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REVIEW ARTICLE

Review of the Therapeutic Secrets of Umbelliferae Family

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ABSTRACT

There are over 3,700 unique species in the Umbelliferae family of flowering plants, which belong to the phylum Apiales. It belongs to the same family as parsley and carrots and is well-known for its distinctive leaf design and clusters of colorful flowers. The inflorescence structure of this family is unlike any other, with umbels holding flowers on pedicels and hollow, ridged, or wrinkled stems. Some members of the family, such as Love and Angelica, have therapeutic characteristics in addition to their culinary and flavoring ones. However, certain species contain dangerous substances; therefore, great care and accurate labeling are required while harvesting or utilizing these plants.

Keywords: *Umbelliferae, therapeutic secrets, Fennel, Dill, Lovage, Celery, carrot ,Parsley*

INTRODUCTION:

A different family of flowering plants that is considered to be part of the phylum Apiales is known as the Umbelliferae Family, frequently referred to as the Apiaceae Family. Since it contains several well-known culinary plants, this family is often referred to as the parsley or carrot family. Around 3,700 varieties make up the Umbelliferae Family, which can be distinguished by its common flower cluster arrangement as well as its intricate leaves. Although a few species of the Umbelliferae Family may grow to shrubby or tree-like forms, many of them constitute herbaceous plants . They tend to have hollow stems that are sometimes ridged or furrowed, and they possess pleasant characteristics. Umbellifers frequently sport alternately convoluted leaves, which are typically separated into leaflets or segments. Their overall delicate and feathery appearance is due to the complexity of their leaves (1).

The distinct inflorescence structure of the Umbelliferae Family is its most distinctive feature. Umbels, which are flat-topped or cyclical clusters containing flowers that have numerous separated flower stalks, called pedicels, that originated from only one point, are where the flowers are arranged. The pedicels grew outwardly from a central point, demonstrating the ribs of an umbrella, and each umbel consists of many rows of small flowers. The family has a visually beautiful and uncommon look according to this arrangement. Umbellifer flowers typically have five petals. These petals are very small and range in color from white and yellow to pink and purple (28). They frequently display radial symmetry. Carrots (*Daucuscarota*), parsley (*Petroselinumcrispum*), celery (*Apiumgraveolens*), fennel (*Foeniculumvulgare*), and dill (*Anethumgraveolens*) constitute just a few of the family's essential culinary plants. These plants are nurtured extensively and treasured for their culinary and medicinal virtues (2).

Many members of the Umbelliferae Family have significant beneficial properties in addition to their function in cooking. For example, various plants like lovage (*Levisticumofficinale*) and angelica (*Angelica archangelica*) have previously been used for medicinal purposes (24). Essential oils produced by a few umbellifers have antibacterial, antifungal, and antioxidant properties. It is essential to bear in mind that some members of the Umbelliferae Family are appropriate for human consumption because some species contain toxic compounds. Due to this, it's important for proper care and precise designation when collecting or using plants from this family (3).

Active substances in plants of the Umbelliferae family

The Apiaceae Family, commonly referred to as the Umbelliferae Family, features a number of plant species containing substances that are bioactive and have medicinal properties. These compounds serve to clarify the medicinal advantages derived from employing these plants in both conventional and contemporary medicine. Here are only a few of the umbelliferae plants' active component parts:

1-Coumarins: Coumarins are volatile compounds with a number of biological properties that are found in many Umbelliferae plants. Their anticoagulant, anti-inflammatory, and antioxidant benefits are shown. Additionally, they might have antimicrobial and anti-cancer effects. Angelica (*Angelica archangelica*) and sweet cicely (*Myrrhisodorata*) are two examples of plants in this family that are rich in coumarin (4, 27).

Essential oils: Various Umbelliferae species produce essential oils, which contain volatile compounds that offer them their distinctive smells and medicinal benefits. Antibacterial, antifungal, and antioxidant effects are frequently found in these oils. Fennel (*Foeniculumvulgare*), dill (*Anethumgraveolens*), and caraway (*Carumcarvi*) are a few instances of plants having a great deal of essential oils (1,15).

3-Dill (*Anethumgraveolens*) includes substantial quantities of the substances 3-apiole and dillapiole. Apiole works well for relieving pain because it boasts anti-inflammatory and analgesic properties. Potential anti-cancer effects were further studied. Dillapiole has shown antibiotic use and insecticide capabilities (8).

