RESEARCH PAPER

ANNUAL VARIATION IN CAMPTOTHECIN AND 9-METHOXY CAMPTOTHECIN ACCUMULATION AND ITS DETERMINATION IN DIFFERENT PARTS OF NOTHAPODYTES NIMMONIANA BY HPLC ANALYSIS

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Nothapodytes nimmoniana is a rich source of camptothecin (CPT) and 9-methoxycamptothecin (9-MCPT), a well known anticancer alkaloid. We investigated annual variation in the concentration of CPT and 9-MCPT in different parts of N. nimmoniana, collected during three consecutive year starting from 2008 to 2010. The CPT and 9-MCPT content in N. nimmoniana extracts was determined by HPLC analysis. The maximum CPT and 9-MCPT accumulation in different parts of N. nimmoniana was found during the year 2010, followed by year 2008 and 2009. The CPT and 9-MCPT accumulation in different parts of N. nimmoniana collected during all the three years was in the following order root > fruit > stem > leaf. The root collected in the month of February 2010, showed higher accumulation of CPT (2.65%) and 9-MCPT (1.06%) than fruit, stem and leaf of N. nimmoniana. The root showed more than 2-fold accumulation of CPT and 9-MCPT than fruit, stem and leaves of N. nimmoniana. The months starting from October to February were characterized by high humidity, low air temperature and less evaporation rate which enhanced CPT and 9-MCPT accumulation in different parts of N. nimmoniana during all the three years (2008 to 2010). Moreover the variations in CPT and 9-MCPT accumulation might be because of changes in seasonal patterns, weather events, temperature changes, biotic and abiotic stresses. These findings indicate that the accumulation of CPT and 9-MCPT in different parts of N. nimmoniana vary annually.

Key words: Annual variation, Camptothecin, 9-Methoxycamptothecin, HPLC, Nothapodytes nimmoniana.

INTRODUCTION

Nothapodytes nimmoniana (J. Graham) Mabberly [formerly, Nothapodytes foetida (Wight) Sleumer] is a rich source of potent alkaloid camptothecin (CPT) and 9-methoxycamptothecin (9-MCPT) (Govindachari and Viswanathan, 1972; Fulzele et al 2001). In addition to anticancer properties exhibited by plants (Chowdhury et al 2012; Zia Uddin et al 2012), biological screenings have recognized that CPT and its derivative, 9-MCPT, have promising anti-cancer drug of twenty first century (Wu et al 1995). The cellular target of CPT is DNA topoisomerase 1 and its numerous analogs have been synthesized as potential therapeutic agents (Wall and Wani, 1995). CPT inhibits the replication of human immuno deficiency virus (HIV) in vitro and is also shown to be effective in the complete remission of breast, cervical, lung and uterine cancer (Priel et al 1991; Takeuchi et al 1991; Potmesil, 1994). CPT itself is not used clinically due to its