

ABSTRACT

Hair Mist Innovation from Belimbing Wuluh (*Averrhoa bilimbi* L.) and Raspberry (Framboisier Rouge) Extracts as a Natural Sunscreen for Hair Protection Against UV Radiation

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This research investigates the potential of belimbing wuluh (*Averrhoa bilimbi* L.) and raspberry (Framboisier Rouge) extracts as a natural sunscreen in a hair mist formulation to protect against UV radiation. Prolonged sun exposure can damage hair, causing brittleness, dryness, discoloration, and moisture loss.

This study addresses the need for natural hair protection alternatives to synthetic sunscreens, which can have long-term side effects. Belimbing wuluh and raspberry were chosen for their antioxidant properties and potential UV protective compounds. Belimbing wuluh contains flavonoids and antioxidants, while raspberry is rich in vitamin C and anthocyanins, both known for photoprotective qualities.

The research employed an experimental method, extracting active ingredients from belimbing wuluh and raspberry using maceration. A hair mist formulation was developed, combining these extracts with hydrogel and olive oil, then diluted with distilled water. Human hair samples were treated with the hair mist and exposed to UV light for two weeks. The effectiveness of the hair mist was evaluated using Scanning Electron Microscopy (SEM) to analyze hair structure and Sun Protection Factor (SPF) testing to determine UV protection levels.

Results showed an optimal 2:3 ratio of extract to solvent for the hair mist formulation, providing good consistency and stability. SPF testing revealed an SPF value of 28.22, indicating high protection against UVB radiation. SEM analysis demonstrated that the hair mist formed a protective layer on the hair, preserving its structure and preventing UV damage compared to the control group. This research suggests that belimbing wuluh and raspberry extracts can effectively protect hair from UV radiation and that the developed hair mist is a promising natural sunscreen alternative with good stability and quality.