4-Apiol: Petroselinumcrispum, commonly parsley, contains apiol, a bioactive chemical. It shows antioxidant and anti-inflammatory properties. Common applications of apiol include uterine tonics and period induction. However, due to its possible effects on the uterus, its use should be discussed with caution, particularly during pregnancy (13).

5-Apiin: Celery (*Apiumgraveolens*) and parsley (*Apiumsativum*) are two examples of Umbelliferae plants containing the flavonoid glycoside apiin. It possesses anti-inflammatory, hepatoprotective, and antioxidant properties. Apiin has shown potential for improving liver function and lowering oxidative stress (7, 26).

6-Phenolic compounds: Many species of Umbelliferae include chemical compounds such as caffeic acid, ferulic acid, and quercetin. The anti-inflammatory and antioxidant properties of these chemicals add to the overall health benefits associated with consuming these plants (12).

7-Polyacetylenes: Carrots (*Daucuscarota*), a species in the Umbelliferae genus containing polyacetylenes, provide a single instance. The compounds in question demonstrated antimicrobial, antifungal, and anti-inflammatory properties. Also, they reveal possible anticancer effects and could potentially clarify why eating carrots promotes immune-boosting benefits (23).

8-Celery (*Apiumgraveolens*) contains phthalides, a group of substances that are bioactive. By relaxing the smooth muscles of the blood vessels, they have been demonstrated to have hypotensive (blood pressure-lowering) effects. Celery is beneficial for promoting urine and maintaining a good fluid balance because phthalides additionally possess diuretic traits (28).

9-Apigenin: Apigenin is a flavonoid that can be discovered in many kinds of Umbelliferae plants, including celery and parsley. The potential that it may have anti-inflammatory, antioxidant, and anti-cancer qualities has been studied. In spite of supporting cardiovascular health, apigenin could possibly offer neuroprotective benefits (2, 17).

10-Lignans: Dill and celery are two plants that belong to the Umbelliferae family and have lignans. Antioxidant and estrogenic properties are present in these substances. Lignans are under investigation for their potential in hormone-related diseases and also as preventive agents for certain cancers, including breast and prostate cancer (11).

11-Terpenoids: Terpenoids are a wide group of compounds with an expansive spectrum of biological activity, so Umbelliferae plants often contain compounds. Its antimicrobial, anti-inflammatory, and anti-cancer effects are currently demonstrated. Also, they support the distinctive scent of a number of plants, such as dill and fennel (5).

12-Polysaccharides: An angelica plant that corresponds to the Umbelliferae family contains polysaccharides that have immunomodulatory properties. These compounds have the potential to treat immunological-related diseases and can promote immune function (7, 14).

It's important to remember that different species within the Umbelliferae Family may have different amounts of bioactive compounds. Additionally, the quantity, preparation method, and specific plant of a component used could impact how these chemicals function medically. Before using these plants for therapeutic reasons, as with any medicinal use, it is advisable to consult with a medical professional.

Plants of the Umbelliferae family

A variety of plant species that were once used in herbal medicine and home treatments were part of the Umbelliferae Family, occasionally referred to as the Apiaceae Family. These plants are useful for treating a variety of diseases since they have a range of medicinal properties. traits. The Umbelliferae Family is used in an array of chemical treatments, as shown in the instances that follow:

1-Fennel (*Foeniculumvulgare*): Fennel seeds and the plant's essential oil have long been used to promote digestion and cure digestive issues such as bloating, gas, and indigestion. A popular remedy for soothing an upset stomach is fennel tea (6).

2-Dill (*Anethumgraveolens*): Dill has an extended tradition of use as a digestive aid and as a colic remedy for young children. To alleviate gastrointestinal pain as well as promote digestive health, it can be prepared as a tea (9, 10).

3- Parsley (*Petroselinumcrispum*): Besides being a popular culinary plant, parsley is also known for its medicinal properties. It is useful in reducing water retention as well as improving kidney health since it is loaded with antioxidants and has diuretic characteristics (15, 19).

4-Angelica (*Angelica archangelica*): Angelica has been used for generations in traditional medicine to treat bronchitis, colds, and coughs that affect breathing. Also, the herb has become known for promoting relaxation and decreasing period cramps (16, 18).

5-Lovage (*Levisticumofficinale*): As a result of its diuretic effects, lovage has been used as a household therapy to increase the production of urine and promote washing. Also, it could encourage urinary tract health and alleviate digestion problems (20, 21).

