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Hemorheological action of trigonelline on in vitro glycated red blood cells

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Abstract: Trigonelline (T) is an alkaloid found in seeds and leaves of different plant species. Recent studies have demonstrated its lipid lowering, antioxidant and anti-diabetic activity. The objective of this work was to evaluate the hemorheological action of trigonelline on glycated red blood cells (gRBC). Erythrocytes were incubated with glucose solutions (GS) at different concentrations. They were then treated with a solution of trigonelline. These samples were observed under an inverted optical microscope. Stationary and dynamic viscoelastic parameters were measured using an Erythrocyte Rheometer. Amplitude (Amp100) and half aggregation time ($t_{1/2}$) were obtained by an optical chip erythrocyte aggregometer. When gRBC were treated with trigonelline, the results of the stationary viscoelastic parameters showed an increase with different GS concentrations. When gRBCs were treated with trigonelline (T) a slight decrease in phase-shift (δ) was observed at 1 Hz and a significant increase was evident at 0.5 Hz. Aggregation kinetics graphs showed Amp100 increase and $t_{1/2}$ decrease for gRBC 1 g/dL, while the inverse result was obtained for gRBC 0.2 g/dL. Our results are useful to understand the mechanisms by which trigonelline can be used to mitigate the effects produced in erythrocytes as a consequence of diabetes.

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