INTRODUCTION

Background

Bacterial pathogens are one of the most dangerous organisms infecting human, animal, and plant; the danger of these bacteria is related to their activity causing damage and disease to human, animal, and plants (Casadevall and Pirofski 2009). Salmonella is one of bacterial pathogens that causes harmful disease (diarrhea) to human. There was estimated that 1.9-2.5 million of under 5 years old children were died from diarrhea per year in developing countries (Nguyen et al., 2006; An 2007). In developed countries: total of 155540 confirmed cases of salmonellosis were reported and 64.5% of the cases were caused by S. enteritidis in 2007 in the European Union. In United States, from 1999 salmonellosis patients caused by S. enteritidis was increased and it was more than 1400 patients in 2006 (Pan Z et al., 2009). Salmonella derby were isolated from patients with diarrhea in Myanmar can invade Hep2 cells when tested in vitro (Budiarti et al., 1991). To fight against these bacterial pathogens, human usually use antibiotics such as Ciprofloxacin, Norfloxacin, Nalidixic Acid and Ampicillin taken either oral or injection (Goodman et al., 1984).

Application of antibiotics has side effect such as the effect of antibiotics on the body health and normal flora. Budiarti 2011, reported that E. coli isolated from healthy human neonatus also adult were resistant to several antibiotics. Antibiotic resistance of some pathogenic bacteria such as Salmonella spp. was reported from Central Africa (Vlieghea et al., 2009). It was reported that antibiotic resistance of Salmonella sp increased up to 70% in many areas of the world, however, the resistance rate of Salmonella sp was different among serotypes. Salmonella enteritidis is generally more susceptible to antimicrobial agents, while S. typhimurium exhibits higher resistance (Su and Chiu 2007). Therefore, there should be an alternative way to avoid these problems. Increasing attention has been paid to biological control through other microorganisms such as bacteriophages. Preliminary observation showed that some bacteriophages infect enteric bacteria with the ability to kill or lysis their bacterial hosts. The utilization bacteriophage to control pathogenic bacteria is not a new way but it has been
utilized by many researchers in Eastern Europe and Russia (Huff et al. 2005). Bacteriophage of EPEC (enteropathogenic *Escherichia coli*) was reported effective to control the EPEC growth (Budiarti et al. 2011). The bacteriophages of *Salmonella* Sp (P15, P19, P38) isolated from domestic sewage at Darmaga Bogor Indonesia have effectiveness to lysis cells of the *Salmonella* sp. from diarrhea disease patient, the phage 38 was reported safe when consumed during two weeks rat sprague dawley (Sartika et al. 2012).

The phage can be used as a biocontrol agent for a specific bacterial disease (Fischetti et al. 2006). The specificity of the phage can also be used for rapid detection of specific pathogenic bacteria such as *Salmonella* spp and *Mycobacterium tuberculosis* by detecting their intracellular compounds of the lysed bacterial cells (Goodridge and Abedon 2003). The phage can also be used for tracing salmonellosis outbreaks and determining the sources of infected pathogens (Ward et al., 2005). There are other applications of bacteriophages in molecular technology i.e. as delivery tools for protein and DNA vaccines, as potential gene therapy vectors and in nanotechnology techniques (Verheust et al., 2010). Therefore understanding of bacteriophages and their molecular genetics is important due to their potential applications.

**Aim of this study**

The objectives of this research were to study three isolates of *Salmonella*’s phages and to find out the best and easiest method to isolate and characterize genomic DNA of the phages.