Anti-oxidant activities of *Damnacanthus major* and *Hibiscus hamabo* Siebold & Zucc. treated methyl jasmonate

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Abstract

Damnacanthus major is an evergreen shrub that grows wild in temperate regions such as Jeju Island in Korea and southern Japan, and ***Hibiscus hamabo*** Siebold & Zucc. is a deciduous shrub plant, belonging to the Malvaceae, and inhabits mainly in coastal areas of Jeju island and south Jeonnam. In order to confirm its potential as cosmetic ingredients, we investigated the **antioxidant activity** according to different concentration of methyl jasmonate as an elicitor treatment method, which is one of the strategies for increasing the content of useful substances in plant culture. As a result, it was found that 100 μM in *Damnacanthus major* and 50 μM in *Hibiscus hamabo* Siebold & Zucc. showed the most effective DPPH and ABTS radical scavenging activity. Additionally, MJ-treated *Damnacanthus major* and *Hibiscus hamabo* Siebold & Zucc. induced reactive oxygen species scavenging in human keratinocytes. These research results suggest that ***Damnacanthus major* and *Hibiscus hamabo* Siebold & Zucc. have potential as cosmetic ingredient resources, and further studies are needed on the relevance between biological activity and standard compounds in plant cell line cultured elicitor (methyl jasmonate)**.

Introduction & Methods

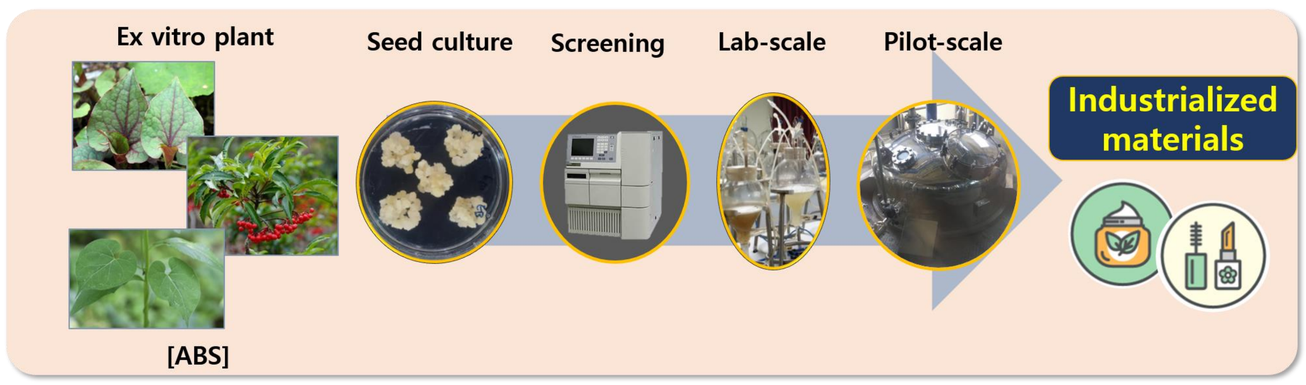

Figure 1. Research model for the conservation and sustainable development of high value-added Jeju biological resources

DPPH & ABTS assay

- A test method that measures the change in color density that occurs when DPPH or ABTS, which develops a specific color due to active oxygen, reacts with antioxidants to change color.
- Positive control : Ascorbic acid (vitamin C)
- Fluorescence measurements at 517 (DPPH) and 734 nm (ABTS)

ROS analysis in HaCaT cell

- Cell line : HaCaT cell (human keratinocytes)
- Cell viability : WST-1 assay in $1x10^5$ cells/well in 96 well plate
- Positive control : Ascorbic acid (vitamin C)
- Fluorescence measurements using DCF-DA

