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Comparison of the effects of aspirin and salicylic acid on the structural changes and fibrillation of hemoglobin

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Abstract

Hemoglobin is one of the vital proteins in the body, playing a critical role in oxygen transport. Aspirin is a widely used medication. Salicylic acid is a natural compound found in various plants, particularly in willow bark extract. On the other hand, aspirin is a synthetic derivative of salicylic acid. Current research investigates and compares the effects of aspirin and salicylic acid on the structural changes and fibrillation of human hemoglobin. The methodology employed in this experimental study was investigated using spectroscopic techniques, including circular dichroism (CD), intrinsic fluorescence spectroscopy, and scanning electron microscopy (SEM). The results obtained from the intrinsic fluorescence emission through the incubation method indicate that the position of heme prosthetic group in hemoglobin-aspirin has changed or caused heme degradation more than hemoglobin-salicylic acid compared to the initial state. Findings from the circular dichroism spectroscopy, which was examined via the incubation approach, revealed a more significant alteration in the secondary structure of hemoglobin incubated with different concentrations of aspirin compared to salicylic acid. Additionally, the results from scanning electron microscopy (SEM) demonstrated that the sample incubated with aspirin exhibited a greater number and larger size of fibrils compared to the sample incubated with salicylic acid. The new current results is in agreement with the litrature statements that salicylic acid may stimulate the antioxidant mechanism pathway [1].

Key words: salicylic acid, Aspirin, human hemoglobin, heme degradation, fibrillation

References

[1] El-Esawi M.A., Elansary H.O., El-Shanhorey N.A., Abdel-Hamid A.M., Ali H.M., Elshikh M.S., Salicylic Acid-Regulated Antioxidant Mechanisms and Gene Expression Enhance Rosemary Performance under Saline Conditions, Frontiers in Physiology, 8, 716, 2017.