EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 5
Issue: 1
181-188
Year: 2018

# AN UPDATED REVIEW ON *CRESSA CRETICA* LINN: AN IMPORTANT MEDICINAL PLANT

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**Article Received on 25/10/2017** **Article Revised on 15/11/2017** **Article Accepted on 05/12/2017**

## ABSTRACT
The traditional uses of medicinal plants in healthcare practices are providing clues to new areas of research; hence its importance is now well recognized. *Cressa cretica* (Linn) belonging to family Convolvulaceae, commonly known as Rudravanti is erect, small, dwarf shrub, usually grows in sandy or muddy saline habitats and is used in folklore medicine for ailments including diabetes, ulcers, asthma, anthelmintic, stomachic, tonic and aphrodisiac purposes, enriches the blood, and is useful in constipation, leprosy, and urinary discharges. The plant is traditionally used in Bahrain as expectorant and antibilious agent. *Cressa cretica* contained many biologically active constituents including coumarins, sterols, alkaloids, tannins, glycosides (cardiac glycoside, anthraquinone glycoside), protein, carbohydrate, flavonoids, unidentified sugars and high salt content. It also contains quercetin, n-octacosanol, scopoletin and umbelliferone. In this review article, a comprehensive account of the morphology, phytochemical constituents, and biological activities are included in view of the recent findings of importance on the plant, *C. cretica*.

**KEYWORD:** Rudravanti, Healthcare practice, phytochemical constituents.

## INTRODUCTION
Today the medical world is affected with complex challenges. Thus time demands an integrated and pluralistic approach towards healthcare to cope effectively with this situation. There has been a expanding interest in Ayurvedic in the past few years. The Ayurvedic literature describes herbs with synonyms, guna-karma, morphological and pharmacological properties. Later modern researchers successfully identified many Ayurvedic herbs. Modern identification criteria include genus, family, class, sub-class etc.[1]

Plants are very indispensable for both human beings and animals not only as a dietary source but also as safer phytomedicine.[2] Plant based drugs have been in use against various diseases since time immemorial. The primitive man used herbs as therapeutic agents and medicament, which they were able to procure easily. The nature has provided abundant plant wealth for all living creatures, which possess medicinal virtues.[3] The important values of some plants have long been published but a large number of them remain unexplored as yet. So there is a necessity to explore their uses and to conduct Pharmacognostical and pharmacological studies to ascertain their therapeutic properties.[4]

World Health Organization has made an attempt to identify all medicinal plants used globally and listed more than 20,000 species.[5] According to the WHO more than 80% of the world's population realize on traditional herbal medicine for their primary health care.[6] Although herbal medicine has existed since the dawn of time, our knowledge of how plants actually affect human physiology remains largely unexplored. Numbers of plants are claiming various medicinal uses and many researches are going on in this view. India is one among the 25 hotspots of the richest and highly endangered eco-regions of the world.[7]

*Cressa cretica* (Linn) belonging to family Convolvulaceae, commonly known as Rudravanti is a erect, small, dwarf shrub,[8] usually grows in sandy or muddy saline habitats along with the species *Suaeda maritima, Salicornia europaea, Salsola soda, Limonium vulgare subsp. Serotinum,* and *Crypsis aculeate.* [9] Variation in Cressa has been handled in two ways: extreme lumping into the single species *C. cretica,* or

extreme splitting of every morphological variant into 19 species.[10-14] Those in the New World represent *C. nudicaulis* and *C. truxillensis*.[15-17] The two in the Old World, however, are still being placed in a single species, *C. cretica*.[14-20]

## TRADITIONAL USES

Traditionally, the plant is used in diabetes, asthma, expectorant, stomachic, antibilious and alternative. [21] The plant has anthelmintic, stomachic, tonic and aphrodisiac purposes, enriches the blood and is useful in constipation, leprosy, asthma and urinary discharges. [22, 23, 24] Dry leaves of *C. cretica* crushed with sugar are used as emetic [25] and a maceration of the aerial parts was drunk as a tonic in Sudan. In Senegal a maceration of the whole plant (together with the barks of Vitex cuneata Thonn and Faidherbia albida (Delile) A.Chev) was drunk against bronchitis. In Sudan a maceration of the aerial parts was drunk as a tonic. A decoction of the stems (together with leaves of Vitex doniana Sweet) was applied topically against skin eruptions as in smallpox.[26]

## PLANT PROFILE[26]

### Synonyms

Sanskrit-Rudanti, Hindi-Rudravanti, Oriya-Dahna, Bengali-Rudravanti, Tamil-Uppusanaga, Telugu-Uppugaddi, Uppusenaga, Kannada-Mullumaddugida, Konkani – Chaval, Malayalam-Azhukanni, Marathi-Lona, Rudravanti.

