CHAPTER I INTRODUCTION

1.1 Background Research

Parkia speciosa Hassk. plants can be found in some of tropical country such as Indonesia, Malaysia, and Thailand (Miyazawa *et al*., 2001). *Parkia speciosa* Hassk. or also known as stink bean In Malaysia, Singapore, and Indonesia, sator or sataw in Thailand, u'pang in Philippines, and yongchak in India. Its seed commonly consumed as vegetable, complementary dish, or flavor material for cuisine. It is a plant that belongs to the genus Parkia and species speciosa in the family Fabaceae (also placed in Leguminosae and Mimosaceae) (Sakunpak *et al*., 2012). The seeds have a peculiar smell and can be eaten raw as ulam (a Malay word for uncooked) or cooked and also called as lalapan in Indonesia (Miyazawa *et al*., 2001).

Parkia speciosa Hassk. seeds have many benefits, including anti-hypertension, curing constipation, antidepressants and so on (Heni, 2010). Stink bean seeds are rich in important minerals namely calcium, phosphorus, magnesium, iron, manganese, and potassium (Mohamed *et al*., 2005). All medicinal agents have potentially unexpected effects including toxicity, and herbs are no different (Kuhn, 2000). As with other drugs, the risk of unexpected effects may be influenced by a user's age, gender, genetics, nutrition status, and concurrent disease states and treatments. In clinical practice recognizing adverse effects of herbal

medicine is not routine and their reporting is even less frequent (Boullata, 2000).

Each type of medicine has many strengths and weaknesses. In order to protect and improve our health, it is important to become an informed medical consumer. Herbal drugs are used widely for preventive and therapeutic purposes. The manufacturers of these products are not required to submit proof of safety and efficacy before marketing, so the adverse effects associated with remedies are largely unknown. Also, herbal products are not regulated for purity and potency. Thus, some of adverse effects reported could be caused by impurities or batch to batch variability. The potency of herbal products may increase the possibility of adverse effects (Kaur *et al*., 2013).

All over the world, especially in developing countries herbal drugs are playing an important role in health care programmes. This is because they are being cheap and locally available. There is a general belief amongst the consumers globally that herbal drugs are always safe because they are natural. However evidences suggests otherwise. The mere fact that a product is natural may not signify that the product is safe. The vast majority of medicinal herbs contain dozens of different compounds of great complexity, often mucilages, tannins, polysaccharides etc. that may modulate and modify the effects of any active principles (George, 2011).

In other side, *Parkia speciosa* Hassk. or named stink bean is one of vegetables that have high enough protein content. Based on the data of Indonesia Healthness Ministry, stink bean contains protein as much 10.2

mg/100 gram (Direktorat Jenderal Hortikultura, 2015). In additions, stink bean is also contain purine (Zulhendra, 2016). The purine content in stink bean might be the side effect that affected the functions of renal (Melanie, 2014).

Uric Acid is a weak acid (pka, 5.8) that is primarily found and distributed in the extracellular fluid compartment as monosodium urate, a final oxidation product of purine metabolism. Uric acid plays an important part in the pathogenesis of gouty nephropathy, and whether it originates from ambient plasma urate or from tubular uric acid crystals (Christopher, 2014).

The presence of kidney damage causes the kidneys can not excrete metabolic products that are not useful to the body especially urea and creatinine. urea and creatinine is the result of a protein metabolism whose disposal is regulated by the kidney through glomerular filtration, the damage to the glomerulus causes the glomerular filtration rate to decrease so that urea and creatinine will accumulate in the blood (Melanie, 2014). Renal failure can be caused by several things such as sepsis, dietary intake, cardiovascular surgery, intratubular deposits like acute uric acid nephropathy and organic solvents (Stanley *et al*., 2001).

Plasma protein, principally albumin, are capable of binding uric acid. On occasion the excretion of urate following their administration may be so great as to lead to acute renal failure, through precipitation of urate in the tubules as were observed in some patient. Uric acid has been the marker of renal damage and play contributory role in the development

of renal damage. Uric acid will be filtered in the glomerular. The damage of glomerulus can be checked by blood urea nitrogen and creatinine level in the blood (Murakami, 2013). Renal failure is a prominent and early manifestation but another organ might be affected in the next (Lentine, 2004). This paper highlights the toxicity sub acute of stink bean extract associated with consumption of herbal product so that conventional treatments can be made more safe and effective.

1.2 Problem Statements

Based on the background that has been described above it can be formulated problems as follows :

1.2.1 How is the effect of stink bean (*Parkia speciosa* Hassk.) to BUN levels on rat (*Rattus norvegicus*)?.

1.2.2 How is the effect of stink bean (*Parkia speciosa* Hassk.) to Creatinine levels on rat (*Rattus norvegicus*)?.

1.3 Theoritical Base

Uric acid is the end product of purine metabolism in mammals and hyperuricemia was historically thought to cause gout and urolithiasis. Animal studies demonstrate that elevated uric acid and level causes hypertension and endothelial dysfunction, arteriolopathy and chronic kidney disease (Murakami, 2013). Uric acid was used as a marker of renal damage but revent observational studies have raised the possibility that uric acid may have a contributory role in the development of chronic kidneys disease (CKD) (Iseki *et al*., 2001). Approximately two-thirds of uric acid is eliminated by urinary excretion and the remainder is excreted

in the faeces. At the glomerular level, urate is freely-filtered and 90% of the filtered urate is reabsorbed (Marangella, 2005). Some of the proposed mechanism of kidney damage are from uric acid include induction of afferent arteriolopathy, inflammation and activation of the renin-angiotensin system (Filiopolus *et al*., 2012). Animal studies provided the most robust data supporting the role of uric acid in the development of intrarenal vascular disease and renal injury (Iseki, 2001).

There are a number of mechanisms by which hyperuricemia increases the risk for the development of CKD. Clinical evidence exists indicating that hyperuricemia raises blood pressure due to endothelial dysfunction caused by UA (Sturm, 2008). On histologic exam, afferent arteriolar thickening was noted which led to conclude that hyperuricemia causes arteriolopathy of the preglomerular blood vessels which impairs the autoregulatory response of the afferent arterioles resulting in glomerular hypertension (Murakami, 2013).

Another study in rats suggests that hyperuricemic conditions alter glomerular hemodynamics and cause cortical renal vasoconstriction as evidenced by a significant increase of afferent and efferent arteriolar resistances. A decrease in the glomerular plasma flow and ultrafiltration coefficient resulted in a 35% decrease in single nephron GFR but an increase in glomerular pressure (Zoccali. 2006). The damage of glomerulus can be checked by blood urea nitrogen and creatinine level in the blood (Murakami, 2013).

1.4 Aim of Research

This study aims to prove the effect of stink bean extract towards BUN and Creatinine levels on rat.

1.5 Research Outcomes

The result of this study are expected to have outcomes:

1. Theoritically:

To provide data about the effect of stink bean extract towards BUN and creatinine levels

2. Practically:

To know what the side effects of stink been used as herbs medicine.

1.6 Hypothesis

The extract of stink bean has effects to increase BUN and creatinine levels of rat renal based on specific doses.