Study on skincare properties of *Saccharomyces cerevisiae* Y017 isolated from Tibetan wine starter

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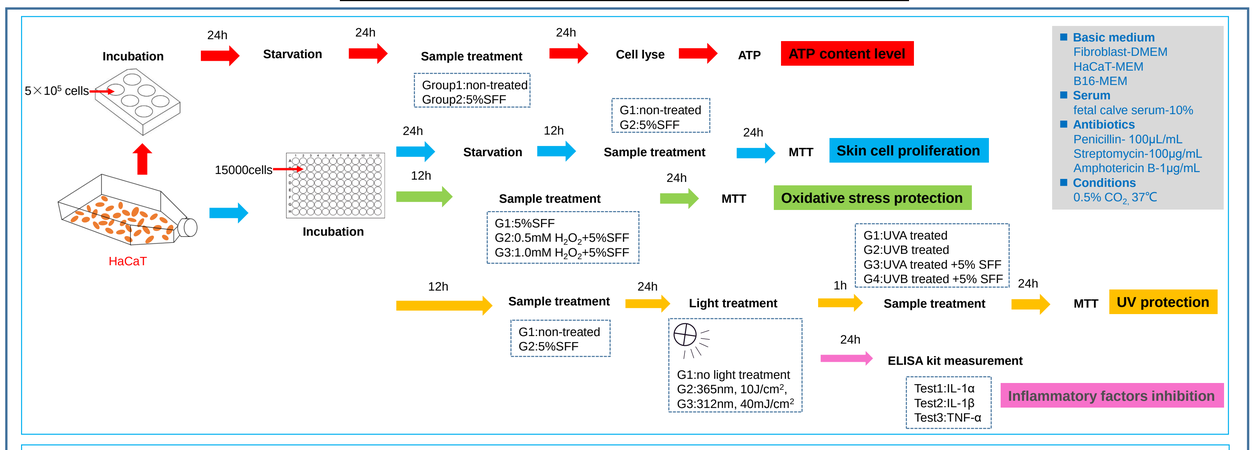
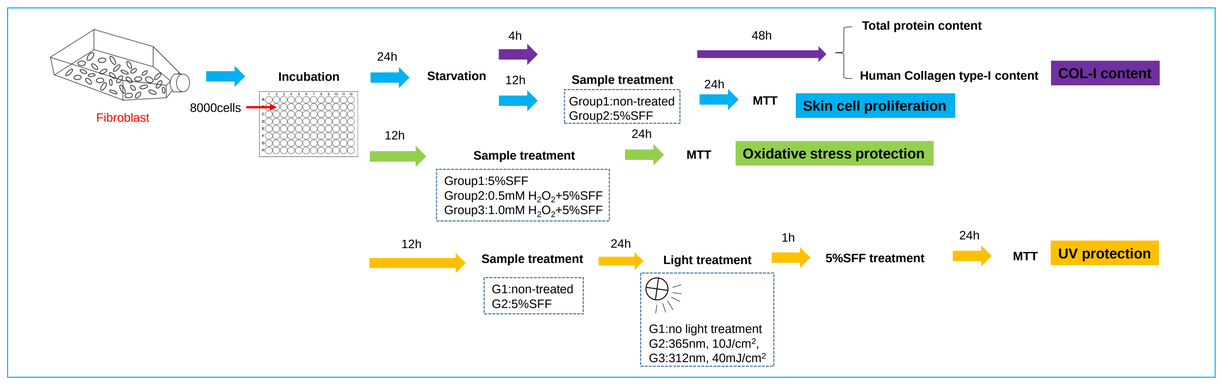
Li, Jun[1*]; Zhang, Zhang[1]; Zhou, Jing[1]; Zhou, Chunxia[1]; Wang, Yue[1]; Xie, Tong[1];
1 R&D Center, JALA (Group) Co. Ltd., Shanghai, China