### Taxonomic classification

Kingdom-Plantae, Phyllum-Angiosperms, Class-Magnoliatae, Subclass-Asteridae, Order-Polemoniales, Family-Convolvulaceae, Genus-Cressa, Species-Cretica.

## GEOGRAPHICAL SOURCE

*C. cretica* is a remarkable salt tolerant plant, common in coastal areas [27] usually occurring in mono specific stands along the landward edge of marshes. [28] This Species occurs from the Mediterranean east through western, central and south east Asia, south to northern and central Africa, South America and Australia. However, it was distributed in Afghanistan; Albania; Algeria; Angola (Angola); Australia (new south Wales, northern Territory, Queensland, south Australia, Victoria, western Australia); Bahrain; Bulgaria; Cyprus; Egypt; Ethiopia; France; Greece; Guinea-Bissau; India; Indonesia; Iran, Iraq, Palestine; Italy; Jordan; Kenya; Lebanon; Libya; Madagascar; Malta; Mauritania; Morocco; Mozambique; Oman; Pakistan; Portugal; Senegal; Somalia; Spain; Sri Lanka; Sudan; Syria; Tunisia and Yemen.[26]

## MORPHOLOGY

*C. cretica* L. is an erect, small, dwarf shrub [29] upto 38cm height. Roots are horizontal, geminate, with lateral branches leading upward to produce above-ground parts. It is a perennial sub shrub or herb, usually much-branched. Stems are at first erect and then become decumbent, apparently short-lived, gray appressed pilose to sericeous. Leaves on main branches are often larger than those on branchlets, the blade 1-12 mm long, lanceolate, ovate or elliptic- to scalelike, sessile; Peduncle lengths, stamen lengths, filament pubescence and ranges distinguish. [30-33] Flowers are solitary, white or pink, axillary, 5-8 mm long, sessile or on short peduncles, bracteates, in spicate to head-like clusters at tips of branchlets, bracteoles unequal in length. Sepals ovate to obovate imbricate. Corolla salver form, the limb 5-lobed, the lobes mostly ovate, imbricate, spreading to reflexed. Stamens exserted; filaments filiform; styles exserted. Ovary 2-locular, 4-ovulate; styles 2, distinct to the base; stigmas capitate. Fruit is capsular, ovoid, unilocular, 2-4-valved, and usually one-seeded. Seeds are 3-4 mm long, glabrous and smooth, and shining to reticulate, dark brown.[31,32,33]

**Fig. Leaves & Flowers of Cressa cretica.**

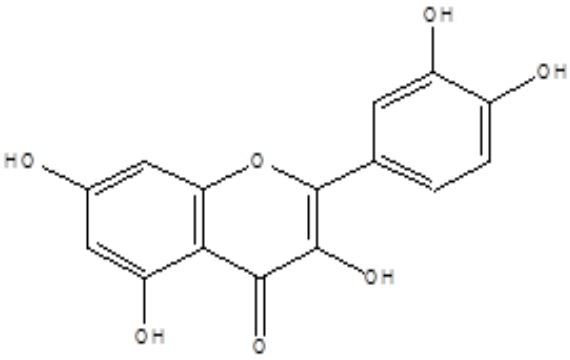
## PHYSICOCHEMICAL PARAMETERS

Total ash 5.23 (% w/w), acid soluble ash 1.24 (% w/w), water soluble ash 0.87 (% w/w), sulphated ash 3.12 (% w/w), extractive values: hexane 3.390 (%), ethyl acetate 7.6-8.621(%), methanol 4.440- 14.4 (%), petroleum ether 1.5%, chloroform 4.8%, n-butanol 3.2% and water 27.2%.[26]

