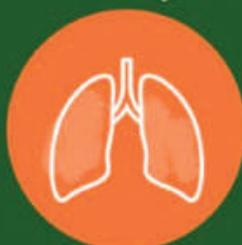
TREATMENT
Iron chelation therapy
treats iron overload from
blood transfusions



Can Still Lead To:



Delayed Growth



Lungs Problems



Cancer



Endocrine Abnormalities

Nutraceuticals in demand

SANJAY AGRAWAL

Nutraceuticals can be broadly defined as nutrients that include substances which have established nutritional functions e. g. vitamins, minerals, amino acids, fatty acids, and so on and herbs or botanical products and the third category is dietary supplements such as probiotics, prebiotics, antioxidants, and enzymes. Dietary supplements, functional foods (probiotics and fatty acid-based foods), botanicals/herbals. They add health benefits to the basic nutritional value found in foods and are primarily used to promote health and wellness or prevent and treat disease. However, most common nutrients supplemented as nutraceuticals are minerals and vitamins, or in combination and or with other antioxidants. The Indian nutraceutical market is dominated primarily by the fast moving consumer goods and pharmaceutical industry.

While nutraceuticals and dietary supplements are often used interchangeably, the latter serves as the broader category. Dietary supplements have been marketed to address a large variety of ailments, from insomnia and poor digestion to low energy, joint pain, and immune health.

Nutrition is one of the most important factors in building the foundation of good health - right from the early years of life. Balanced nutrition is essential for everyone, especially children, because good nutritional habits that are established during early ages turn out to be lifetime habits. The Nutrition market continues to evolve in light of consumer

demands, new applications and emerging technologies. Minerals continue to function as a solid sales generator for the dietary supplement market, especially as increasing numbers of consumers add them to their health and wellness regimens. Mineral fortification has also generated interest from consumers.

Nutraceutical ingredients are nutrient rich components that have beneficial medicinal qualities, which improve human health and provide prevention from diseases. The nutrition value of traditional foods increases with addition of nutraceutical ingredients. Nutraceutical ingredients are used in cosmetics, dietary supplements, food and beverages on a wide range. Medicinal properties of nutraceuticals are used in health beneficial products globally.

Nutraceutical types as prebiotics, probiotics, protein and amino acids, omega-3 fatty acids, vitamins, minerals, fibers and speciality carbohydrates, carotenoids, phytochemical and plant extracts and others segment global nutraceutical ingredients market. Based on application they are segmented as functional food, dietary supplements, functional beverages, animal nutrition and personal care. Global nutraceutical ingredients market are segmented by health benefits as gut health, bone health, heart health, immunity, nutrition, weight management and others.

Asia Pacific accounts for the largest geography driving the nutraceutical ingredients market. Factors restraining the nutraceutical ingredients market are lack of awareness in some regions and stringent regulations in regions like Europe and North America. Health and

lack of nutrition issues, weight management and rise in number of heart as well as chronic diseases have led to increased consumption of natural medicinal and herbal supplements.

US scenario

With the explosive growth of nutraceuticals and their growing popularity among consumers, pharmacists have an opportunity to add to their skills and further cement their position in the healthcare industry as healthcare providers. There are more than 29,000 different nutritional supplements on the market today, according to the US FDA. The US market for nutraceuticals, which was \$64.8 billion in 2015, is anticipated to increase at a compound annual growth rate of 5.3 per cent from 2016 to 2024 and reach a value of \$102.6 billion, according to Transparency Market Research report.

In US, 76 per cent of more than 2,000 adults surveyed take dietary supplements - up five percentage points over 2016, according to the "2017 CRN Consumer Survey on Dietary Supplements" put out by the Council for Responsible Nutrition. The survey found that vitamins/minerals are the most highly consumed supplement category - as found in earlier surveys - with 75 per cent of survey respondents saying they have taken these in the past 12 months. Specialty supplements (taken by 38 per cent of respondents) are the second most popular category. Other popular supplements are herbals/botanicals (taken by 29 per cent of respondents), sports nutrition supplements (22 per cent), and weight management supplements (15 per cent).

