



RESEARCH PAPER

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

Ajay Sharma^{1*}, Pooja Sharma², Arun M. Gurav³

¹Department of Pharmacy, College of Health Sciences, Mizan-Tepi University, Mizan Teferi, Ethiopia

²Amity Institute of Biotechnology, Amity University, Gwalior-474011, Madhya Pradesh, India

³Jawaharlal Nehru Medicinal Plant Garden, Pune-411038, Maharashtra, India

*E-mail: ajaysharmapharma1979@gmail.com

Tel.: +251 948422663.

Received: Dec 26, 2015 / Revised: Jan 19, 2016 / Accepted: Jan 21, 2016

***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) Mabblerly [formerly, *Nothapodytes foetida* (Wight) Sleumer] is a rich source of potent alkaloid camptothecin (CPT) and 9-methoxy camptothecin (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