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A Search for New α-Glucosidase Blockers: Screening of Natural Dihydroxycoumarins

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Abstract- ***Postprandial hyperglycemia can be controlled by reducing the rate of starch hydrolysis in the gastrointestinal tract. Four natural dihydroxycoumarins were evaluated for α-amylase and α-glucosidase inhibitory activities. Daphnetin exhibited strong α-glucosidase inhibition while esculetin also showed significant activity. Molecular docking and fluorescence quenching studies supported the experimental findings.***

Keywords- ***Dihydroxycoumarin, Daphnetin, Esculetin, A-Glucosidase Inhibition, A-Amylase Inhibition***

I. INTRODUCTION

Diabetes mellitus is a chronic metabolic disorder associated with hyperglycemia. Inhibition of carbohydrate-hydrolyzing enzymes such as α-amylase and α-glucosidase is an important strategy for controlling postprandial blood glucose levels. Natural coumarin derivatives have shown promising antidiabetic properties.

II. MATERIALS AND METHODS

Four natural dihydroxycoumarins were screened using DNSA assay for inhibitory activity against α-amylase and α-glucosidase. Molecular docking and fluorescence quenching studies were also performed.

III. RESULTS

Daphnetin showed 100% inhibition against α-glucosidase and moderate inhibition against α-amylase. Esculetin also demonstrated strong α-glucosidase inhibition. Docking analysis confirmed favorable enzyme-ligand interactions.

IV. DISCUSSION

Adjacent hydroxyl groups in coumarin derivatives were found critical for enzyme inhibition. The findings support the potential of daphnetin and esculetin as antidiabetic lead compounds.

V. CONCLUSION

Daphnetin and esculetin demonstrated promising inhibitory activity against α-glucosidase and may serve as potential candidates for future antidiabetic drug development.

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REFERENCES

[1] World Health Organization. Global Report on Diabetes. Geneva: WHO Press; 2016.
[2] Hamdan II, Afifi F, Taha MO. In vitro alpha amylase inhibitory effect of some clinically-used drugs. Die Pharmazie. 2004;59:799–801.
[3] Arora RB, Mathur CN. Relationship between structure and anti-coagulant activity of coumarin derivatives. Br J Pharmacol Chemother. 1963;20:29–35.