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EXTRACTION AND PHYTO CHEMICAL SCREENING OF MEDICINAL

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Abstract:

Extraction of the active ingredient from the plant is increasingly being considered as a basic human need that the pharmaceutical industry uses to make a variety of medicinal compounds. Extraction methods in industry are mostly based on traditional methods that are described in the text of the article and include Maceration, infusion, brewing, tincture, sox and perch, which according to the type of plant, the type of active ingredient of the plant and the conditions in which extraction takes place. One of the methods is used. In addition to traditional methods, new extraction technologies have been adopted, some of which include ultrasonic extraction, microwave and compressed and pressurized solvents. New methods of extracting plant compounds and plant aromatic substances increase the extraction speed and use energy and solvents more efficiently. In this paper, both types of methods are reviewed.

Keywords: Plant Secondery Metabolite, Phyto Chemical Aromatic Plants

1. INTRODUCTION

When medicinal plants are researched and studied, in the first stage of extracting their extracts, the researcher is interested. Plants that are of great importance in the field of medicine contain many secondary compounds that most of these compounds have biological activity that can be important in medicine. Plant extracts are increasingly important in the health or food or pharmaceutical industries. The importance of these plants has led to the frequent consideration of various technologies that are important in the field of extraction(Okigbo et al., 2009).

These extraction technologies have been studied in several cases, in addition to the old methods such as brewing, Maceration, digestion and seepage, new methods such as extraction using ultrasound, extraction with the help of compressed solvent and extraction based on microwaves and supercritical liquid. Also includes. The old and traditional methods mentioned here are very time consuming methods for research work that require a lot of solvent to achieve the purpose of extracting. Therefore, plant extraction went in a direction that, in addition to saving solvent consumption, also takes less time from the researcher, thus helping to protect the environment(Nile et al., 2017).

Extracting effective compounds from medicinal plants in pharmacy means separating compounds that have medicinal activity and are important in the pharmaceutical industry. Isolation of these compounds from plant tissues with high purity means extraction of medicinal compounds. Extraction of these materials in most cases has many impurities that using the appropriate method to purify them can make them more usable. New technologies are trying to increase the extraction efficiency in addition to obtaining extracts with high purity and the resulting extract is of higher quality. For this purpose, in addition to the appropriate method, the type of plant material and the amount of time required for extraction should be considered. In short, a set of factors should be considered that is a good quality extract(Shams et al., 2015).

2. EXTRACTION BY TRADITIONAL METHODS

2.1. Maceration

During this process, the plant tissue is crushed and poured into a container, then the appropriate solvent selected for it is poured on the plant and the plant tissue is uniformly mixed with the solvent and placed in a container that is tightly closed. This container is placed in the environment for at least 3 days and the mixture inside the container is stirred occasionally so that the solvent is in constant contact with the plant(Ćujić et al., 2016).

After performing these steps, the mixture can be passed through a strainer in several steps and the extract can be separated from the plant pulp. For this purpose, before the closing stage in the container, pieces of plant tissue can be placed in the bag and

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suspended in the solvent, which also increases the extraction speed(Trusheva et al., 2007).

2.2. Infusion

In this method, the crushed plant tissue is placed in a mortar and the plant tissue is moistened and pounded several times with water. After a while, some boiling water is added to the mixture and the resulting mixture is placed in a pan. In Ben Marie, with repeated and continuous stirring, heat above 90 degrees is applied to the composition. The lid of the container containing the resulting compound is then tightly closed. After performing all these steps, the plant tissue is pressed and its water is completely taken away. One of the disadvantages of the infusion method is that a number of plant enzymes remain active in this method and alter the composition of the extract(Gião et al., 2007).

2.3. Brew

To prepare the extract with this method, the plant tissue is placed at a temperature above 90 ° C and the container containing the plant tissue is placed on a steam bath and stirred frequently. The steam bath temperature must be kept constant for a specified period of time to obtain the extract. In the last step, the mixture is passed through a strainer and the resulting extract is prepared for the next steps(Hartwig, 2015).

2.4. Tinctures

Herbal extracts obtained by tincture are obtained by solvents such as ethanol and ether. In some cases, plant tissue extract is obtained by combining ethanol and ether. In these cases, more than two units of solvent are added for each unit of the plant(Valachovic et al., 2001). The maximum number of units used for the plant is 10 units. Tinctures have limitations, including complete closure and the fact that the solution must be kept completely out of direct sunlight. Ingredients in tinctures may undergo hydrolysis, oxidation or other chemical changes. Therefore, their use has a limited time(Kowalczyk et al., 2012).