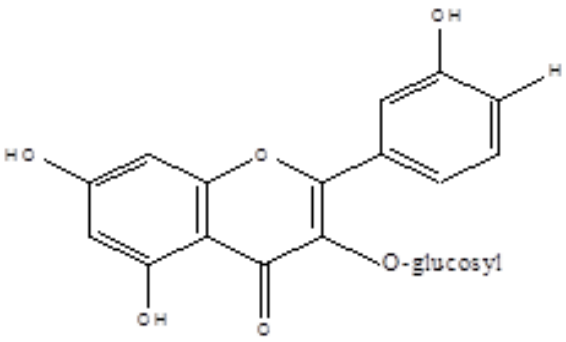
## CHEMICAL CONSTITUENTS

**Table 1: Chemical constituents done on *Cressa cretica* plant.**

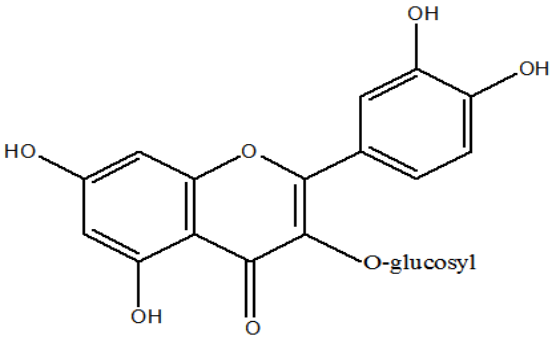
| Sr. No. | Isolated chemical constituents | Part of Plant | Extract/Tech. | Reference |
|---|---|---|---|---|
| 1 | Quercetin glycoside (aglycone) | Aerial part | Hexane and Benzene | [34] |
| 2 | n-Octacosanol, β-sitosterol, umbelliferone, scopoletin, isopimpinellin, β-sitosterol D (+) glucoside and quercetin. | Aerial part | 1H NMR and 13C NMR, MASS spectroscopy | [35] |
| 3 | 7,4'-dihydroxy-5 methoxy Coumaranochromone-7-O-β-D-glucoside | Fruits | Alc. Extract | [36] |
| 4 | 8 acyclic terpenic compounds: Cressanyl ester A, B, C, D, E, F and G, and cressatriterpenic acid | Aerial part | Spectral data analyses and chem. reactions | [37] |
| 5 | Syringaresinol-β-d-glucoside | Aerial part | 1H-NMR and revised 13C-NMR | [38] |
| 6 | 5 flavonoids: Quercetin, Quercetin-3-O-glucoside, Kampferol-3 O- glucoside, Kampferol-3-O-rhamnoglucoside and Rutin | Aerial part | UV, FAB-MS, 1H NMR and 13C NMR | [39] |
| 7 | Triacontanoic acid, 24-hydroxy-4-octacosanone, 24-nor-12-ursene, β-amyrin, stigmasterol, ursolic acid, and stigmasterol 3-O-β-D-glucoside | Whole plant | EIMS, HREIMS, FAB, HRFABMS, 1H and 13C NMR | [40] |
| 8 | Four common heavy metals lead, zinc, copper and nickel | Whole plant | Atomic Absorption Spectroscopy (AAS). | [41] |
| 9 | 12 unsaturated fatty acids and four saturated fatty acids | Seeds | Chemical analysis | [42] |
| 10 | β-sitosterol, Stigmasterol, avenasterol, β-tocopherol. | Whole plant | Fixed oil extract | [43] |
| 11 | Al, Ca, Cu, Fe, Mg, Mn, P, S and Zn | Whole plant | Atomic Absorption Spectrophotometry and U V spectrophotometry | [44] |
| 12 | Analysis of ash | Aerial part | Chemical analysis | [45] |
| 13 | Quercetin | Aerial part | Column Chromatography | [46] |
| 14 | Moderate amount of terpenes and tannins and small amount of saponins and flavonoids | Aerial part | Column Chromatography | [47] |



