CHAPTER I

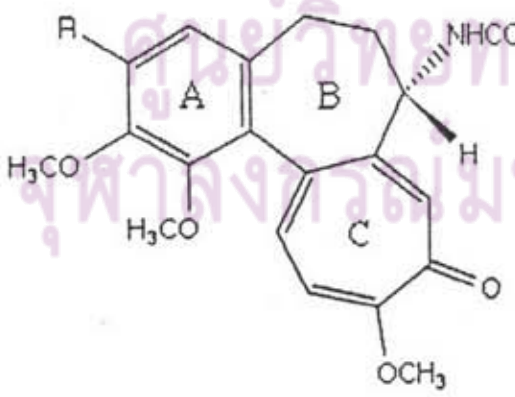
INTRODUCTION

Colchicine (Fig.1) is an important alkaloid used in the treatment of gout (Woodbury, 1970 ; Kastrup, 1988 ; Reynolds, 1989) and in plant breeding work for inducing polyploidy (Eigsti and Dustin, 1955 ; Cordell, 1981). It is a highly biologically active molecule possessing antimitotic, and together with colchicine derivatives are of interest as potential antineoplastic agents (Dixon, 1906 ; Sartorelli and Creascy, 1969 ; Zweig and Chignell, 1973 ; Lin *et al.*, 1980). A number of research works on the chemistry and pharmacological properties of this compound have been reviewed (Cook and London, 1952 ; Wildman, 1960 ; Fell and Ramden, 1967 ; Wildman, 1970 ; Creascy, 1975 ; Shiau, De, and Harmon, 1975 ; Dustin,1978; Roberts and Hyams, 1979 ; Santavy, 1979 ; Capraro and Brossi, 1984).

Colchicine is the predominant alkaloid occuring in some plants belonging to the family Liliaceae, specially the genus *Colchicum*. There have been reported that colchicine was isolated for the first time from *Colchicum autumnale* L. which is native to Europe and Northern Africa (Oberlin,1827 ; Trease and Evans,1966 ; Hussein and Nasra,

1974). Colchicine is commonly extracted from the seeds and corms of *C. autumnale* (Eigsti and Dustin, 1955 ; Glasby,1975 ; Malichova *et al.*,1979 ; Wyatt *et al.*, 1981). The content of colchicine in this plant has been reported to be in the range of 0.22-1.0 % in the dried seeds (Malichova *et al.*,1979) and 0.08-0.60 % in the dried corms (Youngken,1950; Hussein and Nasra,1974 ; Malichova *et al.*, 1979 ; Cordell, 1981).

In addition to colchicine, an alkaloid-glycoside, colchicoside (Fig.1) has also been found in the seeds of *C. autumnale* (Hansel, 1972 ; Forni and Massarani, 1977 ; Petitjean *et al.*, 1978) with its content of approximately 0.3 % dry weight (Forni and Massarani,1977). Industrially, the corms and particularly the seeds of *C. autumnale* have been used as raw materials for colchicine and colchicoside extractions (Forni and Massarani, 1977).



Colchicine R = OCH_3

Colchicoside R = $OC_6H_{11}O_5$

Fig.1 The structures of colchicine and colchicoside.

Presently , there is an increase in the demand of colchicine alkaloid for uses in medicine , agriculture and many research areas. It appears that the supplies from the conventional source of *C. autumnale* is insufficient and costly (Sarin *et al.*, 1974 ; Malichova *et al.*, 1979). Consequently, it is necessary to search for an alternative plant source for colchicine extraction.

Next to the species of *C. autumnale*, *Gloriosa superba* L. has been considered another candidate for colchicine-containing plant (Sarin *et al.*, 1974 ; Bellet and Gaignault, 1985 ; Kiselev and Yavich, 1990 ; Finnie and Van-Staden, 1991). It is a perennial herbaceous climbing plant in the family of Liliaceae. Unlike *Colchicum* species, *G. superba* grows well in the tropical and the southern part of Africa , in Madagascar , India , Ceylon , China , Indochina , and on the adjacent isles (Thakur, Potesilova, and Santavy, 1975). The individual parts of this plant are highly toxic and have been used as traditional medicine since ancient times (Quisumbing, 1951; Chopra, Nayar, and Chopra, 1956 ; Sastri, 1956; Watt and Breyer-Brandwijk, 1962 ; Chopra, Badhwar, and Ghosh, 1965 ; Chopra, Chopra, and Varma, 1969).

In India, it has been reported that colchicine is present to the content of 0.05 % in the tuber and as high as 0.6 % in the ripe seeds (Sarin *et al.*, 1974). This

high colchicine content accompanied by prospects of good availability from both wild and cultivated sources make the *G. superba* seeds a potential source of colchicine (Sarin *et al.*, 1974).

In Thailand, *G. superba* can also be grown in many parts of the country. However, very little is known about the colchicine content in Thai *G. superba* seeds or even the distribution of the compound in various parts of this plant. As part of our interest in the evaluation of *G. superba* plant as a source of colchicine, we developed a HPLC method for determination of colchicine in the seeds and a simple TLC-densitometric method for determination of colchicine in various plant parts. Both developed methods appear to be simple and rapid since the steps of purification prior to the analysis is not necessary.