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Entitled

*DETERMINATION OF VITAMIN D METABOLITES AND THEIR EPIMERS IN OBESE EMIRATI
POPULATION*

by

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Abstract

Introduction: - In this study, the sources, formation, metabolism, function, biological activity, and potency of C3-epimers (epimers of vitamin D) compared to other vitamin D metabolites have been discussed. The importance of C3 epimerization and the metabolic pathway of vitamin D at the hydroxyl group have recently been recognized. Here, the hydroxyl group at the C3 position is orientated differently from the alpha to beta orientation in space. The metabolic stability of 3-epi-1 α ,25(OH) $_2$ D $_3$ has been demonstrated to be higher than its primary metabolite (1 α ,25(OH) $_2$ D $_3$). Some researchers have observed a larger proportion of total vitamin D as C3-epimers in infants than in adults. Insufficient levels of vitamin D were found in mothers and their newborns when the epimers were not included in the measurement of vitamin D. Most commercial immunoassays techniques can lead to inaccurate vitamin D results due to epimeric interference, especially in infants and pregnant women. It is also known that the LC-MS/MS technique can chromatographically separate epimeric and isobaric interference and detect vitamin D metabolites sensitively and accurately.

Methods: - The vitamin D epimers and other metabolites were determined by LC-MS/MS system, model 8060. The methods include preparing the standard solution, collecting blood samples from 729 individuals, extracting vitamin D and epimers from plasma samples using liquid-liquid extraction, and developing and validating for that method.

Results and Discussion: - The vitamin D metabolites and their epimers and isobar have been separated by UHPLC-MS/MS instrument. The method validation parameters, including intra and inter-day precision, intra and inter-day accuracy, recovery, linearity, specificity, and stability, were acceptable. Epimers of vitamin D metabolites cause an overestimation of 25OHD and give false-positive results in the obese Emirati population. The results illustrate that baseline (vitamin D deficient volunteers), follow-up (supplemented volunteers), and healthy volunteers are deficient in vitamin D's major metabolites.

Conclusion: - LC-MS/MS has superior selectivity compared to the other methods due to its ability to differentiate between different metabolites via chromatographic separation and mass transitions differences. This new vitamin D blood test has been successfully applied to estimate the vitamin D and epimer levels in the obese Emirati population accurately. It is recommended for any future clinical studies.

Keywords: epimers of vitamin D; 3-epi-25OHD $_3$; vitamin D; 25OHD; 25OHD $_3$; vitamin D metabolites; C3 epimer; LC-MS/MS; vitamin D blood test; obese Emirati population.