

Beneficial Effects on Skin Health of Narcissus Bulb Polysaccharides

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Hsiao Tzu-Chih^{1*}, Lin Xiao-Feng¹, Gao Yuan-Yuan¹, Zhang Ya-Fen¹, Pan Fa-Wu¹, Chyau Chang-Cherng²
 1 Juwenlee Cosmetics Technology Center, LUO LIH-FEN Group, Fujian, China
 2 Research Institute of Biotechnology, Huang Kuang University, Taichung, Taiwan

Introduction:

Numerous works of literature have reported that polysaccharides-based cosmetics present multifunctional effects in the skin for reducing transepidermal water loss (TEWL) and protecting the skin barrier function. The aim of the study was to investigate the chemical properties of a polysaccharide extracted from Narcissus Bulb (NBP) and to evaluate its effects on skin moisture, as well as anti-allergy and anti-inflammation effects. Results indicated that a yield of 6% (w/w) of polysaccharides was obtained from Narcissus Bulb by using cold water extraction and ethanol precipitation methods^[1]. In the monosaccharide of NBP, mannose was the predominant sugar followed by glucose^[1]. In the basophils RBL-2H₃ cell model tests, NBP concentrations at 100-250 μg/mL showed dose-responsive effects on histamine release and 600-1000 μg/mL NBP could significantly inhibited the release of NO from Raw264.7 cells. These findings demonstrated that the prepared NBP in the study could present potential skin protection effects, including moisture content and TEWL, anti-allergy, and anti-inflammation effects. It could therefore be considered an excellent candidate for polysaccharide-based cosmetics.

Results & Discussion:

Preparation of NBP

The NBP extraction rate was 6%, which could give good economic value.

Impurity Detection

NBP has higher purity which doesn't contain starch, protein, colchicine (absorption peak 244nm) or lycorine (absorption peak 288nm), and high transmittance with no impurities.

Molecular Weight Determination

The GPC spectrum of NBP showed the peak area of 11.307min, which accounts for 94.6%, and its average molecular weight was 559kDa.

Liquid Chromatogram Analysis

The retention time of mannose was 30.3min and the retention time of glucose was 32.1min. The NBP was composed of mannose and glucose. Further calculated, the area ratio was 4:1 by the peak.

