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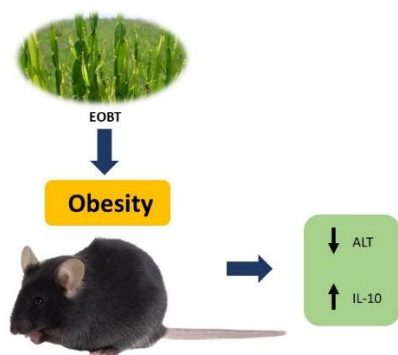
Effect of *Baccharis trimera* Less (DC) essential oil in obese mice on a high-fat diet

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Graphical Abstract



Abstract.

Obesity is a metabolic disorder characterized by the accumulation of fat in the body that poses a risk to the individual's health. In adipose tissue, changes occur in the profile of immune cell. The relationship between obesity and metabolic diseases makes the inflammatory pathways an important therapeutic target for study. *Baccharis trimera* Less (DC) is used by the population for weight loss and some studies point to a possible anti-obesogenic effect. The aim was to evaluate the effect of *Baccharis trimera* essential oil (EOBT) in obese mice of the C57BL/6J lineage that consumed a high-fat diet. Male C57BL/6J mice were subjected to obesity induction through the ingestion of a high-fat diet FOR 12 weeks and were orally treated with EOBT at doses of 1, 10 or 100 mg/kg for 14 days. As a result, it was observed that after 12 weeks with the high-fat diet, the mice showed changes in body mass, adiposity index, dyslipidemia, insulin resistance and changes in anti-inflammatory mediators, when compared to animals treated with the standard diet. The results indicate that the C57BL/6J mouse strain was able to develop morphological changes and induce

	<i>dyslipidemia and insulin resistance with dietary intake. the EOBT resulted in a decrease in ALT levels in the liver and in an anti-inflammatory action due to the increase of IL-10 in the epididymal adipose tissue in animals submitted to a high-fat diet.</i>
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Introduction

Obesity is a metabolic disorder characterized by the accumulation of fat in the body that poses a risk to the individual's health.^{1,2} This accumulation leads to the development of a low-grade chronic inflammatory process and has been associated with diseases such as type 2 diabetes mellitus, cardiovascular diseases and neurodegenerative diseases.³ In adipose tissue, changes occur in the profile of immune cells and in the production of adipokines that can compromise insulin sensitivity.^{3,4} In addition to this characteristic inflammatory process in obesity, there are also changes in the lipid profile caused by dyslipidemia in obese animals.⁵ The relationship between obesity and metabolic diseases makes the inflammatory pathways an important therapeutic target for study.² Many natural products are used in folk medicine for weight loss and have inevitably become interesting therapeutic targets.^{6,8,9} The medicinal species *Baccharis trimera* Less (DC), known as carqueja, is used by the population for weight loss and some studies point to a possible anti-obesogenic effect.^{9,10} The aim was to evaluate the effect of *Baccharis trimera* essential oil (EOBT) in obese mice of the C57BL/6J lineage that consumed a high-fat diet.

Materials and Methods

Male C57BL/6J mice were subjected to obesity induction through the ingestion of a high-fat diet (60%) for 12 weeks and were orally treated with EOBT at doses of 1, 10 or 100 mg/kg for 14 days. In this study, body mass, food intake, adiposity index, organ weight (liver, kidney, spleen and heart) and the mass of the three adipose tissues (epididymal, retroperitoneal and visceral) were evaluated. Parameters related to dyslipidemia, insulin and glucose tolerance of these obese animals treated with EOBT were also analyzed, as well as its possible anti-inflammatory action. All experiments were approved by the Animal Use Ethics Committee (CEUA) of the Institute of Biosciences, UNESP – Campus de Botucatu under protocol number 1156. Parametric data were submitted to the unpaired Student's t test for comparison between two groups and one-way ANOVA for comparison between three groups or more, followed by Tukey's test. For analysis of results with more than one variable, two-way ANOVA was used, followed by the Bonferroni or Tukey test. The minimum value of statistical significance considered was $p < 0.05$.

Results and Discussion

As a result, it was observed that after 12 weeks with the high-fat diet, the mice showed changes in body mass, adiposity index, dyslipidemia, insulin resistance and changes in anti-inflammatory mediators, when compared to animals treated with the standard diet. The results indicate that the C57BL/6J mouse strain was able to develop morphological changes and induce dyslipidemia and insulin resistance with dietary intake.

Conclusions

The treatment of mice with the EOBT resulted in a decrease in ALT levels in the liver and in an anti-inflammatory action due to the increase of IL-10 in the epididymal adipose tissue in animals submitted to a high-fat diet.

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