

## *Daphne gnidium* Methanol Leaf Extract Induces Immune Potential by Activating Monocytes and B-Cells

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### DESCRIPTION

Modification of the immune response to treat immunological-mediated disorders is becoming increasingly popular. Studies on the ability of plant-derived compounds to boost host immune defences are becoming more common. The immunological modulatory potential of a methanol extract from *Daphne gnidium* leaves on immune cells was explored in this study. The tested extract was analysed using the HPLC technique.

Monocytes were purified from freshly prepared PBMC by negative selection using blocking agent and a mixture of biotinylated monoclonal antibodies. PBMC were prepared from peripheral blood on a Ficoll-Paque density gradient, and monocytes were purified from freshly prepared PBMC by negative selection using blocking agent and a mixture of biotinylated monoclonal antibodies.

Flow cytometry was used to investigate the proliferation of B-lymphocytes and the maturation of monocytes. The results showed that this extract stimulated B-cells and monocytes by increasing CD19 and CD14 expression, respectively.

Furthermore, methanol extracts, as well as daphnetin and apigenin-7-glucoside, increased monocyte CD86 expression. In addition, after treatment with methanol extract, CD64 and HLA-DR expression were increased.

The immune system's role is to defend the body against a variety of outside infectious pathogens. This system involves several tissues and organs, as well as other elements. Many diseases, such as cancer, are caused by immune system malfunction. Furthermore, if the immune system is compromised, multiple pathogens might overwhelm the host, resulting in secondary infections.

Modulating the immune system to treat diseases that arise as a result of a weakened immunological response entails inducing the expression of any portion of the immune system. The use of medicinal plants as immune modulators is becoming more popular.

Indeed, medicinal plants may be a viable alternative to chemotherapy due to their immune modulatory qualities, which allow for an improved immune response. Plant-derived chemicals such as lectins, peptides, phenolics, flavonoids, polysaccharides, tannins, and saponins, for example, have been shown to affect the immune system. Because of their high therapeutic value, members of the *Daphne* genus (*Thymelaeaceae*) have piqued interest. These plants have yielded a variety of natural compounds, including flavonoids, coumarins, and diterpenoids.

In traditional medicine, some species are commonly used to treat wounds and bruises. The powdered roots of *Daphne gnidium* have been used as an abortifacient in traditional medicine, while the bark has been used as a diuretic, to heal toothaches, and to prevent hepatitis. *In vivo* antigenotoxic and antioxidant effects of the methanol extract from *Daphne gnidium* have recently been established. The aqueous extract was also found to have anti-tumor and immunological modulatory properties *in vivo*.

The purpose of this study was to look into the immunological modulatory properties of a methanol extract made from *Daphne gnidium* leaves. Traditional medicine has been described as a means of modulating the immune response and treating certain diseases, and various therapeutic compounds originating from plants have been found and refined.

The methanol extract from *Daphne gnidium* leaves had a stimulatory impact on immune cells in this investigation. Indeed, at 1 g/ml, the tested extract considerably boosted B-lymphocyte activity, according to our findings. Thus, compared to lymphocytes incubated without stimulators, incubation of lymphocytes in the presence of the investigated extract boosted the expression of CD19. This suggests that the methanol extract has mitogenic potential.

B-lymphocytes are involved in humoral immunity, and after activation, they proliferate into immunoglobulin (Ig) secreting lymphocytes. It might deduce from these findings that the methanol extract from *Daphne gnidium* leaves stimulates the humoral response. The proliferation of peripheral lymphocytes and the titer of serum antibodies are both affected by certain

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herbal medicinal substances. Many plants used in traditional medicine have been shown to stimulate humoral immunity. Flavonoids are responsible for the immune-boosting properties.

In fact, cyanidanol and its O-methyl derivative have been shown to improve T-cell and B-cell activity. Furthermore, mice treated with flavonoids from *Crataegus oxyacantha* showed a considerable increase in lymphocytes. Apigenin-7-glucoside, which was found in the methanolic extract by HPLC-DAD and had no influence on PBMC proliferation. As a result, we believe that the PBMC proliferation-inducing action reported with *Daphne gnidium* extracts is due to other undiscovered flavonoids or a combination of their constituents. The influence of the methanolic extract on monocyte maturation.

Our findings showed that this extract boosted the expression of CD64, CD86, and HLA-DR antigens in monocytes, resulting in more mature phenotypes. As a result, the investigated extract promotes monocyte differentiation into macrophages, which serve as Antigen-Presenting Cells (APCs). Infectious pathogens, as well as senescent and apoptotic cells, are all captured by macrophages. Adhesion molecules on macrophages such as B7-1 (CD80) and B7-2 (CD80) increase the ligation between macrophages and T-cells (CD86).

T-cell activation and apoptosis are hampered by a decrease in the expression of specific markers caused by the absence of

costimulatory signals. The presence of daphnetin and apigenin-7-glucoside, which boost CD86 expression, can be attributed to the effect obtained with the methanol extract on CD86.

The effect of the methanolic extract on CD64 expression because it is required for immune complex absorption. By boosting the expression of CD64, the extract was able to stimulate monocyte maturation. Daphnetin, luteolin-7-glucoside, and apigenin-7-glucoside only modestly increase HLA-DR expression.

A synergetic effect on the expression of HLA-DR in the methanolic extract, as this extract increases the expression of this marker. Several research on the effect of *Antrodia camphorata* water extract on dendritic cell maturation found that it increased CD86 and HLA-DR expression. *Hochu-ekki*, a traditional Japanese herbal remedy, also increases the expression of CD80, CD83, and CD86.

Based on the findings, it's possible to conclude that *D. gnidium* leaves can influence immune function by stimulating lymphocyte B and monocyte development. The pharmacologically active components in *Daphne gnidium*'s methanolic extract, as well as the signaling mechanisms involved in the modulation of lymphocyte and monocyte responses.