

Immunomodulatory Activity of Solanum Torvum Ethanolic Extract on Infected Wistar Rats

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Abstract

Immunomodulators are compounds that alter the activities of immune system that had a vital role in preventing diseases. Takokak or *Solanum torvum* Swartz is empirically known as immunomodulator by its secondary metabolites such as flavonoids and polyphenols.

This study was conducted to determine the effect of takokak fruits ethanolic extract against parameters of immunity such as the number of leucocyte with its components in Wistar rat strain using induced by *Shigella dysenteriae*. Extract was given orally for 16 days at a dose of 250 mg/kg BW and 500 mg/kg BW. *S. dysenteriae* was induced on day -7, and -14. Then, blood sampling was conducted on day 0, 7, 9, 14 and 16 then compared to positive, and negative controls.

Blood samples were observed using flow cytometry method by flow cytometer instrument. Immunomodulatory activity was observed through changes in numbers of leukocytes components. The result showed an immunomodulatory effect showed by leukocytes, lymphocytes and monocytes alteration in treated group which means that takokak had an immunomodulatory activity in Wistar rats.

Keywords: *Solanum torvum*, immunomodulatory, flow cytometry.

Introduction

Immunity could be defined as any defense system to protect human body from any invading agents by generating cells and molecules used in recognizing and eliminating foreign agent. Immune system modulation is a term that refers to alteration of immune response that are being induced, expressed, or inhibited. Any substances that alter the immune system modulation called immunomodulator.¹

Immunomodulator defined as compound that alter immune system activity by regulated messenger cytokines, adhesion molecules, nitric oxide, hormone, neurotransmitter, and other peptide.²

Solanum torvum Swartz or Takokak in Indonesian widely used either in traditional Chinese medicine and Indian Ayurveda medicine in as medicine for cough, asthma, diabetes, hypertension, liver disease, tuberculosis and

anemia.³ Takokak contains chemical substances such as steroid, saponin, alkaloid and phenol. Previous studies show that *S. torvum* acted as anti-tumor, antibacterial, antiviral and anti-inflammation agent.³ Further studies are needed to determine if *S. torvum* has an effect as immunomodulator.

This research was conducted by counting amount of leucocyte and its component from whole blood of infected wistar rats fed by ethanolic extract of *S. torvum* by flow cytometry method using *Hematology Analyzer Sysmex XT 1800i*.

Material and Methods

Materials:

Takokak fruit harvested from Manoko Plant, Lembang, Indonesia. Amyl-alcohol, aquadest, chloric acid, ferrous (III) chloride, dimetil sulfoksida (DMSO), ethanol 96% (Bratachem®), ethyl acetate (Bratachem®), methanol (Bratachem®), natrium chloride, n-hexan (Bratachem®), calcium hydroxide, chlorophorm (Bratachem®), gelatin solution 1%, natrium sulphate anhydrate, Lieberman-Burchard reagent, sulphate acid reagent 10% in ethanol, Dragendorff reagent (Bismuth subnitrite and calcium iodide), Mayer reagent, vanillin reagent 10% in sulphate acid, magnesium powder.

Testing Animal: White wistar rats (2 months old) with weight \pm 200 mg. Ethical Approval obtained from Committee of Ethics, Faculty of Medicine University of Padjadjaran.

Methods:

Collecting, and Processing Takokak Fruit: Takokak (*Solanum torvum*) fruits were collected from Manoko, Lembang District, Bandung, Indonesia. Fruits were washed by flowing water, sorted, and dried in open air in room temperature for 3 days and covered from direct sun light, then chopped.

Extraction: Dried fruits were extracted by maseration method. It was weighted and rinsed by ethanol 96% as solvent for 3x24 hours. Liquid extract was collected each day and replaced by new ethanol 96%. Liquid extract was evaporated by rotary evaporator (Buchi®) in 350 pressure while temperature was 50°C and concentrated on water bath. Yield was determined then.

Phytochemical Screening: Phytochemical screening was tested for alkaloid, flavonoid, tannin, polyphenol, saponin,