

# Chapter 1

## Nutraceutical Industry with the Collaboration of Biotechnology and Nutrigenomics Engineering: The Significance of Intellectual Property in the Entrepreneurship and Scientific Research Ecosystems

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### ABSTRACT

*This article highlights the relevance of the nutraceutical industry and the implication of biotechnology and nutrigenomics in the field of human health, to increase the quality and range of scope of their products. People in the world take every day functional foods constituted by nutraceutical ingredients. Only in the United States, 47% of men and 50% of women take daily vitamin complexes, inorganic nutrients and other food supplements that are made from nutraceutical ingredients. The article analyzes the nutraceutical industry in the leading countries worldwide. The number of existing companies in this sector is examined, in addition to analyzing the intellectual property generated by this industry. At the same time, it deepens in the number of patents assigned to the enterprises and the scientific publications consigned to each author (particularly to “star scientist”) is observed. Finally, the regulations and policies concerning nutraceuticals products of the different countries are analyzed.*

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## **INTRODUCTION**

The nutrients obtained from adequate foods are vital to maintaining the functionality of the human body. With recent advances in biotechnology (bio/pharma/genomics), medicine and nutrition, the benefits of food have received wide attention from health professionals and the population. New concepts have appeared with this trend, such as functional foods, nutraceuticals, nutritional therapy, nutrigenomics, among many others (Bagchi, 2006). In this way, Stephen DeFelice, in 1989 coined the term “nutraceutical” like a natural product or substance that is a food or a part of food with biological active properties, with health benefits and disease prevention capacity and/or therapeutic effects.

One of the major difficulties in the classification of nutraceuticals, is knowing exactly what the parameters established by each country to know what products may or may not be considered as such are nutraceuticals. This is due to the large number of components and derivatives that can be used to make a nutraceutical product.

In contrast to the natural herbs used by the Asian traditionalists folk medicine, nutraceutical products is a contemporary approach, with a very strict scientific basis in food, pharma, nutrigenomic and biotechnology components, to follow patterns of modern medicine and nutrition and to use genetic engineering to obtain surprising results in the field of healthy foods. The frontier between healthy food, nutraceuticals and medicines is very close. From this, is important to uniform the legislation through public policies, both for developed and developing countries, as important issues of nutrition and health is present in such products.

According to the Association of American Food Control Official [AAFCO] (1996), two segments constitute the nutraceutical word, one is “nutrient” and the second segment refers to “Pharma or even bio/pharma/genomics”. “Nutrient” means any substance contained in foods that cannot be created by the human body, which aims to provide energy, amino acids or essential elements. While the second segment, mean the properties and actions of natural or synthetic substances in living organisms (conformed by small and/or big molecules manipulated by the human for specific actions). Then the joining of the two words gives “nutraceutical”, that is any non-toxic food component that has been scientifically proven the health benefits, including prevention and treatment of disease. A more complete definition is developed by Agriculture and agri-food Canada (2006) in which nutraceuticals are:

*...products purified from foods that are generally sold in medicinal forms, such as powders, tablets or capsules, demonstrated to have physiological benefits or to provide protection against chronic disease. Nutraceuticals can be derived from plants (e.g., antioxidants, Echinacea, fenugreek, etc.), from animals and microorganisms (e.g. elk velvet, essential fatty acids, enzymes, etc.) and from marine sources (e.g., glucosamine, chitosan, fish oils, etc.).*

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