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# Dimethyl 3, 3', 4, 4'-tetrahydroxy- $\delta$ -truxinate isolated from the leaves of *Andrographislineata*.Wall. ex. Nees exert anti-adipogenic activity on 3T3-L1 adipocytes by down regulating C/EBP- $\alpha$ and PPAR- $\gamma$

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## ABSTRACT

Obesity is a complex, multifactorial, and chronic disease that increases the risk for type 2 diabetes, coronary heart disease and hypertension, and has become a major worldwide health problem. Developing novel anti-obesity drugs from natural products is a promising solution to the global health problem of obesity. While screening anti-obesity potentials of natural products, the ethanolic extract from leaves of *Andrographislineata* (EtALL) was found to significantly inhibit adipocyte differentiation and lipid contents in 3T3-L1 cells. The ethanolic leaf extract was subjected to bioassay guided fractionation in 3T3-L1 cell lines. Five fractions were isolated from the EtALL extract by column chromatography. All the Fractions (I-V) along with EtALL were screened for adipogenesis activity (Oil-Red-O staining). The fraction which showed maximum adipogenesis activity was purified by thin layer chromatography. The bioactive Fraction IV was found to have maximum adipogenic (96.83%) activity and the activity was comparable to Rosiglitazone. The spectroscopic data analysis reveals that, the isolated bioactive compound was Dimethyl 3, 3', 4, 4'-tetrahydroxy- $\delta$ -truxinate, a combination of truxillic and truxinic acid derivative. The expression level of adipocyte marker genes including proliferator activated receptor- $\gamma$  (PPAR- $\gamma$ ) and CCAAT/enhancer-binding protein- $\alpha$  (C/EBP- $\alpha$ ) which plays a major role in adipogenesis was investigated. We found that the isolated Dimethyl 3, 3', 4, 4'-tetrahydroxy- $\delta$ -truxinate inhibited adipogenesis in a dose-dependent manner in 3T3-L1 cells; this inhibition was attributed to their abilities to downregulate the protein levels of the adipocyte marker proteins PPAR- $\gamma$  and C/EBP- $\alpha$ . Thus, these results suggest that the ethanolic extract of leaves of *Andrographislineata* and its isolated truxillic and truxinic acid derivative may be of therapeutic interest with respect to the treatment of obesity.

**Keywords:** 3T3-L1 adipocytes cell lines, Dimethyl 3, 3', 4, 4'-tetrahydroxy- $\delta$ -truxinate, *Andrographislineata*, PPAR- $\gamma$ , C/EBP- $\alpha$