

**MICRO-REVIEW****Recent Developments in Chemistry of  
*Daucus carota* (Umbelliferae)**

ANEES A. SIDDIQUI\* and SACHIN M. WANI  
*Department of Pharmaceutical Chemistry, Faculty of Pharmacy  
Jamia Hamdard, New Delhi-110 062, India  
E-mail: dr\_anees@hotmail.com*

**INTRODUCTION**

*Daucus carota* (N.O. Umbelliferae), commonly known as carrot, is a biennial plant. It is 1 to 1.5 m in height or sometimes more branching from base and considered to be native of the seacoasts of South Europe, but nowadays, cultivated in many parts all over India.

Carrot is sweet, sharp and found to be very bitter. It is used as anti-dysenteric, carminative, cardiogenic and appetite stimulant. Carrot is believed to be beneficial in inflammation, asthma and during hiccough. The fruits are recommended in chronic diarrhoea and are also reported to possess diuretic action. It is widely used in bronchitis, chest troubles and urinary complaints. The raw carrot as such eaten acts as mechanical anthelmintic.

According to Unani literature, the wild carrot is laxative. Seeds are considered to be nervine tonic; a decoction of the leaves and seeds is said to be used by natives as a stimulant to the uterus during parturition. In the Punjab, the seeds are considered to be aphrodisiac and given in uterine pain<sup>1</sup>.

**Chemical investigations**

Various types of compounds, e.g., triterpenoid, saponin/sapogenin, flavones and others have been isolated from different parts of this species as listed in Table-1.

**Pharmacological Investigations**

Carrot (*Daucus carota*) of Umbelliferae family is cultivated all over the world for its use as vegetable<sup>29</sup>. When different parts of carrot were investigated for their effects, some meaningful results were obtained.

Carrot has been reported to possess diuretic, nitrogen balance property; it also helps in elimination of uric acid<sup>30</sup>. It is popular remedy for jaundice in some parts of Europe and their fresh root and seeds are used as aphrodisiac and nervine tonic as well as poultice for foul ulcers, burns, and scalds<sup>31</sup>. The oil of carrot seeds has shown antimicrobial property<sup>32,33</sup> and fresh root is known to have antiseptic property in preventing putrescent changes in body<sup>31</sup>. A poultice made of the root is used to correct the discharge from ill-conditioned sores. Decoction of common carrot is also used for infantile diarrhea.

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**Synonyms:** Hindi: Gajar, Marathi: Gazara, English: Bee's nest, Carrot, Urdu: Gazar

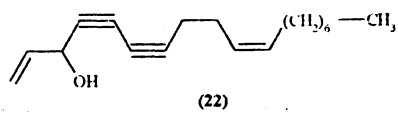
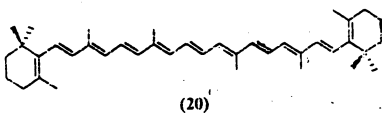
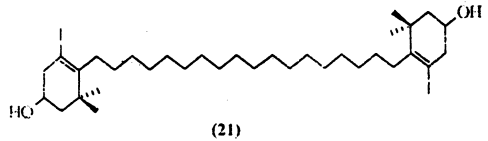
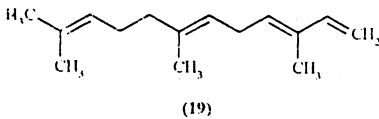
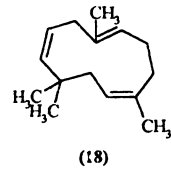
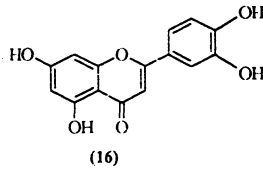
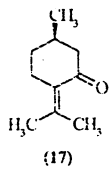
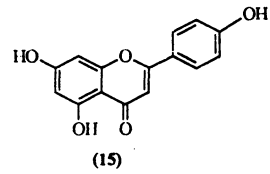
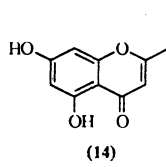
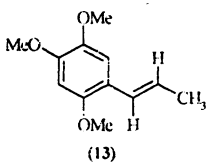
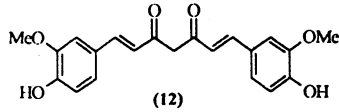
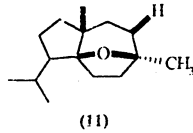
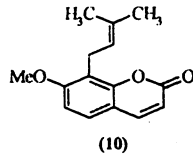
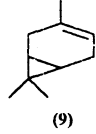
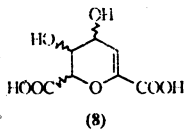
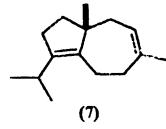
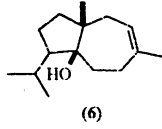
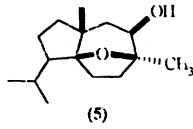
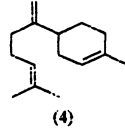
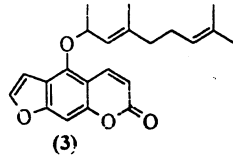
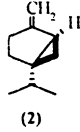
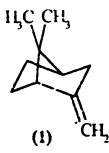
Chemical Constituents of *Daucus carota*

