

## VOLATILE COMPOUNDS OF QURANI PLANTS' MIXTURE; A NEW PHARMACEUTICAL PRODUCT

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### ABSTRACT

**Objective:** QURANI plants' mixture is a new pharmaceutical product composed of some edible and medicinal plants (15 plants) mentioned in the Holy Quran (in a certain percentage, according to that is mentioned in Patent no. 1429/2013, presented to the Academy of Scientific Research and Technology, Egypt in 11/9/2013). The main aim of this work is to determine valuable volatile compounds in the ether extract of QURANI plants' mixture.

**Methods:** GC analysis of ether extract of QURANI plants' mixture were carried out in this work.

**Results:** Results of GC analysis of ether extract of QURANI plants' mixture revealed that, it contained 37 volatile compounds. The most dominant compound in this extract is 2-Ethoxy-3-chlorobutane; Area % is 27.07, this compound is followed by 5-methyl-5-vinyl-1,3-cyclopentadiene; Area % is 16.71. This extract contained also many other important compounds such as: D-Limonene and 2- $\alpha$ -Pinene; Area percentages are 4.72 and 1.38, respectively. Octadecane, 1-chloro - (CAS) and 2-Undecanol (CAS) were found to be the least available compounds in this extract; Area % is 0.45 in case of these two compounds.

**Conclusion:** Ether extract of QURANI plants' mixture can be considered as a rich source of many valuable volatile compounds.

**Keywords:** Ether extract, Edible plants, medicinal plants, QURANI plants' mixture, Volatile compounds.

### INTRODUCTION

The presented work is a part of the submitted Patent no. : 1429/2013 (A new Pharmaceutical Product from Plants Mentioned in the Holy Quran), presented to the Academy of Scientific Research and Technology, Egypt in 11/9/2013. This patent is aimed at the production of a cheap new pharmaceutical product, this product is composed of the QURANI plants' mixture (15 plants) in different percentages, this mixture is valuable against many dangerous diseases (with no toxicity and too little side effects), results will be published in a series of successive papers (1-2).

These 15 plants, those used to prepare this new mixture were cited in the holy Quran as follows: Sûrat Al-Baqarah (The Cow): (61, 266); Sûrat Al-An'âm (The Cattle): (99, 141); Sûrat Ar-Ra'd (The Thunder): (4); Sûrat An-Nahl: (11); Sûrat Al-Kahf (The Cave): (32); Sûrat Maryam (Mary): (23-26); Sûrat Al-Anbiyâ (The Prophets): (47); Sûrat Al-Mu'minûn (The Believers): (18-20); Sûrat An-Nûr (The Light): (35); Sûrat Ash-Shu'arâ (The Poets): (146-148); Sûrat Luqmân: (16); Sûrat Saba' (Sheba): (16); Sûrat Yâ-Sîn: (33-35, 57); Sûrat As-Sâffât (Those Ranged in Ranks): (146); Sûrat Sâd: (51); Sûrat Az-Zukhruf (The Gold Adornments): (73); Sûrat Qâf: (10); Sûrat At-Tûr (The Mount): (22); Sûrat Ar-Rahmân (The Most Gracious): (10-13, 37, 52, 68); Sûrat Al-Wâqi'ah (The Event): (20, 28-29, 32, 89); Sûrat Al-Insân or Ad-Dhr (Man or Time): (17); Sûrat Al-Mursalât (Those Sent Forth): (42); Sûrat An-Naba' (The Great News): (32); Sûrat 'Abasa (He Frowned): (27-31); Sûrat At-Tîn (The Fig): (1-2) (The Holy Quran).