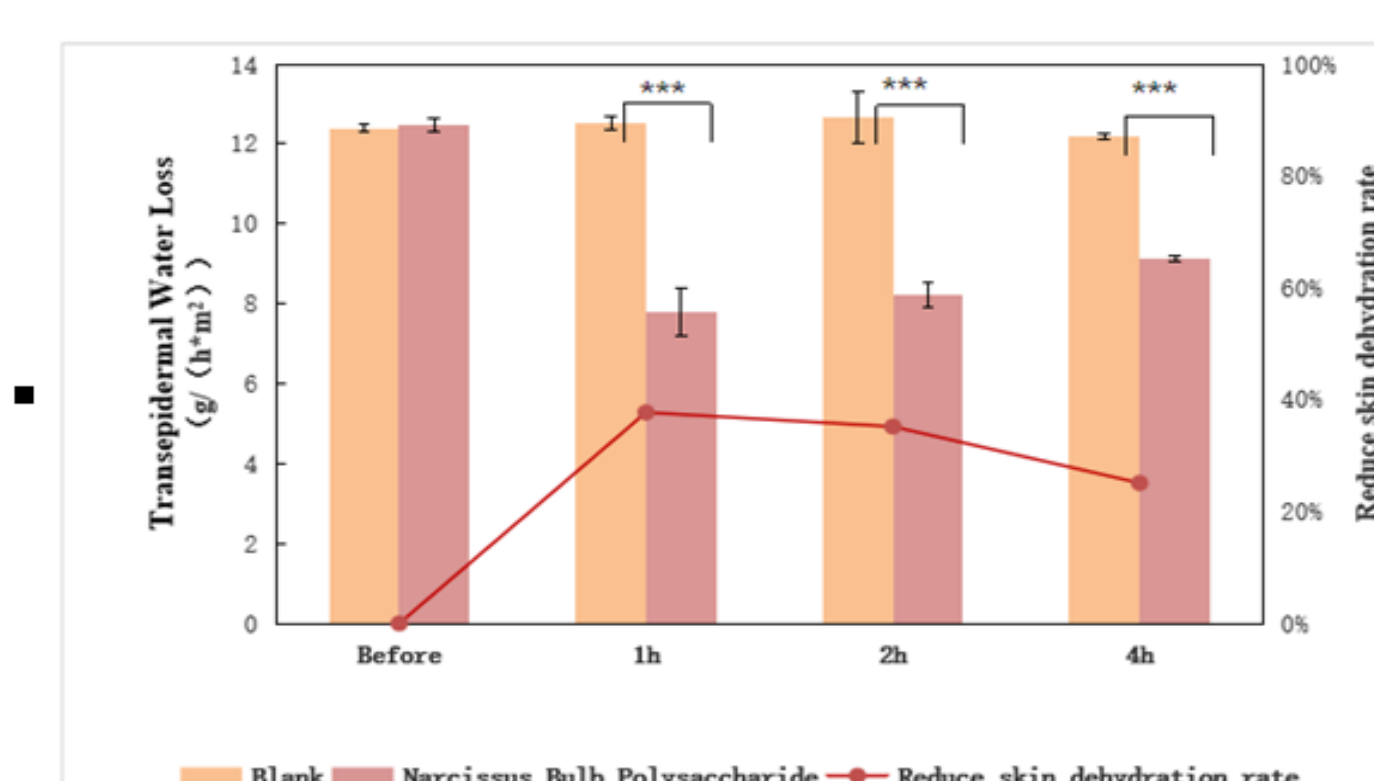
Infrared Spectroscopy Analysis

The material from NBP was a polysaccharide between 400 and 1300 cm⁻¹, and had an ester group^[3,4].

The result shows that 0.5% Narcissus Bulb Polysaccharide(NBP) can improve skin moisture content and decrease the TEWL, which shows NBP has great potential in cosmetics. In addition, we used RBL-2H₃ cells to evaluate anti-allergy activity of NBP. The result shows that NBP significantly reduces the release of histamine. For the anti-inflammation effect, NBP can reduce the production of NO in Raw264.7 cells. Therefore, the preliminary study indicates the potential application of NBP in the cosmetic industry for personal skin-care products.

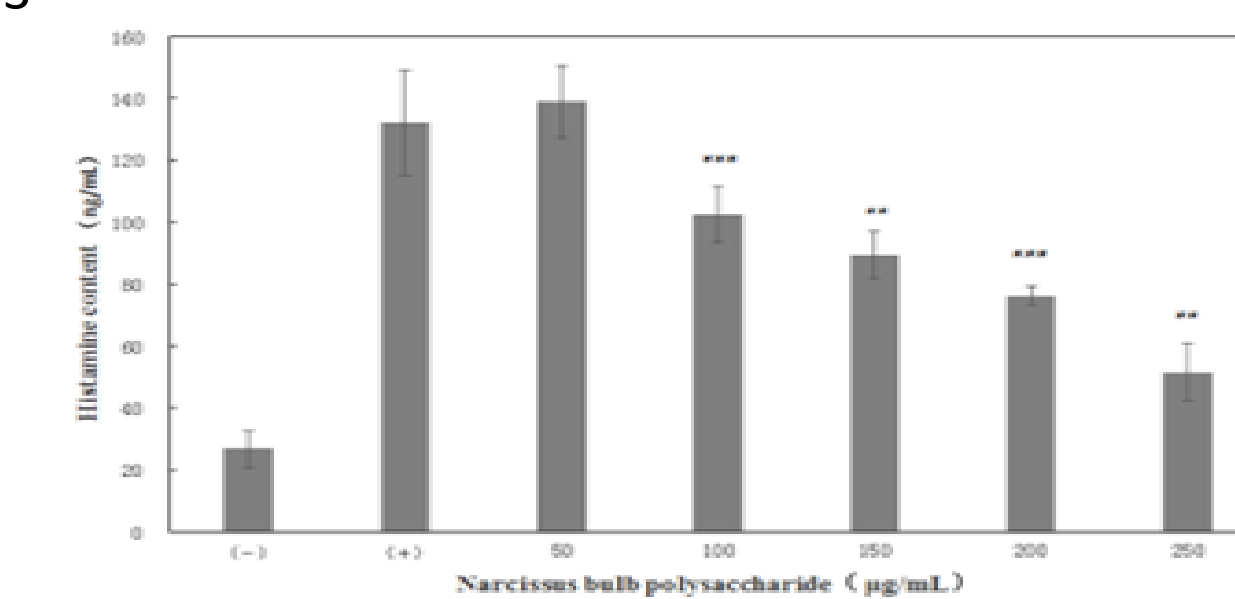
Skin Moisture Content and TEWL

The skin moisture content of the Blank group had been kept above 12.19 g/(h*m²), with a skin dehydration of 28.7%, while using 0.5% NBP, the group measured 9.13 g/(h*m²) moisture content and 37.5% TEWL.



