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Sociedad Latinoamericana de Plantas Medicinales
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MEDICINAL PLANT COMMUNICATIONS

Med Plant Commun
3 (3): 53 - 59 (2020) - https://doi.org/10.37360/mpc.20.3.3.11

Mini Review

Medicinal plants containing resveratrol. a mini review

[Plantas medicinales que contiene resveratrol: un mini review]

José L. Martínez[1], Onder Yumrutas[2], Amner Muñoz-Acevedo[3], Luisauris Jaimes[4] & Ali Parlar[5]

[1]Vice Rectory of Investigation, Development and Innovation, Universidad de Santiago de Chile
[2]Department of Medical Biology, Faculty of Medicine, University of Adiyaman, Adiyaman, Turkey
[3]Department of Chemistry and Biology, Universidad del Norte, Barranquilla, Colombia
[4]Department of Biology, Faculty of Chemistry and Biology, Universidad de Santiago de Chile
[5]Department of Pharmacology, Faculty of Medical, University of Adıyaman, 02040, Adıyaman, Turkey
joseluis.martinez@usach.cl

Abstract: There are many different active ingredients in various plant species in various parts of the world. Resveratrol, one of these active ingredients, has attracted the attention of both drug producing companies and researchers, thanks to its powerful antioxidant properties. The aim of this study is to investigate the presence of plants containing resveratrol. This study was conducted not only to give a brief overview of the plants containing resveratrol, but also to enable researchers to find this information quickly. In this context, the diversity of plants rich in resveratrol has been examined.

Keywords: Resveratrol; Medicinal plant; Anti-oxidant; Phytopharmacology.

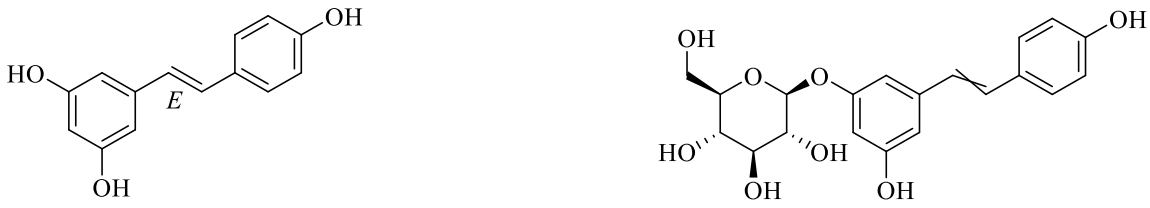
Resumen: Hay muchos ingredientes activos diferentes en varias especies de plantas en varias partes del mundo. El resveratrol, uno de estos principios activos, ha atraído la atención tanto de empresas productoras de fármacos como de investigadores, gracias a sus poderosas propiedades antioxidantes. El objetivo de este estudio es investigar la presencia de plantas que contienen resveratrol. Este estudio se realizó no solo para brindar una breve descripción general de las plantas que contienen resveratrol, sino también para permitir a los investigadores encontrar esta información rápidamente. En este contexto, se ha examinado la diversidad de plantas ricas en resveratrol.

Palabras clave: Resveratrol; Planta Medicinal; Antioxidante; Fitofarmacología**.**

Received: September 20, 2020
Accepted: September 28, 2020
Published online: Septiembre 30, 2020
This article must be cited as: Martínez JL, Yumrutas O, Muñoz-Acevedo A, Jaimes L, Parlar A. 2020. Medicinal plants containing resveratrol. A mini review **Med Plant Commun** 3 (3): 53-59.

INTRODUCTION

More than 2000 years ago, man through his history in the search for medicinal preparations [1], found some such as darakchasava or manakka [1], which today we know is rich in resveratrol. But it took a long time, until 1940 when Takaoka managed to isolate it from the roots of *Verastrum grandiflorum* [2]. It is a chemical structure 3,5,4'-trihydroxystilbene (molecular weight of 228.25 g/mol), which is a natural polyphenol, with a stilbene structure. Its base structure consists of the union of 2 phenolic rings by a styrene double bond that make it up. This double bond is responsible for the cis and trans isomeric forms of resveratrol (Figure No. 1). The trans isomer is the most sterically stable form [3].



E-Resveratrol *E/Z*-Piceid

Figure No. 1

Resveratrol is now known to be a potent antioxidant produced by a large number of plant species in response to stressful situations (ultraviolet radiation, fungal infections, etc.) [4]. It is present in several fruits that are part of the human diet. Such as blueberries (Vaccinium spp.), Currant (Vaccinum spp.), Blackberries (Morus spp.), And peanuts (Arachis hypogaea) [5,6]. Another food rich in resveratrol is red wine, which is the one that contributes a greater content of resveratrol to our diet.