The following is a simple introduction of some important plants contained in this mixture regarding their medicinal importance and their chemical composition. Ginger has been used extensively in folklore medicine to treat common ailments. Ginger has a number of chemical constituents like [6]-Gingerol, [6]-Shagol, Methyl [6] - isogingerol, Paradol which are responsible to provide different pharmacological actions. Now scientific evidences in

support of some of these beneficial properties are budding which would shore up their conservation. The ginger bears an enormous number of pharmacological activities such as: cardio protective, anti-inflammatory, anti-microbial, antioxidant, anti-proliferative, neuro-protective and hepatoprotective properties which have been proved. Among those, neuro-protective activity as well as the effect of ginger against colon cancer has facilitated the extent of the further research with a positive outcome. Since there is no good medicine till now for the treatment of these diseases, so researchers may do a lot of research on ginger for finding out less toxic and more potent drugs for the better treatment of those diseases (3).

Garlic (*Allium sativum*) qualifies as a great vegetable because not only is it an indispensable cooking ingredient, it can also be delightfully eaten. The *Allium* genus belongs to the Liliaceae family comprising onions, leeks, shallots, asparagus etc.. Garlic is primarily used as an herb to enhance many food dishes in various cultures. It contains many substances which studies have shown to act together to prevent various diseases such as hypertension, cancer and it has been shown to reduce plasma concentration of cholesterol and low-density lipoprotein in the blood and age-related conditions. Initial reports of the antimicrobial activity of garlic showed that, Allicin (allyl-2-propene thiosulfinate); a notable flavonoid in garlic, is formed when garlic cloves are crushed. Garlic also contains some sulphur-containing compounds such as alliin, ajoene, diallylsulphide, dithin, S-allylcysteine, enzymes as well as some non sulphur containing compounds including vitamin B, proteins, minerals, saponins and flavonoids (4-5). Many researches have reported a phytoalexin called allixin in garlic (6-7).

*Vitis vinifera* L. contains many chemical constituents such as: phenolic acids, flavonoids, anthocyanins, proanthocyanidins, sugars, sterols, amino acids, and minerals. *Vitis vinifera* L. is considered as a natural antioxidant source. Grapes are also used as demulcent, laxative, refrigerant, stomachic, diuretic and cooling. Moreover, it is useful in bilious dyspepsia, haemorrhage,

dysuria, in chronic bronchitis, heart diseases and gout. Grape juice is given to children to prevent constipation. Dried grapes or raisins are useful in thirst attendant on fevers, cough, catarrh, jaundice, and in sub-acute cases of enlarged liver and spleen (8).

A date palm (*Phoenix dactylifera* L.) fruit is an important component of the diet in most of the hot arid and semi arid regions of the world. Date palm fruits were found to contain carbohydrates (44-88%), fats (0.2-0.4%), proteins (2.3-5.6%), fibers (6.4-11.5%), minerals and vitamins (9). Carbohydrates in dates are mostly in the form of fructose and glucose, which are easily absorbed by the human body (10). Interestingly, dates contain higher concentrations of proteins when compared to other cultivars of fruits such as apples, oranges, bananas and grapes (containing 0.3, 0.7, 1.0 and 1.0% proteins, respectively) (11). Twenty-three different amino acids were found in date's proteins, many of which are not found in the most popular fruits (9).

Several studies in the literature concluded that, the aqueous extracts of dates have potent antioxidant and antimutagenic activity (12-13). *Phoenix dactylifera* L. was reported to have the second highest antioxidant activity among 28 fruits commonly consumed in China (14). Antioxidants have received increased attention by nutritionists and medical researchers for their potential effects in the prevention of chronic and degenerative diseases such as cancer, cardiovascular diseases and aging (15-16). The most effective antioxidants in this respect appear to be the flavonoids and phenolics. Because of their metal-chelating and radical-scavenging properties, phenolics were considered effective inhibitors of lipid peroxidation (12). Dates were found to be a high source of antioxidants, anthocyanins, carotenoids and phenolics (17).