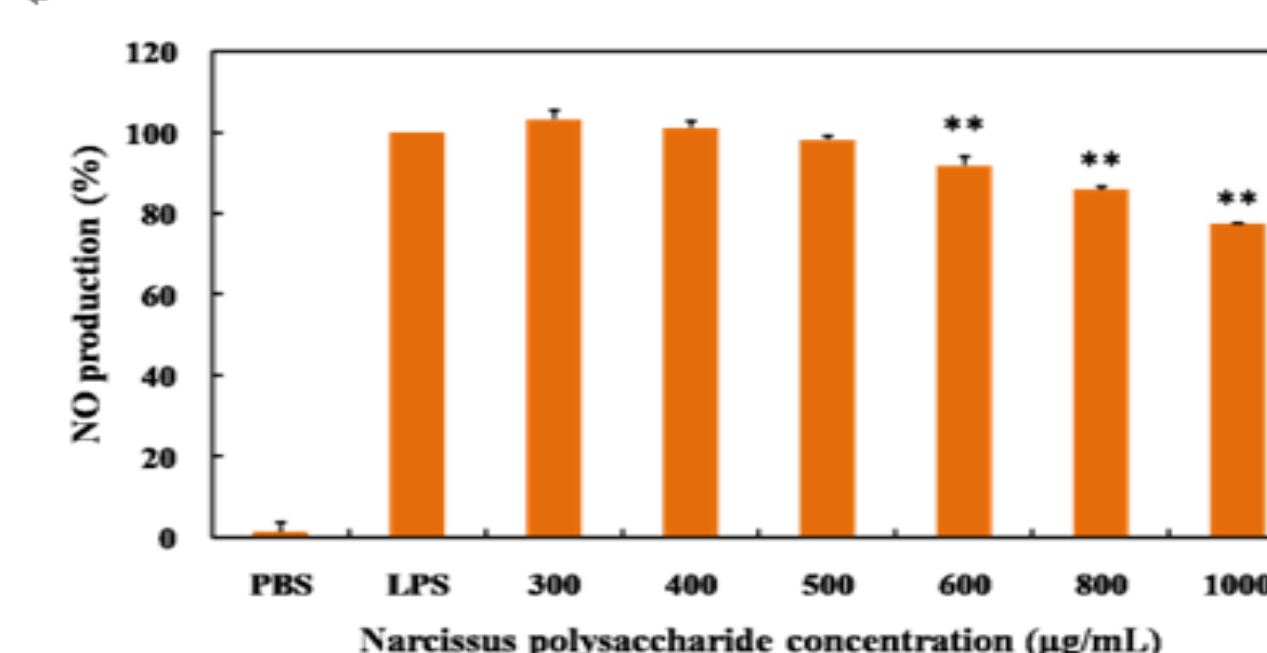
Anti-allergy Test of histamine

The 100-250 μg/mL NBP effectively inhibited the release of histamine from RBL-2H₃ cells.

