Tropentag, September 20-22, 2023, hybrid conference

"Competing pathways for equitable food systems transformation: Trade-offs and synergies"

Body composition changes of male mice C57BL/6 fed high-fat diets supplemented with bovine milk coming from three feeding systems in subhumid tropics

Mario Cuchillo Hilario[1,4], Diego L. Ramírez-Ramírez[2], Lilia G. Noriega[1], Mariana López-Blanco [2], Mareli I. Fournier-Ramírez[3], Margarita Díaz-Martínez[1], Claudia Delgadillo-Puga[1]

[1] *Instituto Nacional de Ciencias Médicas y Nutricíon 'Salvador Zubirán', Mexico*

[2] *Universidad Nacional Autónoma de México (UNAM), Fac. de Medicina Veterinaria y Zootecnia, Mexico*

[3] *Universidad Nacional Autónoma de México (UNAM), Dept. de Ciencias Pecuarias, Mexico*

Abstract

The objective of this study was to compare the body weight, fat mass and lean mass in a mouse model fed with a high-fat diet (HFD) supplemented with lyophilized bovine milk coming from three feeding systems from sub-humid tropical of Yucatán, Mexico. The murine model consisted in 30 male C57BL/6 mice of 21 days of age and body weight of 24g. Mice were allocated into 5 groups (n=6). The experimental groups were: 1) CD= control diet (7 % fat); 2) HFD= high fat diet (21 % fat); 3) ISS= HFD plus 40 % lyophilized bovine milk from intensive silvopastoral system; 4) MS= HFD plus 40 % lyophilized bovine milk from monoculture system, and 5) NVS= HFD plus 40 % lyophilized bovine milk from native vegetation system. The rodents were fed ad libitum during 98 days; body weight and food intake were recorded once a week. Body composition (lean and fat mass) was evaluated in the day 77 by quantitative magnetic resonance (EchoMRI-700 TM; Echo Medical Systems, LLC. Houston, TX, USA). Data were analysed by one-way ANOVA and Tukey (=0.05). HFD (36.8±3.5g) increased body weight ($p = 0.0248$) compared to CD (29.4±2.9g) and ISS (30.5±1.9g). However, all groups supplemented with cow's milk showed a tendency to lower body weight at greater extent than HFD. For lean or muscle mass, HFD obtained the lowest percentage (68.2±2.4g), being statistically different ($p = 0.0206$) to CD which showed the largest value (77.9±6.4g). No further differences were observed in the rest of groups. Even though, a rising trend was depicted from NVS (70.1 %) followed by ISS (75.2 %) and MS (76.4 %). In contrast to lean mass, fat mass percentage was maximum in HFD (29.5 %) being different ($p = 0.0206$) from CD (18.8 %) and ISS (19.2 %). The SM (20.0 %) and NVS groups (26.4 %) were not distinct from CD in this respect ($p = 0.9960$ and $p = 0.1902$, respectively). Cow's milk, could a non-pharmacologic approach to modulate metabolic alterations encouraged by a high fat diet. Supplementation cow's milk deflect excessive body weight gain while depleting body fat mass deposition.

Keywords: Adipogenesis, body composition, lipotoxicity

Contact Address: Mario Cuchillo Hilario, Instituto Nacional de Ciencias Médicas y Nutricíon 'Salvador Zubirán', Mexico City, Mexico, e-mail: mario.cuchilloh@incmnsz.mx