MACERATION TECHNIQUES FOR TISSUES FROM HIGHER PLANTS

Maceration is an extractive technique that is conducted at room temperature. It consists of immersing a plant in a liquid (water, oil, alcohol, etc.) inside an airtight container, for a variable time based on the plant material and liquid used.

Need for maceration

Anatomical studies of plant stems or other parts, rarely convey an accurate picture of the real nature of the cells of which they are composed. One method which reveals cells in their cellular structure is the dissociation method. The target plant is treated with chemicals which dissolve the middle lamella and allow the cells/fibers to become separated from one another. However, in some plants, the mild maceration process will not completely dissociate to a single fiber unit, resulting in an aggregate of fibers. These aggregates of fibers have the appearance of a single fiber. Some processes result in maceration as well as bleaching. A small quantity of the macerated tissues may be mounted in glycerine and observed.

Types of solvents

The solvent must be chosen based upon the chemical nature of the compounds contained within the plant. Solubility and the desired use of the extraction should be considered when choosing the solvent. That is, recognizing their solubility and the desired use of the extraction. Generally, alcohol is the most used substance because it is able to extract a greater part of the molecules (active ingredients) contained within the plant, including molecules which are lipophilic or hydrophilic.

Some others use a vegetable oil when want to isolate only the lipophilic components (fats), while water is used to extract only hydrophilic ingredients. A new technique was developed for measuring the enzymatic maceration of plant tissue. The “macerating enzyme” of *Sclerotium rolfsii* was purified and identified as an endo-polygalacturonase.

Before being processed, the plant must be properly washed and separated from foreign material such as topsoil, pebbles or rocks, weeds, and materials non-suitable for extraction. The plant material can be used fresh or dry based on the desired product.

Preparation before macerating

In order to increase contact between the plant material being extracted and the liquid (solvent), the plant needs to be cut into small pieces.

The pieces should not be too big, otherwise the solvent will not be able to penetrate the innermost cells. They also should not be reduced to powder; that would result in losing the volatile active ingredients (essential oils) contained inside the plant, and also losing the difficult separation by filtration of the plant material from the liquid used once maceration is completed.

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Procedure of maceration

1. Cut the plant tissue (stem or root) into small pieces of not more than 1 mm thick. 2. Put the tissue into freshly prepared macerating fluid. The fluid is prepared by mixing equal volumes of 10% chromic acid with 10% nitric acid. 3. Leave the tissue in the macerating fluid for about three days. (The exact number of days required depends on the type of plant material being used.) 4. Tease the tissue with dissecting needles. If the cells do not separate readily, leave the tissue in the macerating fluid for another day. If the cells separate easily, they are ready for the next step. 5. Filter off the macerating fluid and wash away the acids from the macerated material with water. 6. The macerated plant material may be stored in 70% alcohol. 7. The macerated material is ready for temporary mounting.