CHAPTER 1 INTRODUCTION

1.1 Background

Ascaris suum is a parasitic nematode that causes infection in swines with high prevalence rates in host populations. The prevalence of *A. suum* infection varies with geographical region and farm management practices but few swine herds are totally free of infection (Roepstorff, 2003). Swine ascariasis interferes with health and performance of swines while resulting in reduced feed gain ratios and liver condemnation incurring economic losses (Stewart and Hale, 1988). This parasite is usually associated with liver damages called "milk spots" caused by larvae migration, resulting in organ condemnation.

The usual treatment of ascariasis is done by using anthelmintic. Various problems have been found in the parasite control using synthetic anthelmintic, chemical residues, toxicity issues, not economical and unavailability of these drugs in remote areas (Hussain, 2008). At present, ascariasis control is based mainly on mass treatment with synthetic anthelmintic drugs. In the long term this is not sustainable reinfection after annual or biannual drug treatment is more or less unavoidable due to the long lived and resistant eggs which survive for many years in the environment (Jia *et al*., 2012). Moreover, the use of synthetic drugs is often not feasible for *A. suum* control in many swine production systems. Small holder farmers in many developing countries often do not have access to expensive anthelmintic drugs, many organic and low income farms are not able to prophylactically treat animals with synthetic drugs. Therefore, there is an urgent

need to investigate alternative or complementary options for the control of these parasites (Andrew *et al.*, 2014).

Indonesia rich in various kinds of medicinal plants and have been used for generations as a traditional medicine. One of the medicinal plants found in Indonesia is basil (*Ocimum sanctum*). Basil has been known from as the vedic period. Bhatt (2014) reported that basil extract has numerous pharmacological activities like hypoglycaemic, immunomodulatory, analgesic, antistress, antipyretic, antiulcerogenic, antiinflamatory, antihypertensive and antibacterial. Recent work of its consumption has shown that basil had no genotoxic or organ toxic effects (Chandrasekaran *et al.,* 2013). Reported by Pandey and Madhuri (2010) different parts of basil are used in traditional medicine and cure of many illnesses and everyday ailments like common cold, headache, cough, flu, earache, fever, colic pain, sore throat, bronchitis, asthma, hepatic diseases, malaria fever, as an antidote for snake bite and scorpion sting, flatulence, migraine headaches, fatigue, skin diseases, wound, insomnia, arthritis, digestive disorders, night blindness, diarrhea and influenza.

Anthelmintic activity of basil leaves (*Ocimum sanctum*) against infections as it exhibited excellent prophylactic potential gastrointestinal nematodes has been evaluated by many authors. Joshi *et al*. (2013) reported that the aqueous extract of leaves of *Ocimum sanctum* showed good activity against *Pheretema posthuma*. Adult earthworms (*Pheretima posthuma*) were used due to their anatomical and physiological resemblance with the intestinal round worm parasite. Sentana (2010) also reported that ethanolic extract of basil leaves has anthelmintic activity

against *A. suum in vitro*. As reported by Karumari *et al.* (2014), *Ocimum sanctum* phytochemical constituents contains flavonoid, phenol and tannin. Tannins and phenolics are known to interfere with the energy generation in helminth parasites by uncoupling oxidative phosphorylation and also bind to free proteins in the gastrointestinal tract of host animal or glycoprotein on the cuticle of the parasite and leading to death (Athnasiadou *et al.*, 2001).

In vitro model was used because of ethical considerations, and tend to find the closest model to in vivo research, beside that was to know the chemical compound and to get first information of this herb for next modification in vivo research. Infusion dosage was used because it refers to pharmacopoeia standard for traditional medicine preparations. For comparison this research used piperazine citrate as the drug of choice of ascariasi treatment (Subekti *et al.*, 2012). Based on the background above this research wanted to determine the activity of basil leaves as anthelmintic against *A. suum in vitro* in the preparation of infusion.

1.2 Research Problems

Does the basil leaves (*Ocimum sanctum*) infusion has anthelmintic activity against *A. suum in vitro* ?

1.3 Theoritical Base

Anthelmintics are known to act by causing worms paralysis, worm cuticle damage, and interfere with the worms metabolism (Ekeanyawu and Etienajirhevwe 2012). Organic phytochemicals like steroid, triterpenoid,

flavonoid, phenol, tannin, alkaloid, saponin and acid were identified in the aqueous extract of basil (Karumari *et al*., 2014).

The activity of saponin as an anthelmintic is by increasing the permeability and pore formation of the worm body wall, it can cause vacuolization and disintegration cuticle (Parvathy *et al*., 2012). Tannins and Phenolics are known to interfere with the energy generation in helminth parasites by uncoupling oxidative phosphorylation and also bind to free proteins in the gastrointestinal tract of host animal or glycoprotein on the cuticle of the parasite and leading to death (Athnasiadou *et al*., 2001).

1.4 Aims of The Research

This research want to prove the anthelmintic activity of basil leaves infusion and to study the influence of different concentration of basil leaves (*Ocimum sanctum*) infusion to the death percentage during obeservation time to the *A. suum in vitro*.

1.5 Outcomes of The Research

The results of this research will give some scientific information about anthelmintic activity of basil leaves infusion to the *A. suum* mortality and as reference for the next research of basil leaves infusion as anthelmintic.

1.6 Hypothesis of Research

Basil leaves (*Ocimum sanctum*) infusion has anthelmintic activity to the *A. suum in vitro*.

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