

CHAPTER 1

INTRODUCTION

The rice seed is known to be attacked by many seed-borne diseases and insects (Islam *et al.*, 2000; Agarwal *et al.*, 1989). The one way to eliminate these pests currently practiced from a food grain without leaving pesticide residues is fumigation. Nowadays, there are two registered fumigants for stored food: methyl bromide and phosphine. Because of environmental concerns, the US government has mandated that methyl bromide will be completely eliminated from use by the year 2005 with partial reduction starting in 1999 (Kells *et al.*, 2001). Phosphine is currently undergoing re-registration by the Environmental Protection Agency (EPA, 1993). Assuming phosphine makes it through the re-registration process, it would be the only licensed fumigant for stored food grains. With only one fumigant remaining, insect and microorganisms resistance becomes a greater risk (Kells *et al.*, 2001). Unfortunately some stored product insects already exhibit some levels of phosphine resistance and some show resistance to methyl bromide (Zettler *et al.*, 1989; Zettler and Cuperus, 1990). Loss of fumigants, resistance to remaining fumigants and a trend by consumers to move away from residual chemicals, necessitates the development of additional control strategies (Kells *et al.*, 2001).

An alternative treatment is being sought to improve food safety (Mermelstein, 1999). Ozone can replace traditional sanitizing agents and provide other benefits (Bott, 1991; Cena, 1998; Graham, 1997). The effectiveness and the application still need some more investigation.