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Global Nutraceuticals Market

TechSci Research Analysts in Conversation with:

Dr. Amit Chandra

(Distinguished Scientist and Fellow Botanical Innovation and Strategy, Amway R&D)

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Dr. Amit Chandra serves as Fellow / Advisor for Botanical Innovation at Amway Innovation and Science, I&S), previously known as R&D at Amway Corporation. He is a world class science expert in botanicals/herbals, dietary supplements, nutraceuticals, and cosmeceuticals.

Dr. Chandra is a pharmacognosist / Phyto-chemist / phyto-pharmacologist with a doctorate in Natural Products Chemistry (from CSIR-India), with 35 years of global experience in academia and industry.

Amit's area of focus at Nutrilite & Artistry brands at Amway is directed towards innovation, discovery and development of health and beauty products (dietary supplements, traditional herbals, food and beverage, cosmetics, skin, and personal care). His research has gained him 82 peer reviewed publications and over 83 invited presentations in international platforms of peers to date.

He has 18 patents in his career so far. He is very focused and active on the scientific areas that relate to delivering authentic, safe, and efficacious botanicals/herbals as part of dietary supplements and traditional medicine for health and beauty.

Amit's passion is to convert the traditional botanical medicine / ingredients that have established evidence of efficacy based on ancient wisdom by using modern science to evolve into current products that can delight consumers. The focus is also on consistency in quality, safety, and authenticity of ingredients.

Dr. Chandra participates and serves as a subject matter expert (SME) in international scientific societies and organizations such as AOAC (International Association of Analytical Communities), ASP (American Society of Pharmacognosy), ABC (American Botanical Council), AHPA (American Herbal Products Association), NCNPR (National Center for Natural Products Research), SCC (Society of Cosmetic Chemists), ICSB (International Conference for Science of Botanicals) to name a few. In 2013 he was conferred the award of distinguished scientist by Amway R&D and in 2019 he was conferred the lifetime achievement award of "Fellow of AOAC International" for his meritorious service to that organization. He has also partnered with AYUSH and FSSAI in India for creating good practices for botanical integrity.

Amit's Mantra: Let ancient wisdom meet modern science for holistic wellness solutions that help people live happier and healthier lives.

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How is your work related to nutraceuticals industry?

I work as a fellow / advisor for botanicals and herbals innovation at Amway Corporation. It is a global company and the NutriliteTM brand of Amway is a leading global brand for vitamins, minerals, and dietary supplements (VDS) in the industry. Botanical and herbal ingredients that are part of VDS formulation are nutraceuticals.

My education and experience (38 years) is in the science of phyto-pharmacology / pharmacognosy with an expertise in nutraceuticals, traditional herbal medicine, and dietary supplements (ingredients, efficacy, chemistry, analysis, regulatory compliance per se).

Are Dietary Supplements/Functional Foods all Nutraceuticals or are different?

Nutraceuticals are single ingredients. They can exist as pure compounds and/or as mixtures / extracts such as botanical extracts or whole dehydrated herbs (single or blended). A dietary supplement / functional food may contain single or multiple ingredients in a given formulation.

How do nutraceuticals help in improving the health?

The word Nurtaceutical is derived from, “nutra”- for nutrition and “ceuticals”- for refined healing/therapy/health-benefit. This should not be confused with pharmaceuticals.

Nutraceuticals help to maintain optimal health by balancing the nutrition gaps in the human body and thus helping to prevent onset of comorbidities by physiological mechanisms. They are not meant to cure a decease. In general, they help to provide and maintain a healthy lifestyle.

Nutraceuticals are being derived from Plant, Animal and Microbial Sources. Can you elaborate which source is good?

As I mentioned above, nutraceuticals can be synthetic and/or derived from any natural source of land or water. However, they are regulated and must comply for purity, safety, toxicity, and traceability globally.

There are also regulations for avoidance of trace contaminants such as pesticides, heavy metals, etc. All sources are good if they follow regulations and have GRAS (generally recognized as safe) status and manufactured / formulated in a cGMP facility.

Over the years, the trend of deriving Nutraceuticals from plants has increased. Can you elaborate why this has happened and what are the benefits?

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You are right. This trend has increased and is not looking back. I will give you an example: In a typical day, an average adult human should consume a serving of fresh fruits and vegetables that have five colors (red, yellow/orange, blue/purple, green, white) with a range of multiple tastes and smell (olfactory properties). This comes to about 0.45 kg – 0.50 kg fresh weight / of fruits and vegetables per day.
This is how mother nature wants us to consume healthy food for healthy nutrition. Research has shown that 75% of adults do not follow this rule (due to multiple reasons).
Hence plant-based supplements that contain the necessary phytonutrients to help us fill the nutrition gap are always the second-best choice. Also, to add here is the fact that those phytonutrients are biodegradable, environment friendly and typically accepted by our body due to their natural origin.
Plants and humans have lived together for ages and there is a lot of ancient wisdom to support the benefits derived through them (traditional herbal medicines, ethnobotany, folklore use).
Applying modern sciences to ancient wisdom has catapulted this trend.

