GENERAL INTRODUCTION

Pineapple fruit is widely distributed in tropical regions and in recent years has become one of the most demanded exotic fruits. It is important economically, nutritionally and also highly valued for its nutraceutical properties. Bromelain is a complex mixture of substances that can be extracted from the stem, core and fruit of the pineapple, with a wide variety of health benefits. Bromelain is known for its clinical and therapeutic applications, particularly for modulation of tumor growth, third degree burns, and improvement of antibiotic action, for the oral systemic treatment of inflammatory, blood-coagulation-related and malignant diseases. It also used in food processing for meat tenderization and as a dietary supplement.

Pineapple *Ananas Comosus* (L.) Merr., is a member of the Bromeliaceae family (Monocotyledons) and comprises about 2000 species, with an annual world wide production of over 14 million tons. It is the eighth most abundantly produced fruit in the world, while the third largest grown fruit in India. Pineapple is a perennial monocotyledonous plant having a terminal inflorescence and a terminal multiple fruit. The fruit is a multiple fruit or syncarp or sorosis, formed by the fusion of spirally arranged fruitlets produced by flowers of the inflorescence (Coppens d’Eeckenbrugge and Leal, 2003). Each fruitlet can be identified by an "eye," the rough spiny marking on the
pineapple's surface. Each fruitlet fuses with neighbour ones, which is distinctly marked by slight depression and the region being called as leachets. The edible part of the fruit consists mainly of the ovaries, of the bases of sepals and bracts of the cortex of the axis. The fruit shell is mainly composed of sepal and bract tissues and the apices of the ovaries (Okimoto, 1948). Pineapples have a wide cylindrical shape, green leaves and fibrous yellow flesh. The principle varieties are ‘Queen’ ‘kew’, and ‘Moratius. Var., ‘Queen’ contributes to more than 50% of total production in India. All the varieties grown in India are highly susceptible for stem end rot disease during transportation, ripening, storage and marketing.

Stem end rot (SER) is also called Black rot or butt rot or Thielaviopsis rot caused by the facultative parasitic fungus *Chalara paradoxa* (De Seyn.) Sacc. = *Thielaviopsis paradoxa* (De Seyn.) Hohn., teleomorph: *Ceratocystis paradoxa* (Rohrbach and Apt, 1986) is a major worldwide pineapple post harvest disease. The disease starts in the field when the causal pathogen enters the fruit through the broken peduncle, other wounds (e.g. bruises), or natural openings in the fruit shell. The high temperature and humidity prevailing in tropical countries like India further aggravate post-harvest losses due to fungi. Post harvest losses of about 70% in pineapple are reported in India. It is a wide spread major fungal disease of economic importance that occurs frequently in India. This is a highly specialized pathogen that causes SER disease in pineapple fruit only. The other commercial crop being sugar cane, however they were also isolated from other forest trees and organic debris of various industrial effluents.

Post-harvest losses are costly in terms of money and manpower and it can be catastrophic for developing countries like India. At present, Black rot of pineapple is controlled by the application of fungicides. Despite high cost, the problem of pesticide residue is becoming acute, as they were reported to have carcinogenic, teretogenic,
oncogenic, neurotoxic and genotoxic health hazards. However, increasing consumer resistance and the restrictions imposed on the use of these chemicals, have created an urgent need for the development of safe and effective alternatives. In case of *C. paradoxa* the problem to devise control strategies is multifarious due to its facultative pathogenic nature of infection.

Stem end rot disease establishment and manifestation in pineapple is the ultimate expression of complex interrelationships with its pathogen, the details of which are not well documented. Hence, the present investigation on host-pathogen interaction of SER disease on pineapple var. Queen caused by *C. paradoxa* was undertaken to enumerate the etiology of disease, host biochemical and pathogenic factors, along with histopathological account during infection. Further, development of less toxic, zero residue and host friendly control measures for SER disease on Pineapple have also been emphasized.