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An Initial Evaluation of Newly Proposed Biomarker of Zinc Status in Humans: The Erythrocyte Linoleic Acid: Dihomo-γ-Linolenic Acid (LA:DGLA) Ratio

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Abstract : Background: Zinc is an essential micronutrient for humans with important physiological functions. A sensitive and specific biomarker for assessing Zn status is still needed. Objective: The major aim of this study was to examine if the changes in the content of plasma phospholipid LA, DGLA and LA: DGLA ratio can be used to efficiently predict the dietary Zn intake and plasma Zn status of humans. Methods: The study was performed on apparently healthy human volunteers. The dietary Zn intake was assessed using 24h recall questionnaires. Plasma phospholipid fatty acid analysis was done by gas chromatography and plasma analysis of minerals by atomic absorption spectrometry. Biochemical, anthropometrical and hematological parameters were assessed. Results: No significant relationship was found between the dietary and plasma zinc status (r=0.07; p=0.6). There is a statistically significant correlation between DGLA and plasma Zn (r=0.39, p=0.00). No relationship was observed between the linoleic acid and plasma Zn, while there was a significant negative correlation between LA: DGLA ratio and plasma Zn status (r=-0.35, p=0.01). Similarly, there were statistically significant difference in DGLA status (p=0.004) and LA: DGLA ratio (p=0.042) between the Zn formed groups. Conclusions: This study is an initial step in evaluating LA: DGLA ratio as a biomarker of Zn status in humans. The results are encouraging as they show that concentration of DGLA is decreased and LA: DGLA ratio increased in people with lower dietary Zn intake. However, additional studies are needed to fully examine the sensitivity of this biomarker.

Keywords : dietary Zn intake Zinc, fatty acid composition, LA: DGLA, healthy population, plasma Zn status, Zn biomarker
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