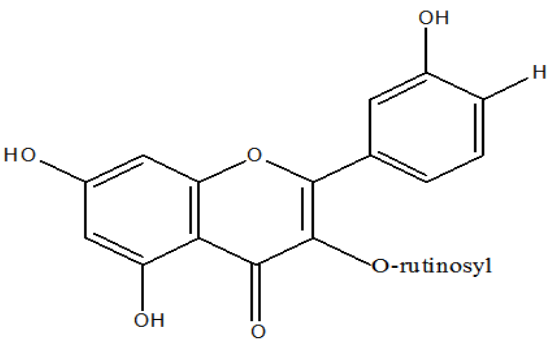

**Quercetin**




**Kaempferol-3-O-β-D-glucoside**

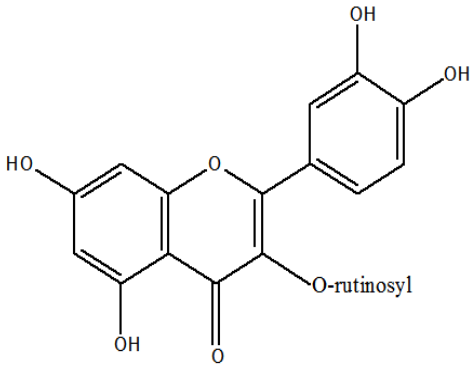



**Quercetin-3-O-β-D-glucoside**

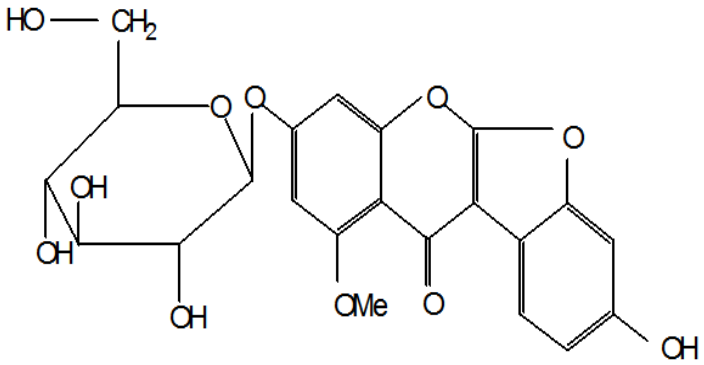



**Kaempferol-3-O-α-L-rhamnosyl**

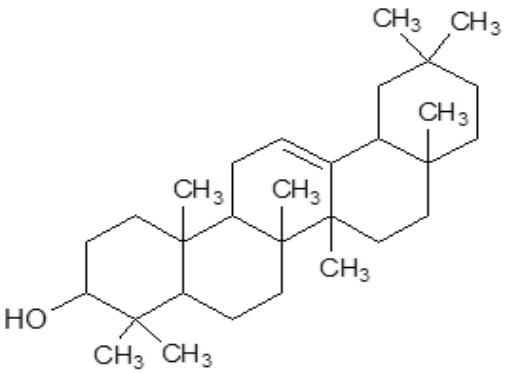
**(1→6)-O-β-D glucoside**



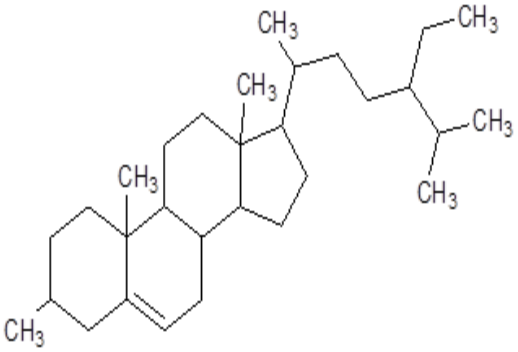

**Quercetin-3-O-α-L-rhamno-(1→6)-β-D-glucoside (Rutin)**



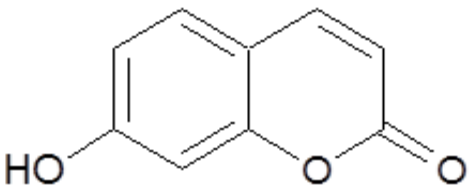

**7, 4'-dihydroxy-5-methoxycoumaranochromone-7-O-β-D-glucoside**



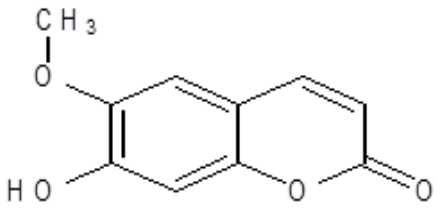

**β-amyrin**



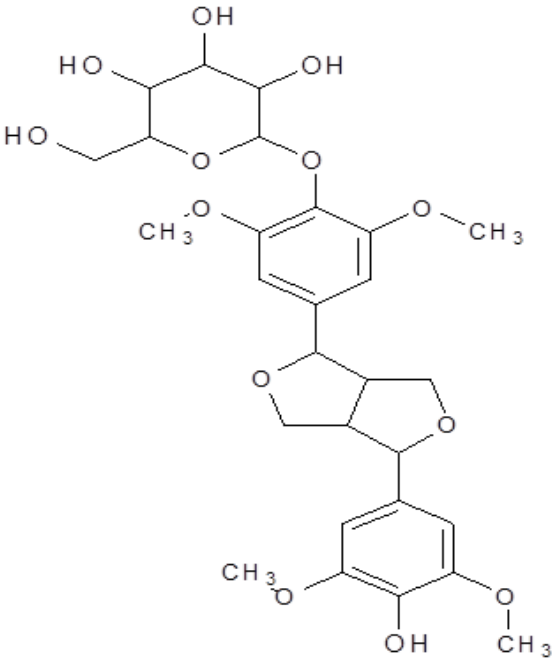

**β–Sitosterol**




**Umbelliferone**




**Scopoletin**



**Syringaresinol-β-D-glycoside**

## PHARMACOLOGICAL ACTIVITIES

**Table 2: Pharmacological activities done on *Cressa cretica* plant**

| S. No | Pharmacological activity | Part of Plant | Extract | Year | Reference |
|---|---|---|---|---|---|
| 1 | Antibacterial activity | Whole Plant | Aqueous and alcoholic | 2007 | [48] |
| 2 | Antibacterial activity | Whole Plant | Aqueous and alcoholic | 2008 | [49] |
| 3 | Antibacterial activity of various extracts | Whole | Hexane, methanol, chloroform, ethyl acetate, ether, crude alkaloid | 2008 | [50] |
| 4 | Antibacterial and antifungal activity of | Whole | Methanolic | 2012 | [51] |
| 5 | Antidiabetic | Aerial | Methanolic | 2010 | [29] |
| 6 | Antidiabetic | Aerial | Methanolic | 2014 | [52] |
| 7 | Antidiabetic | Whole Plant | Methanolic | 2016 | [53] |
| 8 | Antidiabetic | Whole Plant | Methanolic | 2016 | [54] |
| 9 | Antifungal activity | Whole Plant | ethanol extract | 2005 | [55] |
| 10 | Antifungal activity | Aerial | Ethanol, methanol, chloroform, ethyl acetate and aqueous extract | 2009 | [56] |
| 11 | Anti-inflammatory activity and Antioxidant 2011 Activities | Aerial Part | Methanolic and Ethyl acetate extract | 2011 | [57] |
| 12 | Anti-inflammatory, Antipyretic, and Antinociceptive Effects | Whole Plant | Aqueous | 2017 | [58] |
| 13 | Antimicrobial activity | Whole Plant | Methanolic | 2012 | [59] |
