

1 **The Effect of Algae on Immunomodulatory Effects Against**
2 **Influenza A Virus**

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5 **Outline**

- 6 1. Introduction
7 2. Oral Fucoidan Attenuates Lung Pathology and Clinical Signs in a Severe
8 Influenza A Mouse Model
9 3. Anti-Influenza A Virus Activity of Rhamnan Sulfate from Green Algae
10 *Monostroma nitidum* in Mice with Normal and Compromised Immunity
11 4. Conclusion

12 **Abstract**

13 Influenza is a viral infectious disease often causes fever, dyspnea and lung
14 damage during the infection process, while some studies have found that algae extracts
15 are beneficial to these symptoms.

16 After infection, Gavage of *Undaria pinnatifida* fucoidan to mice were found
17 significantly reduce lung consolidation. The higher oral dose of *Undaria pinnatifida*
18 fucoidan provided a significant level of protection against the clinical signs of
19 influenza and lung consolidation in a mouse model when delivered three days prior to
20 infection. Rhamnan sulfate showed potent antiviral activities against enveloped
21 viruses based on the selectivity indices. Through plaque assay, rhamnan sulfate
22 inhibited the early steps of viral replication and targeted the influenza adsorption and
23 penetration steps of viral replication. Rhamnan sulfate suppressed virus growth and
24 promoted the production of virus-specific antibodies. Rhamnan sulfate is
25 incorporated into the Peyer's patch through the M cells, which possibly accounts for
26 its ability to enhance antibody production.

27 Algae extracts can reduce the damage caused by influenza virus and increase
28 immunity. Therefore, Algae extracts can be used as a complimentary medicine for
29 treatment.
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References

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