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Antihypertensive effects and potential vascular mechanisms of the extract and fractions of *Eruca sativa* and Euricin

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Eruca sativa Mill., (Cruciferae) commonly known as “Rocket” (roquette) or “Arugula” and locally as “Taramera”. Traditionally, *Eruca sativa* has nutritional values due to the isothiocyanates (eg., euricin) and also been used as a traditional medicine for the management of cardiovascular disorders, particularly hypertension. The aim of the study was to investigate the blood pressure lowering effect of and potential vascular mechanisms of the extract and fractions of *Eruca sativa* and euricin in hypertensive and normotensive rats and isolated aorta. In in-vivo blood pressure study in normotensive and hypertensive rats under anaesthesia, crude extract of *Eruca sativa* (Es.Cr) and its nHexane (Es.nHexane), chloroform (Es.Chlor), ethyl acetate (Es.EtAc) and aqueous (Es.Aq) fractions caused a fall in mean arterial pressure (MAP) with more potency in hypertensive rats than normotensive rats. Euricin also caused a fall in MAP in both hypertensive and normotensive rats. In isolated rat aortic rings, crude extract and all fractions induced an endothelium-dependent relaxation mediated by L-NAME sensitive nitric oxide (NO) pathway, while euricin also caused a partial endothelium-dependent vasorelaxation mediated by nitric oxide. When tested against high K⁺-induced contractions in rat aorta preparations, crude extract and all fractions caused inhibition of the induced contractions. In isolated rabbit aorta, crude extract and all fractions exhibited phenolamine sensitive contractile effect on basal tension, except Es.Chlor. Es.Cr caused relaxation of high K⁺ (80 mM)-induced and phenylephrine (1 μM) pre-contractions, similar to verapamil, with EC₅₀ values of 5.52 (3.8-7.2) and 7.4 mg/mL (5.8-9), respectively. Euricin also inhibited high K⁺ (80 mM) and phenylephrine (1 μM) pre-contractions, with EC₅₀ values of 1.1 (0.3-2.0) and 1.8 μg/mL (1.0-2.8), respectively. Among the fractions tested, Es.nHexane, Es.EtAc, and Es.Aq were found more potent against high K⁺ than PE precontractions except Es.Chlor was equipotent against both PE and high K⁺. Es.Cr, euricin and all fractions shifted Ca⁺⁺ concentration-response curves (CRCs) to the right similar to verapamil confirming calcium channel blocking (CCB) activity. The results of this study indicated that crude extract and its fractions possess antihypertensive, vasorelaxant and vasocontractile effects. Vasorelaxant effect mediated by calcium channel blocking and L-NAME sensitive NO mediated endothelium dependent effects. The vasocontractile effects are mediated partially by α-adrenoceptor stimulation. This combination may provide pharmacological basis of medicinal use of *Eruca sativa* in the treatment of hypertension. This study provides a evidence that medicinal plant extracts possess combination of constituents and collectively they act as regulator of body functions while a single compound isolated from same plant may not necessarily represent the pharmacological/biological activities of the parent plant.

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