TABLE- 1  
CHEMICAL CONSTITUENTS OF *DAUCUS CAROTA*

Part inves- tigated	Chemical constituent	Refer- ence	Part inves- tigated	Chemical constituent	Refer- ence
<b>Seeds</b>	$\alpha$ -Pinene	2-5	<b>Fruits</b>	Asarone (13)	9
	Nopinene (1)	2-5		Chrysin (14)	14
	Sabinene (2)	2-5		Apigenin (15)	14
	Dipentene	2-5		Luteolin (16)	14
	Geraniol	2-5		Quecetin	14
	Bergamottin	2-5,6		Petroselinic acid	15
	$\beta$ -Bisabolene (3)	2-5,7,8,10		Avenasterol-7-ene	15
	<i>p</i> -Thymol (4)	2-5		Capric acid	15
	Daucol (5)	7-9		Acorenone	16
	Carotol (6)	7-9		Isolemicine	17
	Daucene, b.p. 96°C (7)	9		Asarone aldehyde	17
	$\beta$ -Farnesene	9,19,20		$\beta$ -Bisabolene	17
	Daucic acid (8)	10		Eugenol	17
	Car-3-ene (9)	7		2-Hydroxy-4-methoxy acetophenone	17
	$\beta$ -Selinene	7		Acorenone	17
	$\beta$ -Caryophyllene	7		$\gamma$ -Bisabolene	18
	Myrcene	7		Phenyl-2-naphthylamine	18
	Limonene	7		Pulegone (17)	18
	Camphene	7		$\beta$ -Santalene	18
	$\alpha$ -Tujene	11		$\delta$ -Guiene	18
	$\beta$ -Phyllandrene	11		Benzyl acetate	18
Geranyl acetate	11	$\beta$ -Sesquiphellandrene	18		
Bornyl Acetate	11	<b>Roots</b>	$\alpha$ -Humulene (18)	21	
Osthol (10)	12		$\beta$ -Farnesene (19)	21	
Zosimin	12		$\gamma$ -Murrrolene	21	
Bergapten	12		$\alpha$ -Bergamottine (3)	21	
$\beta$ -Sitosterol	12		Umbelliferose	22,23	
Carota-1,4- <i>b</i> -oxide (11)	13		$\alpha$ - and $\beta$ - Carotene (20)	24,25	
<b>Fruits</b>	Anthraquinone		8	Lutein (21)	24,25
	(i) C <sub>10</sub> H <sub>12</sub> O <sub>4</sub> m.p. 112°C			<i>n</i> -Hentriacontane	26
	(ii) C <sub>16</sub> H <sub>17</sub> O <sub>8</sub> m.p. 230°C			<i>n</i> -Nonacosane	26
	Daucol		8	<i>n</i> -Heptacosane	26
	Elemicin		8	Leucine	26
	Farnesene	8	Valine	26	
	$\beta$ -Elemene	8	Tryptophan	26	
	Kaepferoi	9	Falcarinol (22)	27	
	Apigenin-5-O- and 7- glucoside	9	<b>Leaves</b>	Diglycoside of cyanidine	23
	Luteolin-7-O-glucoside	9		$\beta$ -Sitosterol	14
	$\alpha$ -Pinene	9		Stigmasterol	14
	Sabinene	9		Campesterol	14
	Juniper camphor	9		Cholesterol	14
Carotol	9				
Elemene	9				
$\alpha$ -Curcumene (12)	9				

Aqueous extract of seeds showed spasmodic action on smooth muscles of isolated ileum and trachea and rectus abdominus muscle of frog. Use of drug as carminative may be due to its cholinergic action on smooth muscles of gastrointestinal system<sup>34</sup>.

Pharmacological investigation of the essential oil obtained from the seeds of *Daucus carota* was carried out. Lower dose of 2% suspension of oil produced a transient fall of arterial blood pressure in anesthetized dog, but higher dose produced a persistent hypotension, also causing depression of respiration. It seems that the direct cardiac depressant effect of the drug is one of the major factors responsible for this effect. The oil does not show any analgesic effect in rats, but exerts marked CNS depressant action<sup>35</sup>.

Various chromatographic fractions of seed extract showed antizygotic and/or blastocystotoxic activity in female rats<sup>36</sup>. Seed oil administered to mice inhibited fertility<sup>9, 37, 38</sup> and caused abortions<sup>39, 40</sup>. One of the constituents in the oil acting as abortifacient was found to be  $\beta$ -bisabolene.

A nitrogen-containing base has been isolated from seeds. The effect of this tertiary base was studied on animals. It was found to possess papaverine like nonspecific smooth muscle relaxant and spasmolytic activity, but its activity was found to be about one-tenth that of papaverine<sup>11</sup>.

The effect of carrot on hormone regulated uterine changes has also been studied<sup>42, 43</sup>. Ether extract of seeds of carrot arrests the normal estrus cycle of adult mouse and reduces the weight of ovaries significantly. The extract treatment significantly elevates the cholesterol and ascorbic acid level in ovaries. The significant inhibition of 5,3-dihydroxysteroid dehydrogenase and glucose-6-phosphate dehydrogenase, the two key enzymes involved in ovarian steroidogenesis, is observed. These results indicate that fatty acids from carrot seeds act as an antisteroidogenic agent<sup>44</sup>.

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