CHAPTER I
INTRODUCTION

1. Background and rationale

Leber's hereditary optic neuropathy (LHON) is a maternally inherited neurodegenerative disease of young adults that results in bilateral blindness due to optic nerve degeneration. LHON affected remain asymptomatic until they begin with clouding or blurring of central vision in one eye. The other eye can be affected either simultaneously or sequentially. The characteristic field defect in LHON is a centrocaecal scotoma but papillary reflexes are preserved and report no pain on eye movement. All patients with LHON showed mitochondrial dysfunction in complex I. Over 95% of LHON cases are the result of one of three mitochondrial DNA (mtDNA) point mutations, G11778A, G3460A and T14484C, which all affect genes encoding complex I subunits of mitochondrial respiratory chain (Man et al., 2002). Some in vitro study showed fibroblast from LHON have over production of reactive oxygen species (ROS) (Wong et al., 2002). Oxidative stress is one of important mechanism leading to optic nerve degeneration in LHON. Nowadays, there is no treatment available to improve the final visual outcome in LHON. However, the unaffected LHON carriers need advise to avoid alcohol intake and smoking for prevention form oxidative stress (Man et al., 2002). From the role of oxidative stress in LHON patients, the antioxidant may be a possible potential treatment to improve visual outcome in LHON (Mashima et al., 2000).

Curcuminoid, which are phenolic compounds present in turmeric (*Curcuma longa*), have been demonstrated that they have antioxidant activities (Jayaprakasha et al., 2005). It has been many studies about the use of curcuminoid for treating various diseases associated to oxidative stress such as thalassemia, Alzheimer's disease and Parkinson's disease (Praphaiphit, 2004; Smith et al., 2007; Zbarsky et al., 2005). The study in thalassemia patients has found that curcuminoid capsule reduce malondialdehyde (MDA) and improve antioxidant enzyme activities (Praphaiphit, 2004). Regarding to the safety of curcuminoid in animals, it was confirmed a lack of significant toxicity (Chan et al., 1998).

So the aim of this study was to investigate the effect of curcuminoid extracts capsule in LHON patients with 11778 mutation on oxidative stress status and

endogenous antioxidant enzyme activities in red blood cell, such as catalase (CAT), superoxide dismutase (SOD), total glutathione (GSH), oxidized glutathione (GSSG) and glutathione peroxidase (GPx).

2. Objective

1. To study the oxidative stress status in LHON patients.
2. To study the effect of curcuminoid extracts capsule on antioxidant enzymes activities in LHON patients.

3. Hypothesis

Curcuminoid extracts capsule reduces oxidative stress in LHON patients.

4. Expected Benefit and Application

The supplement of curcuminoid might be a way to reduce oxidative damage in LHON patients.