

Epigenetic Modifying Potential of Dietary Spices: Link to Cure Complex Diseases

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Abstract : In the today's world of pharmaceutical products, one should not forget the healing properties of inexpensive food materials especially spices. They are known to possess hidden pharmaceutical ingredients, imparting them the qualities of being anti-microbial, anti-oxidant, anti-inflammatory and anti-carcinogenic. Further aberrant epigenetic regulatory mechanisms like DNA methylation, histone modifications or altered microRNA expression patterns, which regulates gene expression without changing DNA sequence, contribute significantly in the development of various diseases. Changing lifestyles and diets exert their effect by influencing these epigenetic mechanisms which are thus the target of dietary phytochemicals. Bioactive components of plants have been in use since ages but their potential to reverse epigenetic alterations and prevention against diseases is yet to be explored. Spices being rich repositories of many bioactive constituents are responsible for providing them unique aroma and taste. Some spices like curcuma and garlic have been well evaluated for their epigenetic regulatory potential, but for others, it is largely unknown. We have evaluated the biological activity of phytoactive components of Fennel, Cardamom and Fenugreek by in silico molecular modeling, in vitro and in vivo studies. Ligand-based similarity studies were conducted to identify structurally similar compounds to understand their biological phenomenon. The database searching has been done by using Fenchone from fennel, Sabinene from cardamom and protodioscin from fenugreek as a query molecule in the different small molecule databases. Moreover, the results of the database searching exhibited that these compounds are having potential binding with the different targets found in the Protein Data Bank. Further in addition to being epigenetic modifiers, in vitro study had demonstrated the antimicrobial, antifungal, antioxidant and cytotoxicity protective effects of Fenchone, Sabinene and Protodioscin. To best of our knowledge, such type of studies facilitate the target fishing as well as making the roadmap in drug design and discovery process for identification of novel therapeutics.

Keywords : epigenetics, spices, phytochemicals, fenchone

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