

Potensi ekstrak metanol akar pasak bumi (*Eurycoma longifolia* Jack) sebagai imunomodulator mencit putih jantan (*Mus musculus*) terhadap vaksin BCG = The potency of methanol extract of pasak bumi root (*Eurycoma longifolia* Jack) as immunomodulators in male white mice (*Mus musculus*) toward the BCG vaccine

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Abstrak

[<b>ABSTRAK</b><br>

Kemampuan *Mycobacterium tuberculosis* yang dapat memanipulasi dan menghindari respon imun adalah tantangan dalam mencari terapi dan vaksinasi efektif. Penelitian ini untuk menguji potensi ekstrak metanol akar *Eurycoma longifolia* Jack dalam memodulasi peningkatan IgA dan IgG mencit putih jantan yang divaksinasi BCG, sekaligus untuk menganalisis peningkatan sitokin proinflamasi yang berhubungan dengan produksi IgA dan IgG. Plasma diambil sebelum dan setelah vaksinasi BCG pada 18 ekor mencit yang dibagi ke dalam 2 kelompok; perlakuan dan kontrol. Kadar IgA, IgG, TNF- $\alpha$  dan IL-10 diukur dengan metode ELISA. Hasil menunjukkan bahwa peningkatan IgA kelompok air ( $0,33\pm 0,16$ ) lebih tinggi dibandingkan kelompok pasak bumi ( $0,30\pm 0,30$ ), sedangkan peningkatan IgG kelompok pasak bumi ( $0,38\pm 0,25$ ) terlihat lebih tinggi dibandingkan kelompok air ( $0,29\pm 0,35$ ). Rasio TNF- $\alpha$ /IL-10 kelompok pasak bumi ( $0,46\pm 0,07$ ) lebih tinggi dibandingkan kelompok air ( $0,41\pm 0,05$ ). Terdapat korelasi antara TNF- $\alpha$  dengan IgA pada kelompok air ( $r=0,601$ ,  $p=0,035$ ) juga dengan IgG pada kelompok pasak bumi ( $r=0,559$ ,  $p=0,059$ ). Disimpulkan, pemberian pasak bumi cenderung berpotensi memodulasi peningkatan IgG, tetapi tidak IgA. Selain itu, pemberian pasak bumi juga cenderung meningkatkan sitokin proinflamasi yang mempengaruhi produksi IgA dan IgG.

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<b>ABSTRACT</b><br>

The ability of *Mycobacterium tuberculosis* to manipulate and evade host's immune response is a challenge in finding an effective therapy and vaccination. The purpose of this research were to investigate the potency of methanol extract of the roots of *Eurycoma longifolia* Jack as immunomodulators for male white mice vaccinated with BCG, as well as to analyze the increase of proinflammatory cytokines associated with IgA and IgG production. Plasma were taken before and after BCG vaccination from 18 mice, that were divided into 2 groups; treatment and control. IgA, IgG, TNF- $\alpha$  and IL-10 levels were measured by using ELISA. The results showed that the enhancement of IgA group with water ( $0,33\pm 0,16$ ) was higher than group with pasak bumi ( $0,30\pm 0,30$ ). On the other hand the

enhancement of IgG group with pasak bumi ( $0,38\pm 0,25$ ) was higher than group with water ( $0,29\pm 0,35$ ). The ratio of TNF- $\alpha$ /IL-10 group with pasak bumi ( $0,46\pm 0,07$ ) was higher than group with water ( $0,41\pm 0,05$ ). There are correlations between TNF- $\alpha$  and IgA in the group with water ( $r=0,601$ ,  $p=0,035$ ) as well as between TNF- $\alpha$  and IgG in group with pasak bumi ( $r=0,559$ ,  $p=0,059$ ). As the conclusion, methanol extract of pasak bumi root tend to potentially modulate the increase IgG production, but not IgA. In addition, it also tends to increase the proinflammatory cytokines associated with IgA and IgG production. The ability of *Mycobacterium tuberculosis* to manipulate and evade host's

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