INTISARI

Latar belakang: Pengembangan agen imunostimulan berbasis bahan alam merupakan pendekatan preventif untuk memelihara kesehatan serta meningkatkan daya tahan tubuh terhadap infeksi dan penyakit. Tanaman herbal, seperti *Zingiber officinale* var. Amarum, *Zingiber officinale* var. Rubrum, *Blumea balsamifera*, *Mentha arvensis*, *Alstonia scholaris*, *Myristica fragrans*, *Panax ginseng* dan royal jelly diketahui memiliki berbagai kandungan senyawa yang dapat menstimulasi serta menyeimbangkan sistem imun.

Tujuan penelitian: Menganalisis efek pemberian sediaan bahan alam imunostimulan terhadap proliferasi limfosit, ekspresi mRNA NF-κB p65 dan NFATc1 limpa mencit BALB/c.

Metode: Sebanyak 24 ekor mencit BALB/c dibagi secara acak ke dalam 4 kelompok, yaitu kelompok kontrol dan 3 kelompok perlakuan dengan pemberian sediaan bahan alam imunostimulan dengan masing-masing dosis 0,592 mg/gBB, 0,789 mg/gBB, dan 1,183 mg/gBB selama 14 hari. Uji proliferasi limfosit limpa diukur menggunakan metode MTT, sedangkan pemeriksaan ekspresi mRNA NF-κB p65 dan NFATc1 limpa diukur menggunakan RT-qPCR.

Hasil: Pemberian sediaan bahan alam imunostimulan dosis 0,592; 0,789; dan 1,189 mg/gBB meningkatkan proliferasi limfosit limpa mencit BALB/c masing-masing sebesar 111,2 ± 5,9%, 127 ± 6,2%, dan 146 ± 9,7% dibandingkan kontrol, namun peningkatan pada dosis 0,592 mg/gBB tidak berbeda signifikan secara statistik. Dosis yang sama juga meningkatkan ekspresi mRNA NF-κB p65 limpa mencit BALB/c masing-masing sebesar 1,34 ± 0,11; 1,81 ± 0,10; dan 2,07 ± 0,18 kali terhadap kontrol, namun dosis 0,592 mg/gBB tidak berbeda signifikan. Pemberian sediaan bahan alam imunostimulan dosis 0,592; 0,789; dan 1,183 mg/gBB secara signifikan meningkatkan ekspresi mRNA NFATc1 limpa mencit BALB/c masing-masing sebesar 2,07 ± 0,31; 2,75 ± 0,41; dan 3,22 ± 0,23 kali terhadap kontrol.

Kesimpulan: Sediaan bahan alam imunostimulan secara signifikan meningkatkan proliferasi limfosit, ekspresi mRNA NF-κB p65 dan NFATc1 limpa mencit BALB/c.

Kata kunci: Bahan alam, imunostimulan, proliferasi limfosit, NF-κB p65, NFATc1, proliferasi limfosit

ABSTRACT

Background: the development of immunostimulant agents derived from natural products represents a preventive approach to maintaining health and enhancing the body's resistance to infections and diseases. Herbal plants such as *Zingiber officinale* var. *Amarum*, *Zingiber officinale* var. *Rubrum*, *Blumea balsamifera*, *Mentha arvensis*, *Alstonia scholaris*, *Myristica fragrans*, *Panax ginseng*, and royal jelly are known to contain various bioactive compounds that can stimulate and modulate the immune system.

Objectives: Analyze the effects of natural immunostimulant preparation on lymphocyte proliferation and the mRNA expression of NF-κB p65 and NFATc1 in the spleen of BALB/c mice.

Methods: A total of 24 BALB/c mice were randomly divided into four groups: a control group and three treatment groups receiving the natural immunostimulant preparation at doses of 0.592, 0.789, and 1.183 mg/g body weight for 14 days. Splenic lymphocyte proliferation was assessed using the MTT assay, while the mRNA expression of NF-κB p65 and NFATc1 in the spleen was analyzed using RT-qPCR.

Results: Administration of the natural immunostimulant at doses of 0,592; 0,789; and 1,189 mg/gBW increased splenic lymphocyte proliferation in BALB/c mice by 111,2 ± 5,9%, 127 ± 6,2%, and 146 ± 9,7% relative to control, although the effect at 0,592 mg/gBW was not significant. The same doses also increased splenic NF-κB p65 mRNA expression in BALB/c mice by 1,34 ± 0,11; 1,81 ± 0,10; and 2,07 ± 0,18-fold relative to the control group, although the increase at 0,592 mg/gBW was not significant. Administration of the natural immunostimulant preparation at doses of 0,592; 0.789; and 1,183 mg/gBW significantly increased splenic NFATc1 mRNA expression in BALB/c mice by 2,07 ± 0,31; 2,75 ± 0,41; and 3,22 ± 0,23-fold respectively compared with the control group.

Conclusion: The natural immunostimulant preparation significantly increased lymphocyte proliferation and the mRNA expression of NF-κB p65 and NFATc1 in the spleen of BALB/c mice.

Keywords: Immunostimulant, natural product, lymphocyte proliferation, NF-κB p65, NFATc1