Nutrición Hospitalaria

Nutr Hosp. 2013;28(5):1757-1759
ISSN 0212-1611 • CODEN NUHOEQ
S.V.R. 318

Comunicación breve

The intake effects of *Cyssus sicyoides* drink on body mass, glycemia and femur parameters in male rats

Paula Cristina Alves da Silva[1], Adriana da Silva Leal[2], André Manoel Correia dos Santos[1], Carlos Alberto Soares da Costa[1], Gilson Teles Boaventura[1] and Armando Ubirajara Oliveira Sabaa Srur[2]

[1]Department of Nutrition and Dietetics. Laboratory of Experimental Nutrition (LabNE). Nutrition College. Fluminense Federal University (UFF) Niterói. Brazil. [2]Health Sciences Centre. Institute of Nutrition Josué de Castro. Federal University Fluminense. Río de Janeiro. Brazil.

Abstract

Background: **The *Cissus sicyoides,* popularly called insulin plant, the drink is widely used in folk medicine to control glycemia. However, there are not enough datas about the effect of *Cissus sicyoides* on bone physiology. Thus, the goal was evaluate the glycemia and femur parameters in male rats.**

Material and methods: **Wistar male rats with 12 weeks were divided control group (C) and treated with 5% of *Cissus sicyoides* (CS). After 42 days of treatment the groups were sacrificed and the body mass (g), glycemia, body organs and femur parameters were assessed.**

Results: **In the last week the CS group showed significantly lower body mass and lower glycemia. After 42 days the CS showed heart and liver mass were significantly lower. In regard to bone paramaters, the mass and BMD of femur were significantly lower in CS group.**

Conclusions: **Despite the *Cissus sicyoides* drink decrease the glycemia, nevertheless it intake does not seem unfavorable for bone parameters.**

(*Nutr Hosp.* 2013;28:1757-1759)

DOI:10.3305/nh.2013.28.5.6544

Key words: Cyssus sicyoides. *Rat. Femur. Glycemia. DXA.*

EFECTOS DE LA BEBIDA DE *CYSSUS SICYOIDES* SOBRE MASA CORPORAL, GLUCEMIA Y PARÁMETROS DEL FÉMUR EN RATAS MACHO

Resumen

Antecedentes: **Los *sicyoides Cissus,* popularmente llamada planta de insulina, la bebida es ampliamente utilizado en la medicina popular para el control de la glucemia. Sin embargo, no hay datas suficientes sobre el efecto de *sicyoides Cissus* en la fisiología ósea. Por lo tanto, el objetivo era evaluar la glucemia y los parámetros de fémur en ratas macho.**

Material y métodos: **Ratas Wistar macho con 12 semanas se dividió el grupo control (C) y se trata con un 5% de sicyoides Cissus (CS). Después de 42 días de tratamiento, los grupos fueron sacrificados y la masa corporal (g), la glucemia, los órganos del cuerpo y el fémur parámetros fueron evaluados.**

Resultados: **En la última semana el grupo CS mostraron significativamente menor masa corporal y baja la glucemia. Después de 42 días el CS mostró corazón y de la masa del hígado fueron significativamente menores. En lo que respecta a Paramaters ósea, la masa y la BMD del fémur fueron significativamente inferiores en el grupo CS.**

Conclusiones: **A pesar de la bebida Cissus sicyoides disminuir la glucemia, sin embargo la ingesta no parece desfavorable para los parámetros óseos.**

(*Nutr Hosp.* 2013;28:1757-1759)

DOI:10.3305/nh.2013.28.5.6544

Palabras clave: *Cissus sicyoides. Rata. Fémur. Glicemia. DXA.*

Correspondence: Paula Cristina Alves da Silva.
Department of Nutritrion and Dietetics.
Laboratory of Experimental Nutrition (LabNE).
Nutrition College. Fluminense Federal University (UFF).
St. Mário Santos Braga, 5th floor.
24020-140 Niterói, RJ, Brazil.
E-mail: paulacas11@gmail.com

Recibido: 7-II-2013.
1.ª Revisión: 28-II-2013.
Aceptado: 28-III-2013.