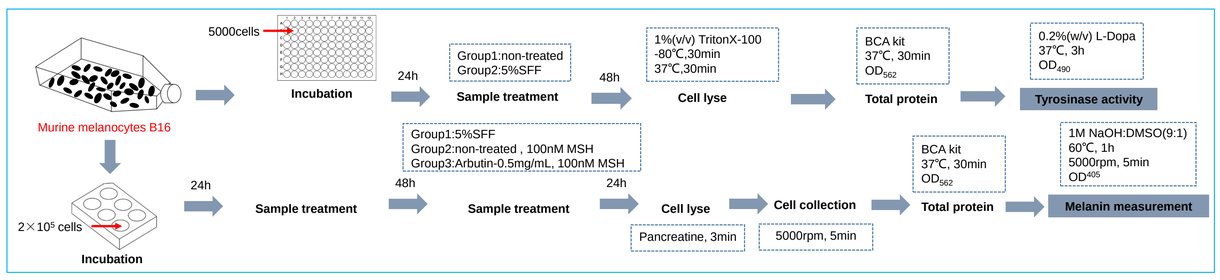
Introduction:

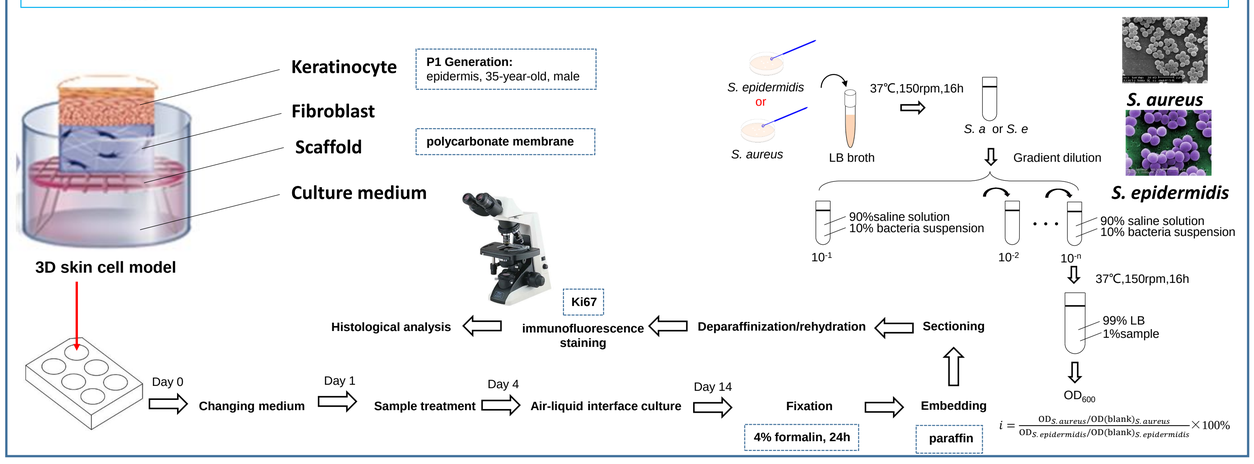
Himalaya is one of the biodiversity hotspots. It harbours a great diversity of microorganisms which includes bacteria, archaea, and fungi[1]. Been exposed to climatic conditions and topological characteristics, these microorganisms have different adaptations to combat the extreme environmental pressures such as strong ultraviolet, high altitude, low oxygen content and extreme climate, inducing these indigenous species to evolve stress resistance characteristics. Due to their uniqueness in the Himalayan region, some of these properties may have vast untapped potential in skincare, such as antioxidation, anti-inflammatory, and anti-ultraviolet radiation. Fermentation ingredients are playing important role in cosmetics and their commercial application blooms as active additives in high-end skincare products. Active ingredients such as vitamins, amino acids, polysaccharides, e.g., *β*-glucan and hyaluronic acid, and their derivatives are mass-produced as mature materials or intermediates in beauty products using various wild or recombinant strains[2-5]. However, few microbial strains isolated from the Himalayas are studied in cosmetics, so as well as their ferment products. In this study, a yeast was isolated from the traditional homemade wine starter and skincare properties of this *Saccharomyces* ferment filtrate (SFF) were investigated.

