

INTRODUCTION

The most widely consumed and the cheapest hot beverage in the world today is tea. The use of an infusion of dried tea leaves has its origin in antiquity. Offering its own characteristic flavour as well as stimulating and soothing qualities, it is drunk all over the world. Recent available statistics show that the total amount of world tea production reaches 2.5 million tons annually, and an average of 2 billion cups of tea are drunk everyday (Yamanishi, 1991). Tea is made from the young leaves and unopened leaf buds of the tea plant, Camellia sinensis (L.) O. Ktze, a species which includes some very distinct varieties. Being a perennial, the tea plant possibly interacts with, and samples more environmental (both physical and biological) problems than does any other plant.

Tea, which forms the backbone of the economy of North East India, is susceptible to attacks by some foliar fungal pathogens like Exobasidium vexans, Colletotrichum camelliae, Pestalotiopsis theae, Corticium invisum, C. theae and Botrytis sp: (Sarmah, 1960). Another important fungal disease of this region caused by Bipolaris carbonum (syn. Helminthosporium carbonum), anamorph of Cochliobolus carbonum Nelson was reported as a new record by Chakraborty (1987). Symptoms of this disease appear as light brown, more or less circular spots on the young leaves. The period of occurrence of this disease is mainly from March to August. It cause considerable damage to the young leaves. This gave an excellent opportunity to go into details of certain aspects of the defense mechanisms of tea against this pathogen as no work has yet been done in this direction.

In spite of all the concerted efforts in recent years to unravel the mysteries of defense mechanisms of plants, our understanding of it is still incomplete. The biochemical mechanisms responsible for containment of fungal pathogens in the resistant interactions are undoubtedly multifold. Since it was not practicable to consider all the probable factors associated with disease resistance, a few promising ones were taken into consideration. Polyphenols are major constituents of tea leaves and their involvement in the defense mechanism either as preformed or induced chemicals seemed highly probable. Phenolic compounds have been commonly associated with other host-parasite interactions (Mahadevan, 1991) and are often noted in greater intensity in resistant interactions (Sridhar and Ou, 1974 ; Purushothaman, 1974 ; Hammerschmidt and Nicholson, 1977 ; Vidyasekharan, 1988 ; and Borkar and Verma, 1991). In some cases it has been associated with phytoalexin accumulation (Mansfield et. al, 1974 ; Langcake and Pryce, 1976 ; Langcake and McCarthy, 1979 ; Holliday et. al, 1981 ; Pierce and Ersenberg, 1987 ; Baker et. al., 1989) or with lignin, tannin and melanin formation (Vance et. al., 1980). Success or failure of infection is also determined by dynamic competition and the final outcome is the result of the sum of favourable and unfavourable conditions for both the pathogen and host cells. There is ample evidence that tolerance of the parasite by the host increases with increasing antigenic similarity, whereas, resistance of the host is characterized by an increasing disparity of antigenic determinants (DeVay and Adler, 1976 ; Chakraborty,

1988 ; Purkayastha, 1989). It has been suggested that not all cross reactive antigens contribute towards determining host-parasite compatibility but rather that only certain "key" cross reactive antigens are important (Palmerley and Callow, 1978 ; Alba et. al., 1983 ; Alba and DeVay, 1985).

The basic objectives of this investigation are (a) to determine the levels of phenolic compounds in tea leaves of resistant and susceptible varieties before and after inoculation with B. carbonum; (b) to ascertain their antifungal activity ; (c) to study wheather disease reactions could be altered in susceptible variety by chemical treatment; (d) to evaluate the changes in the levels of antifungal compound;(e) to estimate host-parasite proteins and to analysis their protein patterns ; (f) to determine serological relationship between B. carbonum and tea varieties and (g) to determine the cell or tissue location of major cross reactive antigens in tea leaves.

Before going into the details of the present work, a brief review in conformity with this study has been presented in the following pages.