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IDENTIFICATION OF PHYTO CONSTITUENTS PRESENT IN MEDICINAL PLANT

Saba Hadi , Baan M. Twaij
Almustansiriyah University, College of Science, Biology department
baanmunim79@gmail.com

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Abstract:

The active ingredients in medicinal plants contain complex compounds that are produced or stored in various plant organs and tissues. In addition to economic and export value, these compounds are of high pharmaceutical, nutritional and health value and have formed the formulation and basis of many drugs. Many methods have been proposed for their separation, including chromatography, spectrometry and electrophoresis, which we have fully described in this article.

Keywords: pharmaceutical, nutritional and health value, Medicinal plants

1_INTRODUCTION

The active ingredients in plants, also called phytochemicals, are a set of chemical compounds that are produced naturally in plant biology. These compounds are being studied because of their importance in medicine and the nutrition industry. Effective herbal compounds create the organoleptic properties of plants and are the cause of plant color and aroma and are biologically important. Carotenoids and flavonoids are among these substances that have found their importance in the medical and nutritional industries(Arora, Kaur and Kaur, 2003). Numerous identification methods have been found for them, of which chromatography in different types, GC-MS detection device, mass spectrometry and electrophoresis are more important and more accurate, and in the text of the article, these identification methods are discussed. The combination of plant essential oils is a collection of active pharmaceutical and aromatic substances that are also of special importance in terms of traditional fever. In addition, modern medicine, by extracting effective herbal compounds, uses them in the manufacture of various medical and anti-inflammatory and analgesic drugs, rheumatic drugs, drugs required for skin diseases or neurological and genital drugs, etc(Ashfaq *et al.*, 2013).

1_MEDICINAL PHYTOCHEMICALS

Medicinal phytochemicals are divided into two main categories, each of which affects metabolism. The first group of medicinal phytochemicals are those active substances that are obtained from the initial metabolism of the plant. The initial metabolism of the plant, which is primarily associated with saccharides, takes place in all plants, and photosynthesis is the cause(Okigbo, Anuagasi and Amadi, 2009). The second category of plant phytochemicals produced in plants is the result of secondary metabolism. This metabolism occurs in nitrogen-absorbing plants, and the plant practically does not use these substances, and the plant tissue itself is useless(Lu *et al.*, 2004).
However, second-class photochemicals are of great medical importance. Photochemicals have such a high value in pharmaceutical science that if a plant has only one active ingredient in its tissue, it has a more beneficial effect on the human body than the same chemically synthesized substance. Phytochemistry is a scientific discipline that specializes in the study and conversion of active herbal substances into medicinal substances. Recognition and study of medicinal compounds in medicinal plants is related to this field and the manufacture of medicine is from the plant composition identified in the field of pharmacy(Ashfaq *et al.*, 2013).

1. DETECTION OF COMPOUNDS IN MEDICINAL PLANTS WITH THE HELP OF CHROMATOGRAPHY

Medicinal plants contain a complex of complex biological compounds that make it very difficult to identify and separate specific substances. By separating them in different ways, quality control of extraction is required, which leads to other challenges. Chromatography is one of the best laboratory and practical methods for identifying and separating effective plant compounds, which can be done by three methods: gas chromatography, liquid and thin layer chromatography(Nyiredy, 2001):

2. THIN LAYER CHROMATOGRAPHY (TLC)

This type of chromatography is an accurate method for identifying the medicinal compounds of the plant and determining their purity in the plant extract and is also used to separate the components of the extract mixture. Due to the small sample size it requires, it is very economical and costs little to operate with this device. This device has

two phases, one of which is the fixed phase and the other is the moving phase. In this method, several samples can be analyzed simultaneously(Sanjeet Jyoti, 2013).

3. HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC)

Is one of the methods of identification and separation of materials that has the positive points of all previous methods and has a very high sensitivity, accuracy and speed in recognizing compounds in medicinal plants and also in the separation of volatiles and Plant instability against heat has also shown a very high ability(Boros *et al.*, 2010). The amount of sample provided by HPLC is much lower than other devices, however, the response of this device is very high and the identification of compounds in an extract is thoroughly investigated. In addition to separating the various components of the extract, this device helps to identify macromolecules such as nucleic acids or amino acids and hydrocarbons of structures water-soluble vitamins and drugs, etc(Chan, 2003). The main components of HPLC include Injector, Pump, column, Solvent Reservoir and Detector. Liquid chromatography in combination with mass spectrometry can handle very sensitive functions in the pharmaceutical industry(Fernand *et al.*, 2008).

4. IDENTIFICATION OF ACTIVE COMPOUNDS OF MEDICINAL PLANTS BY MASS SPECTROMETRY

Spectroscopy is the study and recognition of compounds by the emission of light and other radiation to matter and the rate of absorption of matter. In fact, the desired plant extract is irradiated with rays that have a certain wavelength. The compounds in the extract absorb part of this beam and provide a reflection with different wavelengths. To do this, the sample is poured into a special spectrometer container called an envelope. The amount of photons that the cuvette passes through and is detected as the wavelength received by the detector depends on a set of factors, including the length of the cuvette and the concentration of the sample being examined. This interaction of light and matter identifies the ingredients of the extract(Guo *et al.*, 2006).

5. IDENTIFICATION OF COMPOUNDS IN MEDICINAL PLANTS BY GAS CHROMATOGRAPHY WITH MASS SPECTROMETRY (GC-MS)

This device is made of two parts, one part is gas chromatography (GC) and the other part is mass spectrometry (MS). In the GC part of the device, the process of separating the compounds in the medicinal plant takes place and with the temperature determined for the device, the compounds pass through the stationary phase in the column in the device and each compound is separated and after entering the mobile phase(Ajayi *et al.*, 2011). The compounds separated in the stationary phase are sent to the detector. Then the current created in this path enters the ionization part of MS and after ionization, the sand passes through the analyzer installed in the device and the mass spectrum of each is displayed graphically by the examined device(Fauzi, Hameed and Jawad, 2017).

6. IDENTIFICATION OF ACTIVE INGREDIENTS OF MEDICINAL PLANTS USING ELECTROPHORESIS

This method is used to separate plant macromolecules required in the pharmaceutical industry. Electrophoresis is an electric field-based technique in which the macromolecules in the extract move and separate based on the electric charge in the magnetic field created in the electrophoresis(Gotti, 2011). In this method, the desired compound is loaded in wells created in cellulose acetate or agarose gel and placed in a buffer to regulate the electric current, and the macromolecules in it are separated according to the charge or molecular weight or spatial shape. The amount of pores in cellulose gel or acetate determines the speed of material movement and the quality of separation. Doing so is less expensive than other methods, but may limit the purpose of the work(Gackowski *et al.*, 2021).

7. CONCLUSION

The trend of increasing population in the world has increased the need of human beings for food, clothing and medicine, and in addition, human beings are moving towards consumption. Under these conditions, and due to the widespread global demand for various drugs, medicinal plants have become very valuable. Herbal medicines are more compatible with the human body due to their biological origin and are more effective than their chemically synthesized counterparts. The use of optimal identification methods that have a higher ability to work accurately and separation sensitivity can be effective for the production of more efficient drugs. These methods are described in the text of the article under the headings of electrophoresis, spectrometry and electrophoresis. It is hoped that you will find better ways to identify and purify it more quickly(Arceusz, Wesolowski and Konieczynski, 2013).

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