Materials & Methods:









Results & Discussion:

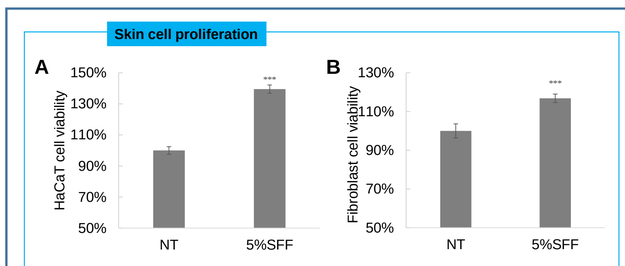


Fig. 1 Proliferation effects of SFF on HaCaT and Fibroblast cells

✓ **The fermented filtrate of *Saccharomyces cerevisiae* Y017 (SFF) invigorates the cells with higher viability on both HaCaT and fibroblast cells, reaching up to 139.49% and 116.84%, respectively.**

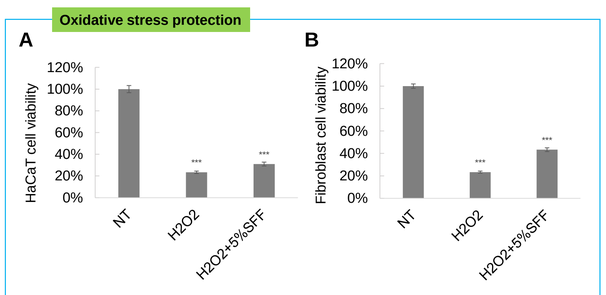


Fig. 2 Protection effects of SFF from H_2O_2 oxidative damage

✓ **SFF shows an impersonal scavenging activity both on HaCaT and Fibroblast cells against H_2O_2-induced oxidative damage.**

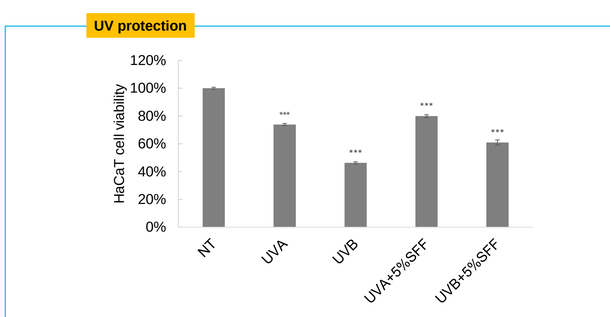


Fig. 3 Protection effects of SFF on HaCaT against UV-irradiation damage

✓ **As shown in Fig. 3, after the respective exposure under UVA and UVB, 5% SFF-treated HaCaT were restored from irradiation damage, regaining the cell viability from 73.83% to 79.95% and 46.30% to 60.92%, respectively.**

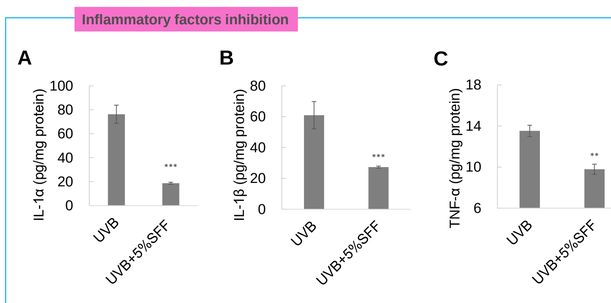


Fig. 4 Effects of SFF on UVB-induced inflammatory factors

✓ **In SFF incubated HaCaT cells, UVB-induced IL-1α decreases from 76.24 ng/(g protein) to18.72 ng/(g protein). IL-1β decreases from 60.94 ng/(g protein) to 27.29 ng/(g protein) and TNF-α decreases from 13.53 ng/(g protein) to 9.79 ng/(g protein).**

