

Vitamin C Tablet Assay by Near –Infrared Reflectance spectrometry

KAZEM KARGOSHA * HAMID AHMADI and NADER NEMATI

*Chemistry and Chemical Engineering Research center of Iran, Tehran,
P.O. Box 14335-186 E-mail: K.Kargosha@ccerci.ac.ir*

When a drug is prepared in a tablet, the active component represents only a small portion of the dosage form. The other components of the formulation include materials to assist in the dissolution, antioxidants, coloring agents and bulk fillers. The tablets are tested using approved testing methods usually involving separation and subsequent quantification of the active component. Tablets may also be tested by near-Infrared Reflectance spectrometry (NIRS)[1].

In the present study, based on NIRS and multivariate calibration methods, a novel and precise method is developed for direct determination of ascorbic acid in vitamin C tablet. Two different tablet formulations were powdered in three different sizes, 63-125 μm , and examined. Spectral region of 4750-4950 cm^{-1} was used and optimized for quantitative operations. Partial least squares (PLS) and multiple linear regression (MLR) methods were performed for this spectral region. The results of optimized PLS and MLR methods showed that reproducibility increase with decreasing grain size and standard error of calibration (SEP) of less than 1% w/w of ascorbic acid and a correlation coefficient of 0.998 can be achieved. The PLS method showed better results than MLR.

Seven overdose and underdose samples (prepared in the laboratory to match marketed products) were tested by proposed and iodometric standard methods. A correlation between NIRS predicted ascorbic acid values and iodometric values was calculated ($R^2=0.9950$).

Finally, the direct analysis of individual intact tablets in their unit-dose packages (Blistering in aluminum and PVC foils) obtained from market were also carried out and a correlation coefficient of 0.9989 and SEP of 0.931% w/w of ascorbic acid were achieved.

1. Drennen, J.K. and Lodder, R.A., J. Pharm. Sci. 79, 622, 1990.