Results

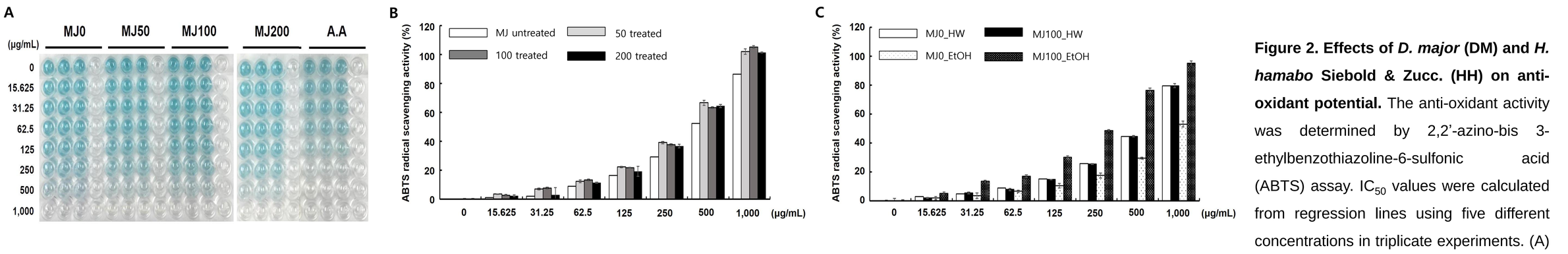

Figure 2. Effects of *D. major* (DM) and *H. hamabo* Siebold & Zucc. (HH) on anti-oxidant potential. The anti-oxidant activity was determined by 2,2'-azino-bis 3-ethylbenzothiazoline-6-sulfonic acid (ABTS) assay. IC_{50} values were calculated from regression lines using five different concentrations in triplicate experiments. (A) ABTS assay pictures of DM (B) radical scavenging according MJ treatment of DM (C) radical scavenging according extract type of DM (D) ABTS assay pictures of HH (E) radical scavenging according MJ treatment of HH (F) radical scavenging according extract type of HH. MJ: methyl jasmonate, AA: Ascorbic acid

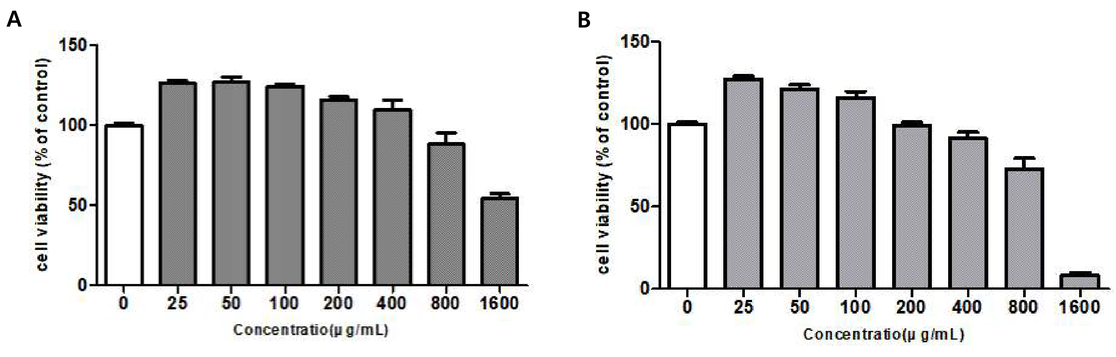

Figure 3. Effects of *D. major* (DM) and *H. hamabo* Siebold & Zucc. (HH) on HaCaT cell viability. Evaluation of HaCaT cell viability of DM (A) and HH (B). DM and HH were diluted to 0, 25, 50, 100, 200, 400, 800, and 1600 μg/mL and treated with HaCaT cells for 24 hours. Cell viability was measured by WST-1 assay. Data were expressed as mean ± standard deviation (n = 3).

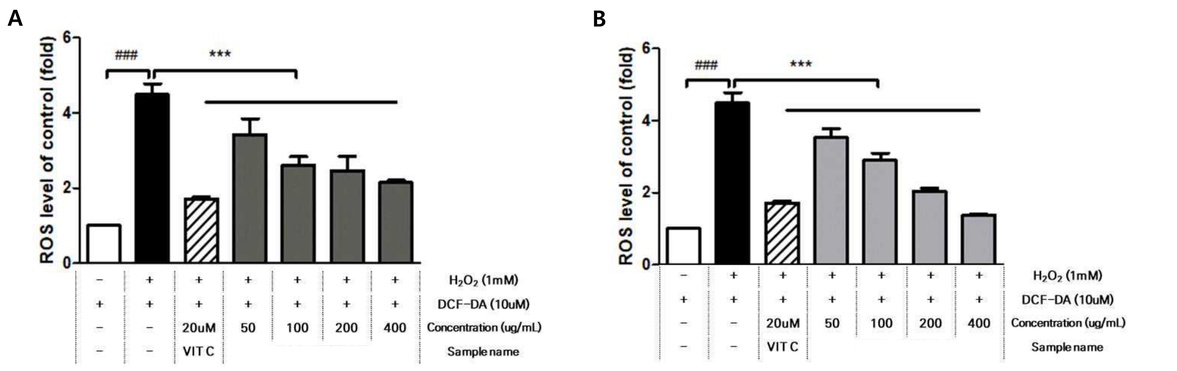

Figure 4. Effects of *D. major* (DM) and *H. hamabo* Siebold & Zucc. (HH) on treatment on intracellular ROS content in hydrogen peroxide-treated HaCaT cells. As a result of treatment with DM or HH, the ROS level was significantly reduced compared to the group treated with only hydrogen peroxide. Data were expressed as mean ± standard deviation (n = 3).

Conclusion

D. major and. *H. hamabo* Siebold & Zucc have potential as cosmetic ingredient resources, and further studies are needed on the relevance between biological activity and standard compounds in plant cell line cultured elicitor (methyl jasmonate)

Acknowledgements

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