2.5. Soxhlet

One of the extraction methods is the Soxhlet apparatus in which the dried plant tissue is crushed into a powder. The created powder is poured into a human and from it a suitable and selected solvent is poured on the powder. Simultaneously with the addition of solvent, the mixture of plant powder and solvent should be stirred continuously until it finally forms a paste(Redfern et al., 2014). The solvent is still added to the dough mixture and by turning on the electric oven installed on the device and balancing its temperature, the mixture of solvent and vegetable powder in the device boils continuously and in a balanced way(Gu et al., 2019).

2.6. Percolation

It is another device for extracting which is able to extract the extract from plant tissue without heat. In this method, there are conical glasses with milk-like appendages at the bottom, which are used to remove the solvent. The plant powder needed for the extract is poured into a percolator and a solvent is added to it and sealed in it. This is done continuously and may take days and is more time consuming than the Soxhlet method. Finally, the extract obtained from it can be used like the Soxhlet method(Long et al., 2008).

3. EXTRACTION BY MODERN METHODS

3.1. Ultrasonic extraction

Ultrasound waves with a power of more than 20 kHz can cause mechanical oscillations in materials with various states of solid, liquid and gas, which feature can make these waves usable for different purposes. Sound waves have the ability to propagate in a substance and to compress or disperse the molecules of that substance during contraction and expansion. The use of ultrasound in extraction is such that these waves increase the penetration of solvent in plant tissue and also helps to destroy the wall of plant cells and speed up the extraction(Hromádková & Ebringerová, 2003).

3.2. Extraction using microwaves

Microwaves are a group of electromagnetic waves that have a specific frequency between 300 MHz and 300 GHz. That is, in the known electromagnetic spectrum, it is located between the x-ray and infrared. In the traditional heat extraction method, which is given to the combination of plant tissue and solvent, a large part of it is wasted, but in microwave extraction, this energy loss to the environment is much less and we can say that we do not have energy loss. This mechanism in heating without energy loss can reduce the extraction time and speed up the work than traditional methods(Mandal et al., 2007).

The basis of working with microwaves is that the waves directly affect the plant tissue and solvents and polar substances. In these cases, two phenomena of bipolar rotation as well as ion transfer and in most cases both of these phenomena lead to heat generation. In this case, the dried plant is used for extraction. Although the plant is dried, it has a very low moisture content and microscopic level, which is enough to generate heat with the help of microwaves(Zhang et al., 2011).

This heat leads to the evaporation of moisture and puts a lot of pressure on the plant cell wall, which destroys the cell and its active components seep out of the damaged wall, and the extract can be separated at this stage with the help of solvent. Microwave extraction separation systems are of two types, the multiple system called the decentralized microwave

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oven and the single system called the centralized microwave oven(Proestos & Komaitis, 2008).

3.3. Extraction of the extract by compressed solvent

Extraction with pressurized solvent is one of the methods of separating the extracts of medicinal plants. To extract through this method, we need a pressure of 10 to 15 MPa and a temperature of 50 to 200 degrees Celsius. This is done to prevent the solvent from evaporating and the solvent from remaining in the liquid state(dos Santos Freitas et al., 2008).

In fact, in this method, increasing the temperature leads to extraction to be done more quickly and in less time, and the presence of high pressure also keeps the solvent in the liquid state. Pressure also helps the cell to compress and extract faster. There is an alternative method for extraction with pressurized solvent in which the extraction of the active substance is enhanced by the use of solvent. This method is faster than extraction with compressed solvent and this is due to the increase in transfer acceleration(Corso et al., 2010).

4. CONCLUSION

In addition to its nutritional and health value, effective herbal compounds have a major share in the pharmaceutical industry and the need of human society to obtain biologically active compounds of the plant is increasing. Research is ongoing to find the best way to extract. Despite modern extraction methods, traditional methods for some plant tissues and some working conditions still retain their place in the effective extraction of plant compounds(Munir et al., 2014).

However, it is more economical and economical to move the extraction to modern methods. Because in addition to reducing time and energy in consuming solvents, it also saves labor costs for the pharmaceutical industry. In addition to all these advantages, new methods work better and more appropriately for the environment and help preserve the environment. However, it is necessary for researchers to note that new methods are still in the laboratory or semi-industrial stages, and in order to determine their superiority over traditional methods, it is necessary to reach the stage of industrial use(Shams et al., 2015).

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