Effect of Antioxidants and skin barrier in embryonic callus derived of the domestic rose roots

Poster 585

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Introduction:

· Background: To maintain healthy skin cells, it is most important to prevent external invasion while strengthening the skin barrier. Roses that grow the most in the country have become used in many fields as a material that has a variety of benefits.
In this study, Sweet Yellow and 18R 120-11(Wongyo D1-409), which are fragrant and bred rose in Korea, was induced with callus to confirm their potential as an eco-friendly material for skin barrier improvement.
· Methods: The embryogenic callus derived from the rose's root was induced, and the callus was extracted with water, and the ellagic acid was confirmed through HPLC fraction. Especially, DPPH assay was performed to determine the antioxidant of Sweet Yellow callus and 18R 120-11, and it was confirmed that free radical scavenging activity was activated. It was confirmed that the expression levels of the proteins filaggrin (FLG).
· Results: These results lead that Sweet Yellow callus extract and others have been proven to be an antioxidant and have a significant effect in improving the skin barrier.
· Conclusion: Therefore, it is expected that the embryonic callus extract derived from the domestic rose roots can be widely used in anti-aging cosmetic materials as the fragrant rose.

Materials & Methods:

1. Production of Sweet Yellow and 18R 120-11 callus
2. Preparation of callus extraction
3. Analysis through HPLC
4. Culture of Human Skin Cells
5. Assessment of Cell Viability by MTT Assay.
6. Determination of Antioxidant/Free Radical Scavenging
7. Real-Time (RT)-PCR (SOD1, CAT, NRF1, FLG)

Table 2. Analytical conditions of the callus extracts using HPLC

Instrument	HPLC System (Agilent 1260 Infinity II system (U.S.A.))		
Column	Shim-pack GIS C$_{18}$ (4.6 × 250 mm, 5 μm, Shimadzu, Japan)		
Detector	Diode Array Detector (210, 255 nm)		
Mobile Phase	Mobile Phase A	0.1% Trifluoroacetic acid in water	
	Mobile Phase B	0.1% Trifluoroacetic acid in acetonitrile	
Flow	1 mL/min		
Injection volume	20 μL		
Mobile Phase Gradient	Time (min)	Mobile Phase A (%)	Mobile Phase B (%)
	0	100	0
	5	100	0
	75	50	50

Results & Discussion:

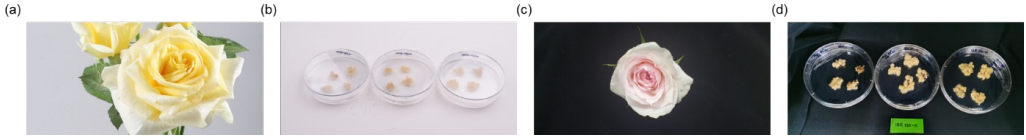

Fig. 1. Callus Induction of Sweet Yellow and 18R 120-11 callus
(a) Sweet Yellow rose (b) Sweet Yellow callus (c) 18R 120-11 rose (d) 18R 120-11 callus

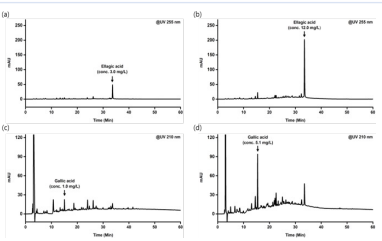

Fig. 2. HPLC chromatograms of Sweet Yellow and 18R 120-11 callus extracts.
Among the peaks of each chromatogram, the identified peaks were ellagic acid (RT 33.5 min) and gallic acid (RT 15.4 min). These two substances were contained more in 18R 120-11 than in Sweet Yellow. (a) Sweet Yellow (detected at UV 255 nm) (b) 18R 120-11 (at UV 255 nm) (c) Sweet Yellow (at UV 210 nm) (d) 18R 120-11 (at UV 210 nm)

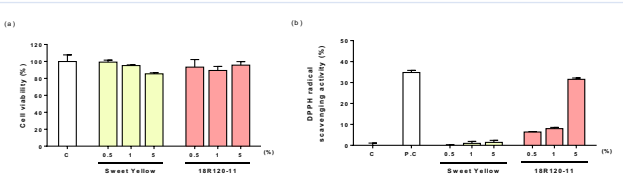

Fig. 3. The effect of Sweet Yellow and 18R 120-11 callus extract on HaCaT cell viability and Antioxidant Activity Cell viability for three different concentrations (0.5%, 1%, and 5%) of Sweet Yellow and 18R 120-11 callus Extract in HaCaT cells by MTT assay (a). DPPH Free Radical Scavenging Activity of Sweet Yellow and 18R 120-11 callus Extract (b). Data are expressed as mean± SD values (n=3) *P<0.05,**P<0.01, ***P<0.001 vs non treated control

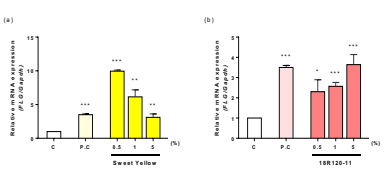

Fig. 5. In vitro assessment of Sweet Yellow and 18R 120-11 callus extract as skin barrier function by real-time RT-PCR.
Relative expression of filaggrin genes encoding FLG in response to treatment with three concentrations and C, P.C (Glyceryl glucoside 1%). (a-b) Data are expressed as mean± SD values (n=3), *P<0.05, **P<0.01, ***P<0.001 vs non treated control

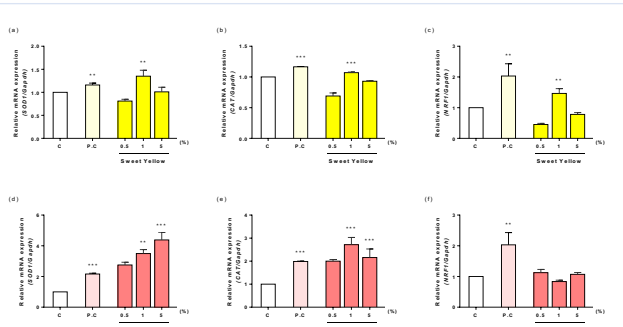

Fig. 4. Sweet Yellow and 18R 120-11 callus extract increases expression of antioxidant genes in HaCaT cells.
Relative expression of antioxidant genes encoding SOD1, CAT, NRF1 in response to treatment with three concentrations of Sweet Yellow(a~c) and 18R 120-11(d~f) and C, P.C (10mM N-acetyl-L-cysteine). Data are expressed as mean± SD values (n=3) *P<0.05,**P<0.01, ***P<0.001 vs non treated control

Conclusions:

Sweet Yellow and 18R 120-11 callus extract derived from fragrant roses are expected to be used as a good material for various industries using skin barrier improvement as well as the supply of antioxidant products for the prevention of ROS as a nature-friendly and eco-friendly material.

Acknowledgements:

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References:

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