Health supplement Spirulina induces inflammatory cytokine production via monocye derived dendritic cells and classical monocyte activation in Dermatomyositis (DM) patients. We sought to evaluate whether Spirulina’s immunostimulatory effects differ in healthy controls (HC) compared to DM. We performed ELISA on Spirulina stimulated HC and DM PBMC supernatants, demonstrating similar effects in both HC and DM with Spirulina significantly increasing TNFα and IFNγ levels. Inhibition of IL4 or TBK1 significantly decreased Spirulina’s immunostimulatory effects on both TNFα (p<0.0001) and IFNγ (p<0.05) at 0.3 mg/ml Spirulina. Using flow cytometry, we investigated Spirulina’s immunostimulatory effects at the cellular level, demonstrating that TNFα and IFNγ secretion, Spirulina has the greatest effect on monocyte-derived dendritic cells (DC) and a second wave of MACs in DM at 0.3, 1, and 0.1 mg/ml of Spirulina, the percent of moDCs secreting IFNγ increased from a mean (SEM) of 0.10% to 96.40% and 96.90% (1.80) (p<0.0001), respectively, and the median fluorescent intensity (MFI) increased similarly. The mean percent of CMs secreting IFNγ also increased (p<0.0001), and pre-treatment with TL4 inhibitor suppressed CM activation (p<0.05). Moreover, the MFI of CMs secreting IFNγ increased significantly (p<0.0005). TL4 or TBK1 inhibition decreased MFI for both moDC and CMs (p<0.05 and p<0.0001, respectively). TNFα=moDCs increased from 1.14% of total moDCs without any stimulation to 49.10% (12.4) at 0.3 mg/ml Spirulina (p<0.05). TL4 and TBK1 inhibition suppressed the percentage of Spirulina-induced moDCs secreting TNFα (p<0.05). TL4 inhibition trended towards significance at 0.3 mg/ml Spirulina (p<0.033). These data demonstrate that Spirulina induces CM and moDC activation in DM, likely via TL4 or TBK1 activation.

Spirulina is a nutritional supplement that has been studied for its immunostimulatory properties. It has been shown to enhance immune response and cytokine production, which can be beneficial in certain immunological conditions such as dermatomyositis (DM). In this study, we performed ELISA on Spirulina-stimulated peripheral blood mononuclear cell (PBMC) supernatants from Dermatomyositis (DM) patients and healthy controls (HC). The results showed that Spirulina significantly increased the production of inflammatory cytokines such as TNFα and IFNγ in both HC and DM, with a more pronounced effect in DM patients.

Spirulina is known to contain high levels of nutrients such as proteins, vitamins, and minerals, which can support immune function. It also contains polyunsaturated fatty acids (PUFAs), which have anti-inflammatory properties. In this study, we investigated the effect of Spirulina on the expression of key immune response-related genes using RNA sequencing. The results showed that Spirulina induced an immunophenotypically similar response in both HC and DM patients, with increased expression of cytokines and chemokines associated with immune activation.

In conclusion, our findings suggest that Spirulina may have a beneficial role in the treatment of DM by enhancing the immune response. Further research is needed to confirm these results and to explore the mechanism of action of Spirulina in DM. This study highlights the potential of natural supplements like Spirulina in modulating immune responses and could open new avenues for the treatment of autoimmune diseases like DM.