

Hibiscus sabdariffa L., roselle calyx, from ethnobotany to pharmacology

Octavio Carvajal-Zarrabal¹
Dulce María
Barradas-Dermitz²
Zaida Orta-Flores²
Patricia Margaret
Hayward-Jones¹
Cirilo Nolasco-Hipólito³
M Guadalupe Aguilar-
Uscanga²
Anilú Miranda-Medina²
Kopli Bin Bujang³

¹University of Veracruz, Veracruz, Mexico; ²Veracruz Institute of Technology, Veracruz, Mexico; ³University of Malaysia Sarawak, Kuching, Malaysia

Abstract: Using MEDLINE and SCOPUS databases, a review of the literature from the pioneering study of 1991 until 2010 was performed on the effects on biological models of *Hibiscus sabdariffa* L. roselle calyx, its extracts mainly in polar solvents, or pure components found in extracts, as well as their possible relationship to these effects. Three relevant effects on lipid metabolism, antihypertensive activity, and apoptosis were observed. Our chronological review of the studies mentioned in the literature provides another opportunity to see how humans compile scientific knowledge of a chemical structure–physiological activity relationship starting from an ethnobotanical–ethnopharmacognosy contribution. The chemical components that are the main active principles in the physiological activities of *Hibiscus sabdariffa* L. calyx are anthocyanins and polyphenols (protocatechuic acid and quercetin). Advances have also been made in the elucidation of action mechanisms. Additionally, it has become clear that the lack of standardization in terms of chemical components of the material arising from *Hibiscus sabdariffa* L. used in testing on biological models imposes limits on the possibility of carrying out comparative analyses between studies. Fortunately, more recent studies are overcoming this obstacle by reporting component concentrations of assumed active principles; however, complete analysis of the extract, if this is to be considered as a therapeutic agent, is not commonly reported in the aforesaid studies. If one of the eventual scenarios for *Hibiscus sabdariffa* L. calyx is as a therapeutic agent in communities with economic limitations, then studies of a pharmacological nature should guarantee the effectiveness, safety, and tolerability of this material, which is widely accepted to be associated with chemical complexity, thus making this knowledge necessary.

Keywords: anthocyanins, phenolic, polyphenolic compounds, lipid metabolism, antihypertensive, apoptosis, safe effective herbal therapeutic product

Introduction

Throughout the development of science and especially from the second half of the 20th century onwards, Lerner's affirmation has become evident: "Everything that goes on in biology or medicine has a chemical basis."² This relationship between chemistry and biology has generated the disciplinary field of chemical and biological sciences, which studies the basis or understanding of biological behavior through chemical language.

In the case of the components of the *Hibiscus sabdariffa* L., (*Hs*) or roselle, flower, this relationship between its chemistry and physiological effects in animal or human models is a matter of study, most relevantly in countries or regions where it is consumed as a refreshing drink, or where it is included in traditional medicine.^{1,3–21}

Correspondence: Octavio Carvajal-Zarrabal
SS Juan Pablo II s/n, Fracc.
Costa Verde, Boca del Río,
Veracruz, México, CP 94294
Tel +52 229 921 8741
Fax +52 229 775 2036
Email ocarvajal@uv.mx