The antihypertensive and diuretic effect of crude root extract and saponins from Solanum sisymbriifolium Lam., in L-NAME-induced hypertension in rats

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Abstract

Ethnopharmacological relevance: Solanum sisymbriifolium Lam., is used in Paraguayan folk medicine claiming antihypertensive and diuretic properties.

Aim of the study: This study aimed to determine the influence of chronic oral administration of the crude root extract and saponins obtained from S. sisymbriifolium Lam., on the blood pressure of male and female rats with hypertension induced by L-NAME, and its consequences on diuresis, the body weight, blood glucose, and level of serum parameters of liver and kidney functionality.

Materials and methods: Wistar rats were randomly divided into seven male, and seven female groups (8 animals each), which received as 6-week pretreatment, 0.9% saline solution (two groups; 0.1mL/10 g of b.w.), L-arginine (100.0 mg/kg/day), enalapril (15.0 mg/kg/day), crude extract (CESs 100.0 mg/kg/day), and saponin purified fraction (1.0, and 10.0 mg/kg/day), and treated with L-NAME (20 mg/kg/day/i.p.) twice, 1, and 6 h after pre-treatment. The animals' body weight, glycemia, and blood pressure were recorded weekly, while serum, hepatic, renal, and histological parameters were analyzed at the end of 6-week of treatment.

Results: A protective effect of CESs (100.0 mg/kg/day), and saponins (1.0, and 10.0 mg/kg/day) against hypertension induced by L-NAME was verified in the systolic, diastolic, and mean blood pressure values, which were significantly lower than the positive L-NAME-hypertensive control group (male and female) at the end of the 6-week treatment. Also, pretreatment with enalapril (15.0 mg/kg/day) induced an efficient protective activity, which validates the method used. Likewise, the volume of urine, creatinine, uric acid, urea, and electrolyte excretion was enhanced at the end of 6-week of treatment in concordance with the reduction in serum level of the same parameters, compatible with the improvement of the diuretic activity. The glycemia, body weight, heart rate, and functional hepato-renal parameters were not modified after a 6-week of treatment, in comparison to the control group, indicating relatively acceptable harmless properties of CESs and saponins. Interestingly, the HDL level in females was increased in contrast to male rats by chronic saponins treatment when compared with the negative control group.

Conclusions: It can be concluded that either the increment in blood pressure (systolic, diastolic, and median) or cardiorenal remodeling effects in male and female rats submitted to L-NAME-induced hypertensive condition, were prevented and well-preserved without a significant variation during a period of 6-week of pretreatment with CESs and saponins pretreatments. Likewise, an important diuretic effect was revealed after this period of treatment.