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Demand for liquid nutraceuticals is higher among consumers than other forms of nutraceuticals - with a 6.10 per cent compound annual growth rate by 2024, according to Transparency Market Research.

According to data from National Health and Nutrition Examination multivitamins/multiminerals are the most commonly used dietary supplements, with about 40 per cent of men and women use during 2003-2006.

A new review published in the British Journal of Clinical Pharmacology looks at the potential of nutraceuticals, stressing the need for a proper definition of nutraceuticals and clear regulations to ensure their safety. A growing demand exists for nutraceuticals, which seem to reside in the grey area between pharmaceuticals and food. The products are thought to provide medical or health benefits "beyond the diet, but before the drugs"

According to Nutrition Business Journal, minerals segment makes up about 8 per cent of the dietary supplement market in US. Nutrition Business Journal estimates that the minerals category in terms of finished product sales totaled more than \$2.1 billion in 2009. On the raw material side, minerals brought in \$240 million, a growth of 5 per cent compared to the previous year.

"Sales of mineral ingredients averaged 4 per cent growth from 2000-2009, with 2009's growth of 5 per cent being much closer to the norm than the 7 per cent growth experienced in 2008," Nutrition Business Journal says in its 2009 Nutrition Industry Overview. Further, "Input pricing remained stable, and the market belonged mostly to European and US suppliers, as China continues to focus elsewhere."

Nutrition Business Journal

pointed out, growth was strongest for magnesium supplements, which spiked 10 per cent to \$340 million. From 2000-2009, magnesium supplement sales posted a CAGR of 14 per cent, while the CAGR for all mineral supplements during this time period was just 5 per cent.

On calcium, Nutrition Business Journal says, garnered the most media attention with the release of a meta-analysis out of New Zealand in August 2010 linking calcium supplementation to heart-attack risk. "The mainstream media covered this study broadly, but industry advocates and various scientific experts found ample reason to doubt and disparage the results, given calcium's broad-based support among medical professionals in supporting bone health," the market researcher said. "Time will tell, but vitamin E suffered mightily from a similar study published in 2005 and has yet to recover." In fact, Nutrition Business Journal research indicates that vitamin E sales have dropped 61 per cent during the last decade.

The next generation

While still a large market, the minerals segment is no longer posting the high growth numbers seen in years past, according to Kathy Lund, business development and marketing director, AIDP, City of Industry, CA. As a result, companies are exploring other opportunities in an effort to carve out new growth and market share.

"Right now solubility and bioavailability seem to be key areas, along with providing 'tasteless' minerals, especially in the case of formulations geared toward children," according to Lund. "There has also been some compelling research in the area of bioavailability. Over the years the chelating process has improved the bioavailability of various minerals, which has brought positive changes to the market."

Formulators need minerals they can work with, whether they are designing an energy drink, children's gummy product, a bone health supplement or a fortified cereal. But what do they pay attention to most when deciding on the selection of a particular mineral form? AIDP's Lund says it varies, depending on the company, the product being formulated and the target audience for that potential product. "Some companies are more price sensitive than others. Some are more quality conscious than others. Regardless, functionality, taste and bioavailability are very important to all of them".

Polyphenols from grape seed extract have been known for years to have strong antioxidant effects. But, new studies indicate grape seed extracts have positive effects on blood pressure in persons with prehypertension and hypertension, as well as metabolic syndrome. Their increasingly recognized health benefits and ease of incorporation into formulations point to establishing grape seed extract as a favored ingredient for use in beverages.

Because of its potential anti-inflammatory properties, borage oil has been used as a treatment for conditions like eczema and rheumatoid arthritis, and it is most popular as a reliever of pains and discomfort associated with the menstrual cycle.

Magnesium also is a metallic mineral garnering an upturn in attention. Approximately 60 per cent of the adult population in the US fails to meet recommendations for magnesium. There are several contributors to this low level of intake: Foods rich in magnesium, such as green vegetables, whole grains, seeds and legumes, are generally scarce on the fast-food menu.

