

Impact of Nutraceuticals on global health: Current challenges and future perspective

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Natural products, especially plant extracts, have been used for thousands of years for maintaining health vigor and for prevention and treatment of diseases. With the current world population at seven and-half billion, rising health care costs, and drug resistance, the use of complementary and alternative medicine is inevitable. Out of the US and Europe, 80% of people rely on dietary supplements. Presently, 150 million Americans consume at least one supplement every day. These complementary and alternative medicines are also referred to as Ayurvedic, Unani, traditional Chinese medicines, etc. In 1989, Dr. Stephen DeFelice coined the term “Nutraceutical” from “Nutrition” and “Pharmaceutical”, and defined it as “A food (or part of a food) that provides medical or health benefits, including the prevention and/or treatment of a disease”. By the turn of the 21st century, the use of nutraceuticals has exploded to safeguard human and animal health. Currently, revenue of the nutraceutical industry is more than \$250 billion per year. From a “One Health” perspective, nutraceuticals are used for infectious and non-infectious diseases in humans and animals. By having antioxidative, anti-inflammatory, immunomodulatory, cytoprotective, antimicrobial, anti-parasitic, anti-fungal and many other properties, nutraceuticals are used for cardiac, respiratory, hepatic, neurodegenerative (Alzheimer’s and Parkinson’s), diabetes, arthritis, cancer, and other ailments. Additionally, phytochemicals are playing a vital role in controlling vectors and thereby mitigating the spread of diseases such as malaria, West Nile, dengue, and others around the globe. In spite of their worldwide use in human and animal health, nutraceuticals lack mechanistic rationale and quality standards compared to pharmacotherapeutic drugs because of their inadequate efficacy, safety and toxicity evaluation, lack of clinical studies, and inadequate regulatory guidelines. In the US, the only major regulation related to nutraceuticals is the 1994 passage of the Dietary Supplement Health and

Education Act by the US Congress. If Farm Bill 2018 is passed by the US Congress, then cannabis, for pain management, atopic dermatitis, osteoarthritis, and many other health conditions, will be the most popular nutraceutical. In the EU, current regulations require evidence that herbal medicinal products meet acceptable standards of quality, safety, and efficacy before a product can be issued. Currently, the nutraceutical industry is facing too many challenges, including quality control, evidence of therapeutic efficacy, food-nutraceutical-pharmaceutical interaction, and assurance of product safety. By all means, the future of nutraceuticals in human and animal health seems bright as novel nutraceuticals will divulge optimal efficacy with few or no side effects.

Speaker Biography

Ramesh C Gupta, earned his DVM, MVSc, and PhD in India, and carried out his postdoctoral training at Michigan State University (1981-1983) and Vanderbilt University (1983-1987) in the US. Currently, he serves as Professor and Head of the Toxicology Department, Murray State University. For more than 35 years, he has conducted experimental brain research in relation to pesticide and neurodegenerative diseases, and for the last twenty years has been heavily engaged in nutraceuticals research. He has made presentations in the UK, France, Australia, Italy, Japan, Germany, Switzerland, Spain, Czech Republic, Sweden, Finland, South Korea, and China. Dr. Gupta has served on the panels of NIH, CDC, NIOSH, and National Academy of Sciences, and has published >425 publications, including eight major books: (1) Toxicology of Organophosphate and Carbamate Compounds, (2) Veterinary Toxicology: Basic and Clinical Principles, (3) Handbook of Toxicology of Chemical Warfare Agents, (4) Anticholinesterase Pesticides: Metabolism, Neurotoxicity and Epidemiology, (5) Reproductive and Developmental Toxicology, (6) Biomarkers in Toxicology, (7) Nutraceuticals: Efficacy, Safety and Toxicity, and (8) Nutraceuticals in Veterinary Medicine (in preparations). In 2006, he received the Murray State University’s Distinguished Researcher Award; and in 2014, Outstanding Research Award. He is a Diplomate of the American Board of Toxicology, and Fellow of American College of Toxicology, American College of Nutrition, and Academy of Toxicological Sciences. Currently, he holds active membership in more than a dozen academic societies, including American College of Nutrition, American Veterinary Medical Association, American Society for Pharmacology and Experimental Therapeutics, Society of Toxicology, Eurotox, International Society for the Study of Xenobiotics, and American College of Toxicology.

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