6-Carrot (*Daucuscarota*): Carrots are a nutritious snack that offers an assortment of health benefits. Antioxidants, vitamins, and minerals that promote general health are plentiful in these Natural treatments that encourage healthy skin, improve the way she sees, and enhance immunity frequently involve carrots (22, 23).

7- Celery (*Apiumgraveolens*), having a high water content and diuretic features, may help reduce fluid retention and maintain the health of the urinary tract. As an alternative remedy for arthritis and inflammation, it is also used in traditional medicine to aid digestion (25, 26).

While there's a history of traditional use for these plants, it is essential to talk with your doctor before implementing them for therapeutic purposes. Some individuals might be sensitive or allergic to some plants, while there may also be interactions with prescription medications or prior illnesses (22).

In conclusion, the family of flowering plants called Umbelliferae has many varieties and is distinguished for its distinctive inflorescence arrangement, compound leaves, and sweet characteristics. This family has a large variety of useful and visually appealing plants that have both culinary and medicinal significance.

REFERENCES

1- ReLavaud, C., Beauvière, S., Massiot, G., Le Men-Olivier, L., &Bourdy, G. (1996). Saponins from Pisoniaumbellifera. Phytochemistry, 43(1), 189-194.
2- Mthembu, X. S., Van Heerden, F. R., &Fouché, G. (2010). Antimalarial compounds from Scheffleraumbellifera. South African Journal of Botany, 76(1), 82-85.