Banana is the common name for the fruit of herbaceous plant of the family *Musaceae* and genus *Musa*. They are native to the tropical region of Southeast Asia. Bananas are mostly cultivated for the fruit and also for fiber and ornamental use. About 170 countries produce bananas in the world. In the developing world banana are considered as staple food (18). According to the Food and Agriculture Organization of the United Nations (FAO), banana is the main fruit in international trade and one of the most popular fruits in the world. This fruit industry is an important source of income, employment and export earnings for developing countries, in Latin America, Asia and Africa, and is responsible for creating many jobs, both in agricultural and urban areas (19). It provides instant energy, rich source of fiber, minerals and vitamins (18). Banana fruit is rich in nutrients with good flavor, is

widely consumed throughout the world (20). It has about 200 volatile components which include phyto-nutrients, sterols and fatty acids. Traditionally it is considered good for any gastric irritations, ulcers, constipation. Its starch provides a protective layer in the stomach while its non-digestible fiber is good for cholesterol lowering and constipation. Native Africans use inner part of banana peel for insect bites and skin problems. In Ayurveda they suggest eating of banana peel for diabetics as it is a good source of potassium, but does not contain sugars which are more in the edible portion. Ancient uses and recent studies have shown that bananas have good antioxidant properties and correcting electrolyte imbalance (18).

## MATERIAL AND METHODS

### Plant materials

Fifteen edible and medicinal plants mentioned in the Holy Quran were purchased from the Egyptian market, these plants were washed carefully with distilled water and surface sterilized by 70 % ethanol for 20-30 seconds, then they were cut to small pieces, dried at room temperature (25° C) till complete dryness, then these plants were grinding to give fine powder, then these plants were mixed in a certain percentage (1-2).

### Chemical analysis

Ether extract of this mixture was obtained by soaking it in HPLC-Grade ether (1/10 W/V) for 1 week, shaking well of samples during the extraction period was done. Volatile components of these extract were analyzed using GC (Gas Chromatography) instrument (Date of analysis: 06/29/14 06:09:41 PM, Scans: 18531, Libraries used in analysis are: Wiley9, mainlib and replib, Operator: ISQ120602, High Mass (m/z): 649.99329, Low mass (m/z): 40.00000, ISTD Amount: 0.000, Dilution Factor: 1.00, Run Time: 63.02 minutes, Sample Weight: 0.00) of the Central lab of National Research Centre, Giza, Egypt.

## RESULTS

GC analysis of ether extract of the QURANI plants' mixture revealed that, it contained 37 volatile compounds. The most dominant compound in this extract is 2-Ethoxy-3-chlorobutane; Area % is 27.07, this compound is followed by 5-methyl-5-vinyl-1,3-cyclopentadiene; Area % is 16.71. This extract contained also many other important compounds such as: D-Limonene and 2-á-Pinene; Area percentages are 4.72 and 1.38, respectively. Octadecane, 1-chloro - (CAS) and 2-Undecanol (CAS) were found to be the least available compounds in this extract; Area % is 0.45 in case of these two compounds.