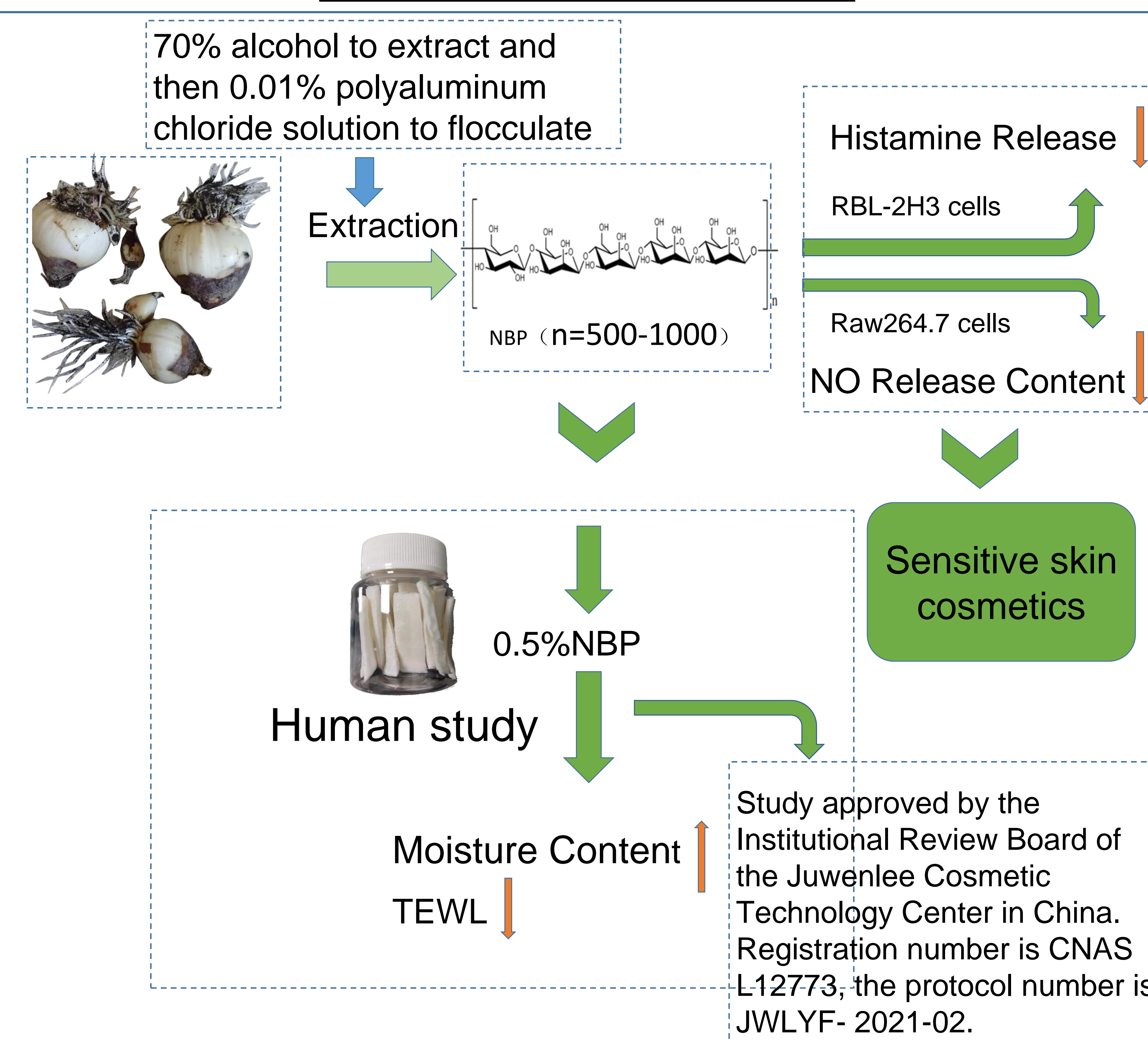


Anti-inflammation Test of NO

The 600 μg/mL NBP inhibited the release of NO from Raw264.7 cells^[5].



Materials & Methods:



Impurity Detection:

- ★I₂/KI Test Identification observed the colour.
- ★Coomassie Brilliant Blue Test observed the colour.
- ★Ultraviolet Spectrophotometer was scanned at 200-400nm.
- ★Molecular Weight Determination^[2].
- ★Pre-column PMP Derivatization Analysis of Monosaccharide
- ★Infrared Spectroscopy Analysis was scanned at 4000-500 cm⁻¹.

Conclusions:

The study found a total of 6.5% (w/w) of NBP, which severely reduced the viscosity. The product was mixed with starch, and it was difficult to separate from the polysaccharides. Narcissus Bulbs contain a variety of alkaloids, which have inhibitory effects on cancer cells, but are very toxic to common cells. Therefore, the alkaloids in NBP must be completely removed. With 0.5% NBP, changes of skin moisture content and TEWL can be seen. It may be that the NBP applied on the surface of the skin forms a film that protects the surface of the skin.

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