

The Natural Bioactive Substances and Its Nutritional Benefits

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Abstract

Several fields of modern chemical studies were inspired by and still follow the chemistry of natural substances. New therapeutic choices were made possible in particular by natural chemicals, and the history of medicinal chemistry is full of instances in this regard. Furthermore, modern drug discovery tools can provide natural derivatives a new lease on life by allowing the traditional applications of compounds derived from nature to be rationalized and translated into contemporary medicinal chemistry. The identification of new potential pathways and mechanisms of action targeted by such chemicals is also made possible by these conventional usages.

The secondary metabolites created by the plant cell through various metabolic pathways are known as bioactive substances. Numerous epidemiological studies contend that scavenging free radicals produced by the body through a diet high in bioactive chemicals can lower the incidence of degenerative diseases like diabetes, cancer, obesity, and cardiovascular issues.

Keywords: Secondary Metabolites (SMs), Bioactive Substances, Natural Products.

Introduction

Using natural bioactive chemicals found in plant sources as antioxidants to scavenge free radicals has become more and more popular. Due to their low cost of production and lack of side effects, several agri-food pharma firms are now exclusively looking for natural bioactive substances, their formulations, and methods for treating numerous degenerative diseases. Because of this, recent advances in phytochemistry have enabled the extraction and identification of several novel bioactive chemicals from a wide range of plant sources, opening the door to their use in the food, cosmetic, and pharmaceutical industries. To recover the bioactive chemicals from natural sources, however, proper extraction and identification procedures are required. The approach is now more accessible and successfully implementable across a variety of businesses, particularly the

agri-food pharmaceutical industry, thanks to these advancements in bioactive chemical formulations.

The findings of an international collaboration between scientists from Egypt and Saudi Arabia shed light on the production of cytokines from transgenic *Raphanus sativus* L. plants, which control the immune system's response to viral and bacterial infections [1,14]. This suggests that *R. sativus* is a source of a biologically active compound that acts as an anticancer and antiviral drug. *Abelmoschus manihot* flower extract was prepared using ethanol, methanol, and supercritical fluid extraction. This study [2,3,16,17] looked at the neuroprotective efficacy of this extract against PC12 cell cytotoxicity, oxidative stress, and inflammation. While the supercritical extract induced 10% cell death with a stronger protective effect on PC12 cell apoptosis, a concentration of ethanolic and water extracts had toxic effects on PC12 cells.

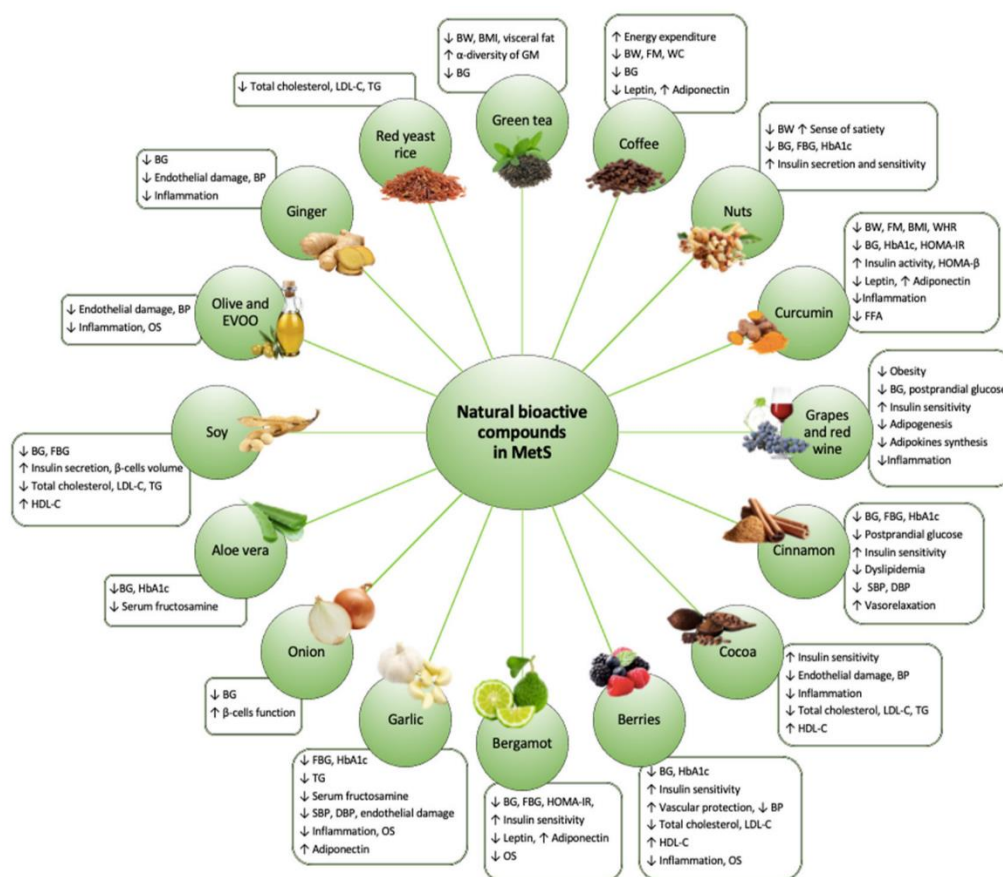


Figure (1). Classification of Natural Bioactive Substances [15].

In PC12 cells, the supercritical extracts increased the expression of antioxidant enzymes, encouraged the creation of an intracellular antioxidant with reduced glutathione, and decreased the generation of reactive oxygen species. This suggests that the supercritical extracts are effective at repairing oxidative stress-related damage and further delaying the onset of oxidative stress-induced neurodegenerative diseases. A similar conclusion was reached by [4,5,618] about AdpA_1075's regulatory role as a worldwide regulator of morphological differentiation and secondary metabolism, which supports *Actinosynnema pretiosum's* ansamitocin production. Another Portuguese study team created yogurt that was enhanced with encapsulated tomato extract after discovering the storage stability and *in vitro* bio-accessibility of the latter [7,8,15,19] (Figure 1).

The overview of the bioactive components (also known as cannabinoids) in cannabis (*Cannabis sativa* L.), biosynthesis, post-harvest operations on the cannabinoid profile, drying treatments, and the impact of various post-harvest operations on the cannabinoid yield was provided by [9,10,20,21]. To enhance the extraction and identification of cannabinoids from cannabis, this review recommended optimizing the drying conditions, pre-treatment procedures, and curing conditions. Numerous studies have advised using micro/nano encapsulating techniques, which were illustrated in a review by [11,12,13] because the bioactive chemicals are sensitive to internal and/or exterior conditions. This review came to the conclusion that bioactive substances needed to be encapsulated using nanofabrication technologies in order to control their release and extend their shelf life for the development of functional meals.

Conclusion

Natural bioactive substances following plant secondary metabolites (SM) are considered compounds. Many recent studies have highlighted the importance of their activity as antioxidants, protection against microbial growth, and anti-inflammatory effects, especially since these compounds are of natural origin and therefore have no negative health effects. Therefore, we recommend and recommend the intake of these compounds as natural additives in functional foods and other food processing.

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