Introduction

The species *Cissus sicyoides* has several synonyms, such as Cissus verticillata (L.), C. Descourt latifolia, C. M tinctoria, among others.[1] This species, found in the Amazon region is popularly known as "insulin", "indigo climber", "vine-Puca," "Japanese curtain" and "white grape". Its leaves are used externally against rheumatism, healing of abscesses and preparation of infusion of the leaves and stem, widely used in muscle inflammation, epilepsy, stroke, hypertension and diabetes mellitus, which according to the reported beneficial effects, popularly came to be called insulin plant.[2,3,4]

Arising from the use of insulin plant in folk medicine in controlling glycemia, some studies are being conducted in order to prove scientifically the action of this plant on glycemia.[3] Epidemiological studies have reported reduced risk of hip fractures or higher bone mineral density (BMD) in habitual tea drinkers.[5] However, there are not enough datas about the effect of the *Cissus sicyoides* drink intake on bone physiology, as well as, clinical and experimental models. The use of herbal, non-mineral and non-vitamin supplements has been expanded. In the area of bone health there have been several attempts, mostly with animal models or in vitro, to evaluate potency of various herbal products.[6] Our goal was to evaluate the effects of *Cissus sicyoides* drink intake on glycemia, bone density and bone mass in male rats.

Materials and methods

The protocol used to deal with experimental animals was approved by the Animal Care and Use Committee (CEUA) of the Health Sciences Center of the Federal University of Rio de Janeiro, which based their analysis on the principles adopted and promulgated to use of animals in research activities in Brazil.

Wistar male rats were kept in a room with controlled temperature (25 ± 2º C) and an artificial dark-light cycle. The animals with 12 weeks old were kept together distributed in 2 groups, a control group C (N = 6) and the experimental group *Cissus sicyoides* drink CS (N = 6). Both groups were fed by receiving standard diet (Nuvilab-CR1) *ad libitum* for 42 days. In the same way, the control group received water while the experimental group received 3 times per week of *Cissus sicyoides* diluted drink. The drink was administrated at 25° C and in a concentration of 5% *ad libitum*.

Body mass (g) was evaluated once per week. The glycemia was evaluated in the first week and last week, after 6h of fasting, respectively. At 42 days, the rats were anesthetized with a dose of thiopentax, after the sacrifice the heart, liver and kidneys were dissected and weighed. Femur was collected and cleaned of soft tissue and preserved at -20° C until posterior analysis. Bone parameters: Femur mass (g), the distance between epifhysis and width of the diaphysis were mearsured using calipers with a readability of 0.001 mm. The femurs were submitted to DXA (Dual-energy X-ray absorptiometry) analyses the technician did not know about the experimental protocol. The bone mineral density (BMD, g/cm^2) and bone mineral content (BMC, g) were measured for each bone.[7]

Statistical analyses were performed using the GraphPad Prism statistical package (version 5·00, 2007, San Diego, CA, USA). Body mass was analyzed using two-way ANOVA, followed by *post hoc* Bonferroni post-test. The remaining results were analyzed using Student's *t* test. All results are expressed as means ± SEM with significance level of P <0·05.

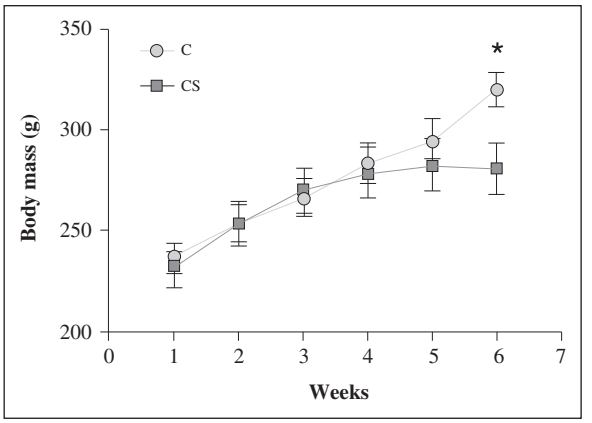

Fig. 1.—Body mass development (g). C: Control group and CS, experimental group treated with Cissus sicyoides *in a concentration of 5% drink. *Significantly different from the control group (Two-way ANOVA P < 0.05).*

Results

During period of 42 day, the body development was similar between groups, however, in the last week the CS group showed lower body mass ($P < 0.05$, 280.40 ± 12.63 vs. 319.40 ± 8.55) (fig. 1). In regard of the glycemia both groups showed similar results in the first week. While, in the last week the CS group showed significantly lower (-10%) glycemia (table I).

After 42 days of the experiment the heart and liver mass were lower ($P < 0.05$, -14% and -22%, respectively) in CS group. The femur paramaters were analyzed, the distance between epiphysis, width of the diaphysis and BMC there is no difference between groups. Despite, the femur mass and BMD were lower ($P < 0.05$, -7% and -8%, respectively) in CS group (table I).

