

Title: A Mechanistic Review on Therapeutic Potential of Medicinal Plants and their Pharmacologically Active Molecules for Targeting Metabolic Syndrome

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Abstract: Metabolic syndrome (MetS) therapy with phytochemicals is an emerging field of study with therapeutic potential. Obesity, insulin resistance, high blood pressure, and abnormal lipid profiles are all components of metabolic syndrome, which is a major public health concern across the world. New research highlights the promise of phytochemicals found in foods, including fruits, vegetables, herbs, and spices, as a sustainable and innovative method of treating this illness. Anti-inflammatory, antioxidant, and insulin-sensitizing qualities are just a few of the many positive impacts shown by bioactive substances. Collectively, they alleviate the hallmark symptoms of metabolic syndrome by modulating critical metabolic pathways, boosting insulin sensitivity, decreasing oxidative stress, and calming chronic low-grade inflammation. In addition, phytochemicals provide a multimodal strategy by targeting not only adipose tissue but also the liver, skeletal muscle, and vascular endothelium, all of which have a role in the pathogenesis of MetS. Increasing evidence suggests that these natural chemicals may be useful in controlling metabolic syndrome as a complementary treatment to standard medication or lifestyle changes. This review article emphasizes the therapeutic potential of phytochemicals, illuminating their varied modes of action and their ability to alleviate the interconnected causes of metabolic syndrome. Phytochemical-based interventions show promise as a novel and sustainable approach to combating the rising global burden of metabolic syndrome, with the ultimate goal of bettering public health and quality of life.

Keywords: Metabolic syndrome, phytochemicals, herbal treatment, medicinal plants, nutraceuticals, therapeutic potential.

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