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Chilean crude extract of *Ruta graveolens* generates vasodilatation in rat aorta at cellular subtoxic concentrations

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ABSTRACT

In Chile elevated percentage of population have cardiovascular diseases, 70% of this populations is a hypertensive peoples. The *Ruta graveolens* (Ruta) is a medicinal plant used in different parts of the world with different therapeutics properties like dermatologic as far as anti-helmintic properties. We analyzed the vascular action measuring the tension to identify vasodilator effect of Ruta extract in norm-tense rat ' s aorta incubated and measured in isolated organ bath, and evaluating the toxicity effect in CRL-1730 cell line, through enzymatic assay (MTT), confocal microscopy (propidium iodide stain) and flow cytometry (TUNEL assay), including extracellular reactive oxygen species (ROS) production through luminescence assay. The results show with DE_{50} 29 ± 0.1 μg/mL evidenced vasodilatation, partially endothelium-depend. The cytotoxicity showed with DE_{50} 304.6 ± 2 μg/mL in enzymatic assay (MTT) while evidenced membrane permeability in high concentrations (1500 μg/mL), DNA fragmentation in absence of oxidative stress in only observed when high concentrations of Ruta are used over the cell culture. The vasodilatation activity is executed in subtoxic concentration and partially endothelium-depend without permeability effect in the membrane and deterioration of the cells viability suggesting a complex effect of Ruta preparation in the regulation of vascular tone.

KEYWORDS

Vasodilatation; *Ruta graveolens*; Toxicity, Endothelium

Cite this paper

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References

[1] Kaplan, N.M. and Victor, R.G. (2009) Kaplan ' s clinical hypertension, Lippincott Williams and Wilkins, Philadelphia.

[2] Fasce, E., Campos, I., Ibanez, P., Flores, M., Zarate, H., Roman, O. and Fasce, F. (2007) Trends in prevalence, awareness, treatment and control of hypertension in urban communities in Chile. Journal of Hypertension, 25, 1807-1811. doi:10.1097/HJH.0b013e328244e481

[3] Dehkordi, F.R. and Kamkhah, A.F. (2008) Antihypertensive effect of Nigella sativa seed extract in patients with mild hypertension. Fundamental & Clinical Pharmacology, 22, 447-452. doi:10.1111/j.1472-8206.2008.00607.x

[4] Susalit, E., Agus, N., Effendi, I., Tjandrawinata, R.R., Nofiarny, D., Perrinjaquet-Moccetti, T. and Verbruggen, M. (2011) Olive (Olea europaea) leaf extract effective in patients with stage-1 hypertension: Comparison with Captopril. Phytomedicine, 18, 251-258. doi:10.1016/j.phymed.2010.08.016

[5] Mansour, S.M., Bahgat, A.K., El-Khatib, A.S. and Khayyal, M.T. (2011) Ginkgo biloba extract (EGb 761) normalizes hypertension in 2K, 1C hypertensive rats: role of antioxidant mechanisms, ACE inhibiting activity and improvement of endothelial dysfunction. Phytomedicine, 18, 641-647.

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[6] Raghav, S.K., Gupta, B., Agrawal, C., Goswami, K. and Das, H.R. (2006) Anti-inflammatory effect of Ruta graveolens L. in murine macrophage cells. Journal of Ethnopharmacology, 104, 234-239. doi:10.1016/j.jep.2005.09.008

[7] Ojala, T., Remes, S., Haansuu, P., Vuorela, H., Hiltunen, R., Haahtela, K. and Vuorela, P. (2000) Antimicrobial activity of some coumarin containing herbal plants growing in Finland. Journal of Ethnopharmacology, 73, 299-305. doi:10.1016/S0378-8741(00)00279-8

[8] Oliva, A., Meepagala, K.M., Wedge, D.E., Harries, D., Hale, A.L., Aliotta, G. and Duke, S.O. (2003) Natural fungicides from Ruta graveolens L. leaves, including a new quinolone alkaloid. Journal of Agricultural and Food Chemistry, 51, 890-896. doi:10.1021/jf0259361

[9] Miguel, E. (2003) Rue (ruta l., rutaceae) in traditional spain: frequency and distribution of its medicinal and symbolic applications. Economic Botany, 57, 231-244. doi:10.1663/0013-0001(2003)057[0231:RRLRIT]2.0.CO;2

[10] Conway, G.A. and Slocumb, J.C. (1979) Plants used as abortifacients and emmenagogues by Spanish New Mexicans. Journal of Ethnopharmacology, 1, 241-261. doi:10.1016/S0378-8741(79)80014-8

[11] Pathak, M.A., Parrish, J.A. and Fitzpatrick, T.B. (1981) Psoralens in photochemotherapy of skin diseases. Il Farmaco; Edizione Scientifica, 36, 479-491.

[12] Bohuslavizki, K.H., Koppenhofer, E., Hansel, W. and Moller, W.D. (1988) A new approach for the treatment of demyelinating diseases? Journal of Neuroimmunology, 20, 251-252. doi:10.1016/0165-5728(88)90170-1

[13] Amira, S., Rotondo, A. and Mule, F. (2008) Relaxant effects of flavonoids on the mouse isolated stomach: Structure-activity relationships. European Journal of Pharmacology, 599, 126-130. doi:10.1016/j.ejphar.2008.09.021

[14] Chiu, K.W. and Fung, A.Y.L. (1997) The cardiovascular effects of green beans (Phaseolus aureus), common rue (Ruta graveolens), and kelp (Laminaria japonica) in rats. General Pharmacology, 29, 859-862. doi:10.1016/S0306-3623(97)00001-3

[15] Freire, R.B., Borba, H.R. and Coelho, C.D. (2010) Ruta graveolens L. toxicity in Vampirolepis nana infected mice. Indian Journal of Pharmacology, 42, 345-350. doi:10.4103/0253-7613.71898

[16] Forstermann, U. (2010) Nitric oxide and oxidative stress in vascular disease. Pflügers Archiv—European Journal of Physiology, 459, 923-939. doi:10.1007/s00424-010-0808-2

[17] Rush, J.W., Denniss, S.G. and Graham, D.A. (2005) Vascular nitric oxide and oxidative stress: Determinants of endothelial adaptations to cardiovascular disease and to physical activity. Canadian Journal of Applied Physiology, 30, 442-474. doi:10.1139/h05-133

[18] Higuchi, Y. (2003) Chromosomal DNA fragmentation in apoptosis and necrosis induced by oxidative stress. Biochemical Pharmacology, 66, 1527-1535. doi:10.1016/S0006-2952(03)00508-2

[19] Xia, M.L., Zhou, X.M., Yao, H., Jiang, H.D., Bruce, I.C., Wei, E.Q. and Xia, Q. (2005) Rutin-induced endothelium-dependent vasorelaxation in rat aortic Rings and the underlying mechanism. Conference Proceedings—IEEE Engineering in Medicine and Biology Society, 6, 5595-5597.

[20] Conway, G.A. and Slocumb, J.C. (1979) Plants used as abortifacients and emmenagogues by Spanish New Mexicans. Journal of Ethnopharmacology, 1, 241-261. doi:10.1016/S0378-8741(79)80014-8

[21] Duarte, J., Pérez-Vizcaíno, F., Zarzuelo, A., Jiménez, J. and Tamargo, J. (1993) Vasodilator effects of