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Anti-sickling activity of *Daniellia oliveri* (Rolfe) Hutch. & Dalziel. bark aqueous extracts in the management of sickle cell disease in Benin.

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ABSTRACT

*Objective***:** *Daniellia oliveri* (African copaiba balsam tree) is a plant used in Benin in the treatment of sickle cell disease. It is a traditional plant, which not all virtues have been scientifically proved. This work was carried out to evaluate the action of the bark of *Daniellia oliveri* in the treatment of sickle cell crises.

Methods and Results: The aqueous extract of the bark of *Daniellia oliveri* was preincubated at different concentrations with cells of the SS phenotype before or after the Emmel Test. Methaemoglobin was assayed after incubation of the extract with haemoglobin. *In vivo*, the action of the extract on haematopoiesis was evaluated in Wistar rats. At a dose of 40 mg / ml of blood, the extract significantly inhibited and reversed the formation of sickle cells ($P < 0.05$). It lowered the production of methaemoglobin at a dose of 10 mg / ml. Haemoglobin level, MCV, and platelet count did not significantly change in treated rats.

Conclusion and Application of results: The aqueous extract of the bark of *Daniellia oliveri* therefore inhibited the sickling of red blood cells *in vitro* and could be considered as a preventive remedy for sickle cell attacks. In addition, it reversed sickle cells into normal shaped red blood cells and so could be considered in the development of curative treatments for the sickle cell crises. However, the extract did not increase haemoglobin and mean corpuscular volume. It did therefore not show any hematopoietic activity and could not be considered as a remedy for anaemia. In addition, the number of blood platelets did not increase indicating an absence of thrombopoietic

activity. It lowered the production of methaemoglobin in SS red blood cells indicating a decrease in oxidative stress in SS red blood cells. It could thus be used as an antioxidant for the prevention or treatment of attacks in people with sickle cell disease in combination with plants, which have antianeamic properties.

Keywords: Sickle cell disease; *Daniellia oliveri*; anaemia; Benin.