| 14 | Antioxidant and radical scavenging activity | Whole Plant | n-butanol extracts | 2007 | [60] |
| 15 | Antioxidant effect | Leaves | Water and ethanol 70%) | 2016 | [61] |
| 16 | The antitussive effect 2009 | Whole Plant | Methanolic | 2009 | [62] |
| 17 | Bronchodilator and mast cell stabilising activity | Whole | ethyl acetate fraction (Fr-Et) and Methanolic fraction | 2012 | [63] |
| 18 | Contraceptive evaluation | Whole | Various fractions (FrI 75:25 CHCl3:CH3OH, FrII 50:50 CHCl3:CH3OH and Fr III 25:75 CHCl3:CH3OH) | 2008 | [64] |
| 19 | Contraceptive activity | Whole | Cressa constituents (Rutin & Scopoletin) | 2012 | [65] |
| 20 | Genotoxic Effect | Whole | Ethyl acetate | 2017 | [66] |
| 21 | Germination of pollen grains | Whole Plant | Aqueous extracts | | [67] |
| 22 | Hepatoprotective activity | Whole | Isolated Fractions (EEF, BUF, AF and PEF) | 2014 | [68] |
| 23 | Protective effects | Aerial | Ethanolic extract | 2014 | [69] |
| 24 | Nootropic activity | Aerial | Ehanolic extract | 2014 | [70] |
| 25 | Testicular function 2006 | Whole Plant | Methanolic | 2006 | [71] |

## CONCLUSION

Before the introduction of modern medicines, disease treatment was entirely managed by herbal remedies. It is estimated that about 80% of the world population residing in the vast rural areas of the developing and under developed countries still rely mainly on medicinal plants. It is quite obvious that *Cressa cretica* is known to possess antibacterial, antifungal, antitussive, testicular functions and antifertility activities. It is known as a rich source of flavonoids, heavy metals, lead, copper, zinc and nickel present in Cressa sp. might be medicinally important and/or nutritionally valuable. It contains terpenic compounds, syringaresinol-β-d-glucoside, triacontanoic acid, stigmasterol, ursolic acids, β-amyrin and edible fixed oil. It also contains quercetin, n-octacosanol, scopoletin and Umbelliferone. This review discusses the chemical constituent, pharmacological and therapeutic effects of *Cressa cretica* as promising herbal drug because of its safety and effectiveness.

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