**Table 1: Volatile components of ether extract of the QURANI plants' mixture**

RT	Molecular Weight	Molecular Formula	Compound Name	Area (%)
5.06	320	C <sub>20</sub> H <sub>32</sub> O <sub>3</sub>	Benzyl oxy tridecanoic acid	2.66
5.22	130	C <sub>8</sub> H <sub>18</sub> O	2-Heptanol, 5-methyl-(CAS)	1.63
5.39	130	C <sub>8</sub> H <sub>18</sub> O	2-Octanol	1.24
5.69	130	C <sub>8</sub> H <sub>18</sub> O	2-Hexanol, 3,4-dimethyl-	3.24
6.23	136	C <sub>6</sub> H <sub>13</sub> C <sub>10</sub>	2-Ethoxy-3-chlorobutane	27.07
6.93	162	C <sub>12</sub> H <sub>18</sub>	Benzene, (3,3-dimethylbutyl)-	0.82
7.23	106	C <sub>8</sub> H <sub>10</sub>	5-methyl-5-vinyl-1,3-cyclopentadiene	16.71
7.64	106	C <sub>8</sub> H <sub>10</sub>	Benzene,1,2-dimethyl-(CAS)	1.06
9.50	172	C <sub>11</sub> H <sub>24</sub> O	2-Undecanol (CAS)	0.45
10.12	358	C <sub>19</sub> H <sub>34</sub> O <sub>6</sub>	Dodecanoic acid, 2-(acetyloxy)-1-[[acetyloxy methyl] ethyl ester	0.57
10.50	246	C <sub>18</sub> H <sub>30</sub>	Benzene, (1,3,3-trimethylnonyl)-	0.86
10.92	136	C <sub>10</sub> H <sub>16</sub>	2-á-Pinene	1.38
11.64	120	C <sub>9</sub> H <sub>12</sub>	Benzene, 1,3,5-trimethyl-(CAS)	0.77
11.85	142	C <sub>10</sub> H <sub>22</sub>	Decane	3.85
12.69	1780	C <sub>94</sub> H <sub>180</sub> N <sub>4</sub> O <sub>26</sub>	Permethylated and reduced product of degradation product from H <sub>3</sub> glycolipid by L- L-Fucosidase and by B-Galactosidase	1.43
12.95	136	C <sub>10</sub> H <sub>16</sub>	D-Limonene	4.72
13.48	200	C <sub>11</sub> H <sub>20</sub> O <sub>3</sub>	5-(1-Ethoxy-ethoxy)-4-methyl-hex-2-enal	1.36
13.79	220	C <sub>15</sub> H <sub>24</sub> O	12-Oxabicyclo[9.1.0]dodeca-3,7- diene, 1,5,5,8-tetramethyl-, [1R-1R*,3E,7E,11R*]-	1.06

14.10	168	C <sub>10</sub> H <sub>16</sub> O <sub>2</sub>	Ascaridole	0.79
14.24	156	C <sub>11</sub> H <sub>24</sub>	Decane, 2-methyl-	0.67
15.58	156	C <sub>11</sub> H <sub>24</sub>	Undecane (CAS)	4.59
16.20	288	C <sub>18</sub> H <sub>37</sub> Cl	Octadecane, 1-chloro - (CAS)	0.45
16.45	170	C <sub>10</sub> H <sub>18</sub> O <sub>2</sub>	Bicyclo[3.1.0]hexane-6-methanol, 2-hydroxy-1,4,4-trimethyl-	0.58
16.79	238	C <sub>17</sub> H <sub>34</sub>	Undecane, 2-cyclohexyl-	0.61
17.59	214	C <sub>14</sub> H <sub>30</sub> O	1-Tetradecanol (CAS)	0.48
17.88	240	C <sub>17</sub> H <sub>36</sub>	Tetradecane, 2,6,10-trimethyl-	0.97
18.12	214	C <sub>14</sub> H <sub>30</sub> O	1-Tetradecanol (CAS)	0.61
19.18	170	C <sub>12</sub> H <sub>26</sub>	Dodecane	4.35
19.65	184	C <sub>13</sub> H <sub>28</sub>	Undecane, 2,6-dimethyl-	0.71
22.60	184	C <sub>13</sub> H <sub>28</sub>	Tridecane	1.46
25.84	198	C <sub>14</sub> H <sub>30</sub>	Tetradecane	1.67
28.91	212	C <sub>15</sub> H <sub>32</sub>	Pentadecane (CAS)	0.85
31.81	226	C <sub>16</sub> H <sub>34</sub>	Hexadecane (CAS)	0.50
52.62	380	C <sub>27</sub> H <sub>56</sub>	Heptacosane	0.57
53.73	390	C <sub>24</sub> H <sub>38</sub> O <sub>4</sub>	Di-(2-ethylhexyl) phthalate	4.49
56.30	380	C <sub>27</sub> H <sub>56</sub>	Heptacosane (CAS)	0.65
58.04	460	C <sub>27</sub> H <sub>56</sub> O <sub>5</sub>	Dimethoxyglycerol Docosyl Ether	0.52

## DISCUSSION

Results of GC analysis of ether extract of QURANI plants' mixture are in parallel with other previous works regarding the presence of important phytochemical compounds in individual plants contained in this new mixture (1-20).

## CONFLICT OF INTERESTS

Declared None

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