# Unveiling the Potential of Raspberry Leaves for Cosmetic and Dermatological Formulations

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Raspberry leaves, despite their potential health benefits, often face wastage on a global scale, leading to their classification as bio-waste. However, recent advancements have shed light on the significant bioactive compounds present in these leaves. Studies have unveiled their high phenolic content and potent antioxidant activity, sparking interest across various industries. Indeed, the present study delves into recent advancements and applications concerning raspberry leaves, focusing on their dermatological, antioxidant, antimicrobial, and antibiofilm activities. The primary aims are to explore the potential dermatological benefits of raspberry, antioxidant capacity, antimicrobial efficacy against relevant skin pathogens, and their ability to hinder biofilm formation. The findings reveal notable properties: a total antioxidant activity of 93.5%±0.12, a complete inhibition of hyaluronidase activity (100%), 69.4%±2.7 suppression of elastase, and 30.0%±5.9 attenuation of tyrosinase. Moreover, the antibiofilm results exhibit substantial inhibitory effects, with a mass quantification inhibition rate of 51 % against *Cutibacterium acnes*, and 42% against *Staphylococcus aureus*, accompanied by 41 % and 41 % suppression of their respective metabolic activities.
This study underscores the remarkable potential of raspberry leaves for dermatological applications, emphasizing their antioxidative, antimicrobial, and antibiofilm properties. These findings suggest their promising role in skincare and cosmetic formulations.

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**References:**

**[1]** Huang, Xin, Wu, Yaqiong, Zhang, Shanshan, Yang, Hao, Wu, Wenlong, Lyu, Lianfei & Li, Weilin (2023) Changes in Antioxidant Substances and Antioxidant Enzyme Activities in Raspberry Fruits at Different Developmental Stages. *Scientia Horticulturae* 321 (novembro): 112314. https://doi.org/10.1016/j.scienta.2023.112314.