The resveratrol content in wine comes from grapes (Vitaceae), specifically from their skin, seeds, petioles and woody parts, which are the richest in this compound [7]. For this reason, red wine is richer in resveratrol than white wine, since during the obtaining of red wine, the parts of the grape in which resveratrol is found are macerated, unlike obtaining white, in the these parts are discarded [8,9]. In addition, the alcohol that is formed during the fermentation of the grape favors its solubility and, therefore, its extraction. The presence of resveratrol is also documented in some trees such as eucalyptus [10,11] and fir [12], as well as in the tropical deciduous tree Bauhinia racemosa [13].

Methodology

We performed a systematic review of the scientific literature using the Web of Science, PubMed, and Scielo databases through multiple combinations of MeSH terms: "Resveratrol" and "Medicinal plants and resveratrol". We limited the search to studies in resveratrol isolated. We not excluded articles written in other language. We obtained over 250 articles that were analyzed and subsequently those that correspond to the objectives of this study were selected. Following this criterion, we chose and used 111 articles as a reference for this review.

Results

Some plants containing resveratrol are included in Table 1. Thus, 111 species belonging to 71 genera and 34 families have been included in this Table.

Table No. 1 shows the list of medicinal plants in which resveratrol is found:

Table No. 1

Family	Species	Reference
Aceraceae	*Acer mono* Maxim.	[14]
Annonaceae	*Dasymaschalon trichophorum* Merr.	[15]
Araliaceae	*Panax pseudoginseng* Wall. var. *notoginseng* (Burkill) Hoo et Tseng	[16]
Betulaceae	*Alnus* spp.	[17]
Bromeliaceae	*Ananas comusus* (L) Merr.	[18]

Compositae	*Aster tataricus* L. f.	[17]
	Syneilesis aconitifolia (Bge.) Maxim.	[17]
Cyperaceae	*Carex fedia var miyabei* (Franchet) T. Koyama	[19]
Dipterocarpaceae	*Vatica pauciflora* (Korth.) Bl.	[20]
Ericaceae	*Vaccinium myrtillus* Linn.	[21]
	Vaccinium chaetothrix Sleumer	[17]
	Vaccinium delavayi Franch.	[22]
	Vaccinium dendrocharis Hand. -Mazz.	[17]
	Vaccinium haitangense Sleumer	[23]
	Vaccinium moupinense Franch.	[17]
	Vaccinium sikkimense C. B. Clarke	[17]
	Vaccinium vitis-idaea Linn.	[24]
	Vaccinium nummularia Hook. f. et Thoms. ex C. B. Clarke	[17]
	Vaccinium retusum (Griff.) Hook. f. ex C. B. Clarke	[17]
	Vaccinium microcarpum (Turcz. ex Rupr.) Schmalh.	[25]
	Vaccinium oxycoccos Linn.	[26]
	Vaccinium spp.	[27]
Euphorbiaceae	*Euphorbia humifusa* Willd. ex Schlecht.	[17]
Gnetaceae	*Gnetum parvifolium* (Warb.) C. Y. Cheng ex Chun	[28]
	Gnetum montanum Markgr	[29]
	Gnetum hainanense C. Y. Cheng	[30]
Gramineae	*Hordeum vulgare* L.	[31]
	Poa annua L.	[17]
	Festuca ovina L.	[17]
	Stipa tianschanica (Roshev.) Norl.	[17]
	Lolium perenne L.	[32]
Grossulariaceae	*Ribes nigrum* L.	[33]
Hamamelidaceae	*Exbucklandia populnea* (R. Br.) R. W. Brown	[17]
Iridaceae	*Belamcanda chinensis* (L.) Redouté	[34]
Jungladeaceae	*Juglans regia* L.	[35]
Lauraceae	*Cinamomum* spp.	[36]
Leguminosae	*Cassia quinquangulata* Rich	[37]
	Cassia tora L.	[38]
	Cercis chinensis Bunge	[39]
	Glycine max (Linn.) Merr.	[40]
	Bauhinia racemosa Lam.	[41]
	Arachis hypogaea Linn.	[42]
	Lycidise rhodostegia Hance	[43]
	Cassalpinia millettii Hook. et Arn.	[44]
	Maackia amurensis Rupr. et Maxim.	[45]
	Caragana sinica (Buc'hoz) Rehd.	[46]
	Caragana jubata (Pall.) Poir.	[47]
	Caragana stenophylla Pojark.	[48]
	Medicago sativa L.	[49]