3- de Medeiros Gomes, J., da FonsÃªca, D. V., de Albuquerque, C. H., da Silva, M. S., de Almeida, R. N., & Tavares, J. F. (2016). Antinociceptive and antioxidant activity of CalliandraumbelliferaBenth. African Journal of Pharmacy and Pharmacology, 10(42), 892-899.
4- Kooti, W., Moradi, M., Ali-Akbari, S., Sharafi-Ahvazi, N., Asadi-Samani, M., &Ashtary-Larky, D. (2015). Therapeutic and pharmacological potential of Foeniculumvulgare Mill: a review. Journal of HerbMed Pharmacology, 4(1), 1-9.
5- Diao, W. R., Hu, Q. P., Zhang, H., &Xu, J. G. (2014). Chemical composition, antibacterial activity and mechanism of action of essential oil from seeds of fennel (Foeniculumvulgare Mill.). Food control, 35(1), 109-116.
6- Bernath, J., Nemeth, E., Kattaa, A., &Hethelyi, E. (1996). Morphological and chemical evaluation of fennel (Foeniculumvulgare Mill.) populations of different origin. Journal of essential oil research, 8(3), 247-253.
7- Barros, L., Carvalho, A. M., & Ferreira, I. C. (2010). The nutritional composition of fennel (Foeniculumvulgare): Shoots, leaves, stems and inflorescences. LWT-Food Science and Technology, 43(5), 814-818.
8- Tian, J., Ban, X., Zeng, H., He, J., Chen, Y., & Wang, Y. (2012). The mechanism of antifungal action of essential oil from dill (Anethumgraveolens L.) on Aspergillusflavus. PloS one, 7(1), e30147.
9- Naidu, M. M., Vedashree, M., Satapathy, P., Khanum, H., Ramsamy, R., &Hebbar, H. U. (2016). Effect of drying methods on the quality characteristics of dill (Anethumgraveolens) greens. Food Chemistry, 192, 849-856.
10- SelenIsbilir, S., &Sagiroglu, A. (2011). Antioxidant potential of different dill (Anethumgraveolens L.) leaf extracts. International journal of food properties, 14(4), 894-902.
11- Shyu, Y. S., Lin, J. T., Chang, Y. T., Chiang, C. J., & Yang, D. J. (2009). Evaluation of antioxidant ability of ethanolic extract from dill (Anethumgraveolens L.) flower. Food Chemistry, 115(2), 515-521.
12- Mahmood, S., Hussain, S., & Malik, F. (2014). Critique of medicinal conspicuousness of Parsley (Petroselinumcrispum): a culinary herb of Mediterranean region. Pak J Pharm Sci, 27(1), 193-202.
13- de MenezesEpifanio, N. M., Cavalcanti, L. R. I., Dos Santos, K. F., Duarte, P. S. C., Kachlicki, P., Ożarowski, M., ... & de Almeida Chaves, D. S. (2020). Chemical characterization and in vivo antioxidant activity of parsley (Petroselinumcrispum) aqueous extract. Food & function, 11(6), 5346-5356.
14- Luthria, D. L. (2008). Influence of experimental conditions on the extraction of phenolic compounds from parsley (Petroselinumcrispum) flakes using a pressurized liquid extractor. Food chemistry, 107(2), 745-752.
15- Zhang, H., Chen, F., Wang, X., & Yao, H. Y. (2006). Evaluation of antioxidant activity of parsley (Petroselinumcrispum) essential oil and identification of its antioxidant constituents. Food research international, 39(8), 833-839.
16- Korpinen, R. I., Välimaa, A. L., Liimatainen, J., &Kunnas, S. (2021). Essential oils and supercritical CO2 extracts of Arctic Angelica (Angelica archangelica L.), marsh Labrador tea (Rhododendron tomentosum) and common tansy (Tanacetumvulgare)—chemical compositions and antimicrobial activities. Molecules, 26(23), 7121.
17- Bhat, Z. A., Kumar, D., & Shah, M. Y. (2011). Angelica archangelica Linn. is an angel on earth for the treatment of diseases. International Journal of Nutrition, Pharmacology, Neurological Diseases, 1(1), 36-50.
18- Aćimović, M., Rat, M., Pezo, L., Lončar, B., Pezo, M., Miljković, A., &Lazarević, J. (2022). Biological and chemical diversity of Angelica archangelica L.—case study of essential oil and its biological activity. Agronomy, 12(7), 1570.
19- Kaur, A., &Bhatti, R. (2021). Understanding the phytochemistry and molecular insights to the pharmacology of Angelica archangelica L.(Garden angelica) and its bioactive components. Phytotherapy Research, 35(11), 5961-5979.
20- Kemzūraitė, A., Venskutonis, P. R., Baranauskienė, R., &Navikienė, D. (2014). Optimization of supercritical CO2 extraction of different anatomical parts of lovage (Levisticumofficinale Koch.) using response surface methodology and evaluation of extracts composition. The Journal of Supercritical Fluids, 87, 93-103.
21- Złotek, U., Szymanowska, U., Pecio, Ł., Kozachok, S., &Jakubczyk, A. (2019). Antioxidative and potentially anti-inflammatory activity of phenolics from lovage leaves Levisticumofficinale Koch elicited with jasmonic acid and yeast extract. Molecules, 24(7), 1441.
22- Santos, P. A., Figueiredo, A. C., Oliveira, M. M., Barroso, J. G., Pedro, L. G., Deans, S. G., &Scheffer, J. J. (2005). Growth and essential oil composition of hairy root cultures of Levisticumofficinale WDJ Koch (lovage). Plant science, 168(4), 1089-1096.
23- Raees-ul, H., & Prasad, K. (2015). Nutritional and processing aspects of carrot (Daucuscarota)-A review. South Asian Journal of Food Technology and Environment, 1(1), 1-14.
24- Surbhi, S., Verma, R. C., Deepak, R., Jain, H. K., &Yadav, K. K. (2018). A review: Food, chemical composition and utilization of carrot (Daucuscarota L.) pomace. International Journal of Chemical Studies, 6(3), 2921-2926.
25- Fikselová, M., Šilhár, S., Mareček, J., &Frančáková, H. (2008). Extraction of carrot (Daucuscarota L.) carotenes under different conditions. Czech Journal of Food Sciences, 26(4), 268-274.
26- Kooti, W., &Daraei, N. (2017). A review of the antioxidant activity of celery (Apiumgraveolens L). Journal of evideHedayati, N., BemaniNaeini, M., Mohammadinejad, A., &Mohajeri, S. A. (2019). Beneficial effects of

celery (Apiumgraveolens) on metabolic syndrome: A review of the existing evidences. Phytotherapy Research, 33(12), 3040-3053.nce-based complementary & alternative medicine, 22(4), 1029-1034.
27- Hedayati, N., BemaniNaeini, M., Mohammadinejad, A., &Mohajeri, S. A. (2019). Beneficial effects of celery (Apiumgraveolens) on metabolic syndrome: A review of the existing evidences. Phytotherapy Research, 33(12), 3040-3053.
28- Sowbhagya, H. B. (2014). Chemistry, technology, and nutraceutical functions of celery (Apiumgraveolens L.): an overview. Critical reviews in food science and nutrition, 54(3), 389-398.