Discussion

To our knowledge, this is the first study to evaluate the intake effects of *Cissus sicyoides* on femur parameters in male rats. Previous studies[6] investigated the

Table I
Glycemia, body organs and femur parameters

	C	*CS*
Glycemia in the first week (mg/dL)	94.60 ± 1.91	93.75 ± 1.37
Glycemia in the last week (mg/dL)	114.20 ± 2.63	102.60 ± 3.60*
Heart (g)	1.47 ± 0.68	1.25 ± 0.21*
Liver (g)	11.41 ± 0.43	8.88 ± 0.39*
Kidneys (g)	2.36 ± 0.12	2.21 ± 0.61
Femur (g)	0.86 ± 0.01	0.80 ± 0.02*
Distance between epiphysis (mm)	36.81 ± 0.20	36.59 ± 0.32
Width of the diaphysis (mm)	4.40 ± 0.07	4.32 ± 0.05
BMD (g/cm^2)	0.13 ± 0.01	0.12 ± 0.01*
BMC (g)	0.36 ± 0.02	0.32 ± 0.02

C: Control group and CS, experimental group treated with *Cissus sicyoides* in a concentration of 5% drink.
*Significantly different from the control group (Student's t test, $P < 0.05$).

effects of hypoglycemic and anti-lipid aqueous extract of leaves of *Cissus sicyoides* in alloxan-induced diabetic rats. The authors demonstrated that the aqueous extract of the plant insulin, administered orally for 7 days, produced a significant decrease on glycemia. However, the plant insulin had no effect on glycemia of normal mice. Another study[7] showed it is intake did not affect significantly the glycemia levels of these animals, however, the treatment with the extract promoted slight reduction in glycemia when compared with the control group. However, Pepato et al[4] observed reduction of glycemia when the drink was administrated to streptozotocin-diabetic rats. The glycemia results observed in the present study are in agreement with the literature, which indicates a large number of compounds with potential antidiabetic.

The organs mass were significantly lower in the CS group and it could be probably because the lower body mass, then, further studies are necessary to elucidate the relationship between organs and body mass. The positive relationship between body mass and bone mass in adult humans and experimental models is well stablished.[8] In overweight individuals with BMD is higher, especially in the hip region.[9] In experimental models the same positive action of higher body mass was reported.[10] Based on the results, these studies suggest which lower body mass act directly by the action of load mechanical inhibiting osteogenesis and consequently BMD.[11]

We conclude, despite the *Cissus sicyoides* drink significantly interfere in glycemia, the drink does influence body mass in the last week and it is intake does not seem to be favorable for bone parameters showing a significantly lower femoral mass and BMD. Although the drink had hypoglycemia effects, the bone results suggest which the CS intake might increases the risk for bone fragility when compared to control group. These findings emphasize the complex nature of nutrients and it is relationship with organic system.

References

1. Lombardi JA. Flora neotropica monograph 80 New York Botanical Garden Bronx; *IDF* -International Diabetes Federation. Diabetes Atlas. 5, ed. 2011.
2. Albuquerque JMD. Plantas medicinais de uso popular. Brasília: ABEAS. (Programa de agricultura nos Trópicos, 6), 96 p, 1989.
3. Beltrame et al. Estudo fitoquímico e avaliação do potencial antidiabético do *Cissus sicyoides* L. (Vitaceae). *Quim Nova* 2001; 24 (6): 783-5.
4. Pepato et al. *Cissus sicyoides* (princess vine) in the long-term treatment of streptozotocin-diabetic rats. *Biotechnol Appl Biochem* 2003; 37: 15-20.
5. Sacco et al. Phytonutrients for bone health during ageing. *British Journal of Clinical Pharmacology* 2012; 75 (3): 697-707.
6. Radimer KL, Subar AF, Thompson FE. Nonvitamin, nonmineral dietary supplements: issues and findings from Nhanes III. *J Am Diet Assoc* 2000; 100: 447-54.
7. Tsujio et al. Bone mineral analysis through dual energy x-ray absorptiometry in laboratory animals. *J Vet Med Sci* 2009; 71: 1493-7.
8. Viana et al. Hypoglycemic and anti-lipemic effects of the aqueous extract from *Cissus sicyoides. BMC pharmacology* 2004; 4 (9): 1471-2210.
9. Reddy GA et al. Bone mass of overweight affluent Indian youth and its sex- specific association with body composition. *Archives of Osteoporosis*, 2009; 4: 31-9.
10. Iwaniec UT et al. Body mass influences cortical bone mass independent of leptin signaling. *Bone* 2009; 44: 404-12.
11. Watkins BA, Li Y, Lippman HE et al. Modulatory effect of omega-3 polyunsaturated fatty acis on osteoblast function and bone metabolism. *Prostaglandins Leukot Essent Fatty Acids* 2003; 68: 387-98.