	Ammopiptanthus mongolicus (Maxim. ex Kom.) Cheng f.	[50]
	Vigna umbellata (Thunb.) Ohwi et Ohashi	[51]
	Albicia kalkora (Roxb.) Prain.	[17]
Liliaceae	*Aloe vera* L. var. *chinensis* (Haw.) Berg.	[17]
	Veratrum grandiflorum (Maxim.) Loes. f	[2]
	Veratrum nigrum L. var. *ussuriense* Nakai	[52]
	Veratrum taliense Loes. f.	[53]
	Veratrum maackii Regel	[54]
	Lilium brownii var. *viridulum* Baker	[17]
	Ornithogalum caudatum Jacq	[55]
	Smilax china L.	[56]
	Smilax scobinicaulis C. H. Wright	[58]
	Smilax glabra Roxb	[59]
	Smilax bracteata Presl	[60]
	Dracaena cochinchinensis (Lour.) S. C. Chen	[61]
Magnoliaceae	*Magnolia officinalis* Rehd. et Wils.	[62]
Myrcinaceae	*Aegiceras corniculatum* (Linn.) Blanco	[63]
Myrtaceae	*Eucalyptus tereticornis* Smith	[64]
	Syzygium jambos (L.) Alston	[65]
Nothofagaceae	*Nothofagus fusca* Hook.f.	[66]
Oleaceae	*Olea europaea* L.	[17]
Palmae	*Archontophoenix alexandrae* (F. Muell.) H. Wendl. et Drude	[17]
	Phoenix dactylifera L.	[17]
Pandanaceae	*Pandanus* spp.	[17]
Pinaceae	*Pinus palustris* Mill.	[17]
	Pinus taeda L.	[67]
	Pinus echinata Mill.	[17]
	Pinus elliottii Engelm.	[17]
	Pinus sibirica (Loud.) Mayr	[68]
	Pinus sylvestris L.	[69]
	Pinus koraiensis Sieb. et Zucc.	[35]
	Picea abies (L.) Karst.	[70]
Polygonacea	*Rheum nanum* Siev. ex Pal1.	[71]
	Reynoutria japonica Houtt	[72]
	Fallopia multiflora (Thunb.) Harald. var. cillinerve (Nakai) A. J. Li	[73]
	Fallopia multiflora (Thunb.) Harald.	[73]
	Rumex gmelinii Turcz. ex Ledeb.	[74]
	Rumex japonicus Houtt.	[75]
Ranunculaceae	*Paeonia suffruticosa* Andr.	[76]
	Paeonia suffruticosa (Andr.) Kerner	[77]
Rhamnaceae	*Ziziphus jujuba* Mill.	[78]
Rosaceae	*Rubus chingii* Hu	[79]
	Rubus crataegifolius Bge.	[17]
	Armeniaca mume Sieb.	[17]

	Fragaria ananassa (Weston) Duchesne	[33]
Theaceae	*Camellia sinensis*	[80]
Umbelliferaceae	*Pleurospermum* spp.	[81]
Vitaceae	*Vitis vinifera* L.	[82]
	Vitis amurensis Rupr.	[83]
	Ampelopsis cantoniensis (Hook & Arn) K Koch	[84]
	Ampelopsis japonica (Thunb.) Makino	[85]
	Tetrastigma hypoglaucum Planch ex. Franch.	[86]
	Tetrastigma serrulatum (Roxb.) Planch	[17]
	Cissus quadrangularis L.	[87]
	Cissus sicyoides L.	[88]
	Parthenocissus tricuspidata (S. et Z.) Planch.	[89]
	Parthenocissus quinquefolia (L.) Planch.	[90]
	Morus macroura Miq.	[91]
	Morus alba L.	[92]
	Morus nigra L.	[93]
	Cudrania cochinchinensis Lour.	[94]
	Artocarpus lakoocha Roxb.	[95]

DISCUSION AND CONCLUSIÓN

In this study 111 species from 34 families were determined from which resveratrol had clearly been isolated. This compound has had more uses every day on diseases mainly at the human level, the therapeutic effects of resveratrol and certain plants containing it against some respiratory diseases such as ARDS and asthma, which are caused by many pathogens, including SARS-CoV-2, as well as provides information to researchers in these areas. In another example of reliability of the therapeutic effect of resveratrol against SARS-CoV-2, Cui et al. added resveratrol to the piglets´ diet for 21 days, and they found that resveratrol reduced both TNF-α levels and diarrhea due to rotavirus [96]. Another important feature of asthma is airway hyperresponsiveness (AHR), and it was evaluated by Parlar and Arslan using unrestrained whole-body plethysmography, which is a method that can detect breathing patterns [97].

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