

**RESEARCH ARTICLE**

**The comparison of two Chemometric Assisted UV Spectrophotometric Techniques with High-performance Liquid Chromatography Methods for simultaneous determination of three Antiemetic drugs used in Chemotherapy Induced Nausea and Vomiting**

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**ABSTRACT:**

This research work was emphasis to adopt green analytical chemistry via development of environmentally friendly methods for simultaneously estimation of drugs used for chemotherapy induced nausea and vomiting (CINV). In these study two multivariate calibration methods namely; Partial least square (PLS) models, Principal component regression (PCR) and RP-HPLC (Reverse phase- high performance liquid chromatography) method were employed for simultaneous assessment of aprepitant (APT), dexamethsone (DEX) and ondansetron (OND) in their market formuations. The chromatographic separation was achieved on Phenomenex Luna C18 column (150mm X 4.6mm in diameter with 5 $\mu$  particle size) and detection was carried out by UV-Visible detector. The mobile phase comprises a mixture of ethanol and toluene in a ratio of 65:35% v/v, at the flow rate of 1.2ml/ min. The elution was monitored at 225nm and total run time required for separation was 10 min. The retention time of APT, DEX and OND were found to be 4.37 min, 6.57 and 8.11 min respectively. The Applied methods were validated as per ICH guidelines to achieve maximum sensitivity and lowest error. Linearity range for multivariate calibration methods was found to be 5-50 $\mu$ g/mL for APT, DEX and OND and similarly for HPLC methods was found to be 5-30 $\mu$ g/mL, 5-30 $\mu$ g/mL and 5-50 $\mu$ g/mL of APT, DEX and OND respectively. A statistical procedure was carried out to find statistical difference among these developed methods. The results revealed that there is no significant difference between two multivariate models and HPLC methods. Therefore, it could be applied as an alternative of HPLC method in quality control laboratories lacking the required facilities for these expensive instruments. Hence, proposed method can also be applied in clinical pharmacy, toxicology and quality control analysis without the interference of commonly encountered dosage form additives.

**KEYWORDS:** Partial least square, Principal component regression, RP-HPLC, Aprepitant; Dexamethsone, Ondansetron, chemotherapy Induced nausea and vomiting.

**1. INTRODUCTION:**

Chemotherapy-induced nausea and vomiting (CINV) is most common side effects of chemotherapy. Severity of CINV may lead to prevalence of therapeutic complications such as malnutrition metabolic disturbances, dehydration, pneumonia and so on<sup>1,2</sup>. The triple anti-emetic regimens including neurokinin-1 (NK1) receptor antagonist, corticosteroid and 5- hydroxy tryptamine 3-receptor antagonist have been advised and recommended by the American Society of Clinical