Title: Targeted therapeutic management based on phytoconstituents for sickle cell anemia focusing on molecular mechanisms: Current trends and future perspectives.

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Abstract: The global epidemic of Sickle cell anemia (SCA) is causing thousands of children to die. SCA, a genetic disorder affecting the hemoglobin-globin chain, affects millions globally. The primary physiological issue in these patients is the polymerization of sickle hemoglobin within their red blood cells (RBCs) during their deoxygenating state. The RBC undergoes a sickle shape due to the polymerization of mutant hemoglobin within it and membrane deformation during anoxic conditions. To prevent complications, it is essential to effectively stop the sickling of RBCs of the patients. Various medications have been studied for treating SCA patients, focusing on antisickling, γ-globulin induction, and antiplatelet action. Natural and synthetic anti-sickling agents can potentially reduce patient clinical morbidity. Numerous clinical trials focused on using natural remedies for the symptomatic therapy of SCA. Medicinal plants and phytochemical agents have antisickling properties. Recent studies on plant extracts' natural compounds have primarily focused on *in vitro* RBCs sickling studies, with limited data on *in vivo* studies. This review discussed the potential role of phytoconstituents in the management of SCA.

Keyword: Sickle Cell Anemia/Disease, Plants, Phytochemicals, Treatment.

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