What plant parts (roots/leafs/seeds/flowers) are used for deriving nutraceuticals?

All / any plant parts can be used. There is no rule just to prefer one over the other. It depends which plant part has which phytochemicals / phytonutrients that are being extracted for targeted health benefit.

Can you elaborate the role of herbals and botanicals as nutraceutical ingredients?

If you ask this question to a botanist there are three kinds of plants. Herbs, shrubs, and trees. The parts derived from them are typically called botanicals (from ingredient perspective). But if you ask the same question to a person like me from the VDS industry, the concept becomes more human friendly and goes like this. Herbal = medicinal plant while botanical = plant-based ingredient containing specific phytochemicals for optimal health.
Both originate from plants.
“Herbals” are typically based on ancient wisdom and history of benefits from human use (established benefits), while “botanicals” are typically based on proven health benefits based on processing/extraction targeted for specific phytochemicals (created benefits).

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What are the regulatory aspects that need to be taken care of or need to be addressed while preparing nutraceuticals from herbals and botanicals?

I think I mentioned this above somewhere. Typically, a plant-based nutraceutical should be traceable, GRAS, quality controlled, manufactured in a cGMP facility, devoid of trace contaminants.

Health benefits claims (for prevention not cure) are also allowed by some (not all) markets (example: Health Function Food / HFF in South Korea), but those need extensive proof of efficacy, safety, and characterization by human clinicals, toxicology and phyto-chemistry.

Can you elaborate on the process of producing nutraceuticals from plant-based sources?

There are three typical ways. First and easiest is freeze dried and powdered (dehydrated herbs or botanicals). Second, is gravimetrically standardized based on actual weight by weight or original plant to resultant dried extract basis (for example: a 4:1 extract means one part of extract is equivalent to four parts of starting material).

Third, is phytochemical based targeted extraction and standardization to have end products with specific levels of specific phytochemicals / phytochemical class (for example: green tea extract containing 40% catechins).

What is the difference in production time, shelf life and effects on health between plant-based nutraceuticals and other counterparts?

By regulation, products need to have a legit label claim for ingredients it contains, and a shelf-life date based on stability studies that lives up to a certain percentage of the claim (typically 80-100% at end of shelf life).

It is a fact that natural products are more labile to heat, light, and humidity than their synthetic non-plant-based nutraceutical counterparts. The health benefits are only "valid" until the end of the shelf life.

The regulations have a specific ask on how to conduct stability studies for compliance. It is different from country to country. Since these are derived from plants the production lead time is much longer than their synthetic counter parts as "nature" has role to play in obtaining the starting plant material.

Do you think herbals and botanicals can replace pure compounds in nutraceuticals in the coming years?

In my opinion it may not happen. Both will exist and synergize with (or com-



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plement) each other rather than replace it. Yes, what I think is that the science behind herbals and botanicals will get stronger and stronger to a certain point that the definition of prevention versus cure could be re visited in future. Also, sustainability will emerge as a big player in the manufacturing process, giving rise to the need for alternate agriculture beyond farms (controlled environment agriculture practices).

How has COVID-19 changed the use of herbals and botanicals in the nutraceuticals industry?

Focus on Immunity, Respiratory and Healthy Life Span (healthy aging) is on forefront from plant-based solutions since COVID-19. This trend is there to stay in our industry. Hence authenticity, quality and legit science is the need of the hour.

Current situation and post COVID-19, we will see a huge surge in demand and an extreme challenge with supply chain. Also, the way the global weather is changing we will also see a challenge in the yield of beneficial phytochemicals from plants when grown naturally. Consumer desire to see/experience health benefits faster and instantly is another challenge with botanical based nutraceuticals.

This is giving rise to "economically" and "instant benefit" motivated botanical adulteration in quality. It is extremely important that the botanical integrity is maintained all the way from seed to shelf to prevent adulteration at different steps of processing.

"Economically Motivated Adulteration": Spiking a botanical extract with pure phytochemicals from synthetic or other botanical source to pass quality control test for compliance (for example, spiking pomegranate extract with synthetic ellagic acid to pass quantitative test).

"Instant Benefit Motivated Adulteration": Spiking botanical extracts with pharmaceuticals.

For example, spiking weight loss, sexual enhancement, and pain management herbal products with pharmaceutical drugs.

I and several of my global peers from industry, government, academia, and regulatory bodies have formed a cohort to join hands, re-visit and create good practice guidelines for ensuring botanical integrity from seed to shelf. This is a work in progress.



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