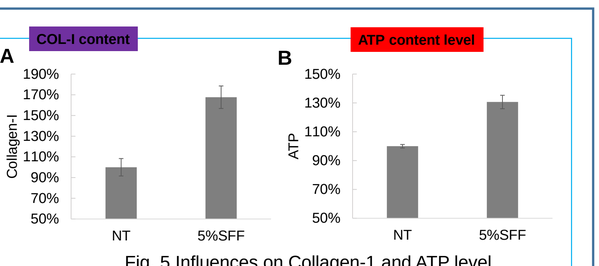


Fig. 5 Influences on Collagen-1 and ATP level

✓ **SFF promotes Col-I synthesis with a remarkable increase of 67.68% (Fig. 5A), and SFF induced a 30.66% promotion of the intracellular ATP level (Fig. 5B).**

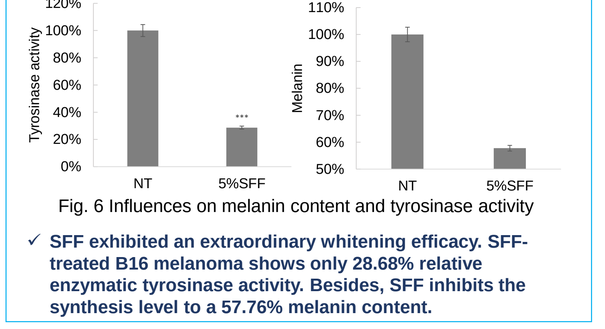


Fig. 6 Influences on melanin content and tyrosinase activity

✓ **SFF exhibited an extraordinary whitening efficacy. SFF-treated B16 melanoma shows only 28.68% relative enzymatic tyrosinase activity. Besides, SFF inhibits the synthesis level to a 57.76% melanin content.**

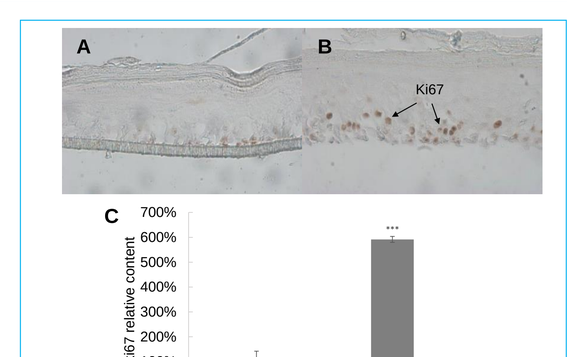


Fig. 7 Histological analysis of RHE

✓ **SFF is good biological mildness at the working concentration of 5%(v/v), providing a more regular and complete whole morphology of the RHE.**
✓ **Ki67 expression was remarkably accelerated in the Immunohistochemical staining evaluation of 3D RHE model, with a 591.70% increase (Fig. 7B), indicating a potential of basal cell proliferation.**

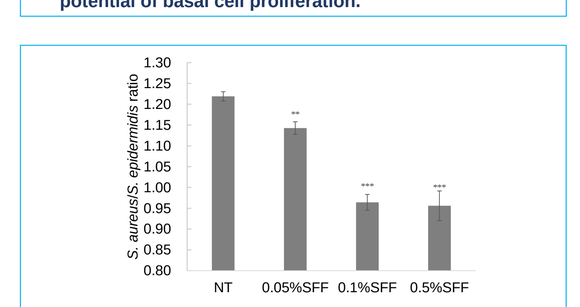


Fig. 8 Selective growth influence on *S. aureus* and *S. epidermidis*

✓ **SFF generally shows a concentration-dependent inhibition effect on the growth ratio of these two bacteria. 0.5% SFF decreases the ratio by 23.32% when compared with the non-treated group.**

Conclusions:

SFF exhibits a comprehensive cutaneous characteristic of cell proliferation, H2O2-induced oxidative stress protection, UVB damage recovery, synthesis inhibition of inflammatory factors, COL-I synthesis acceleration, ATP level promotion, and positive regulation on skin microbiota. Moreover, the basal cell proliferation efficacy of SFF was provided in the reconstructed 3D epidermis model. Basing on the evaluation results in this study, SFF is capable as an alternative additive in beauty products.

References:

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