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Annals of Experimental Biology, 2021, 9 (3): 9-9
(http://www.scholarsresearchlibrary.com)

ISSN:2348-1935

The Production of Physiologically Active Compounds

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EDITORIAL

The term secondary metabolite means a substance produced by plants, microorganisms, or animals that are not needed for their growth. People have long used the products of the second metabolism plant to satisfy a wide range of needs. The basic use of these compounds has been that of medical personnel first in the form of energy injections and then since the 19th century in a logical way after the advent of molecular separation. In addition to extensive research of secondary metabolites over such a long period current estimates indicate that only 6% of high-yielding plants (between 300,000 species and 500,000 species) have been systematically studied for their pharmacological abilities and only 15% have been tested for phytochemicals generally. Therefore, there is a very high probability of further studies in this field. The identification and classification of a bioactive active ingredient quickly create the need for a way for its continuous production. The second metabolite is usually characterized by its various chemical and complex complexes often comprising many chiral centres and labile bonds, and this makes its chemical synthesis challenging. Therefore, healthy molecules are often extracted from their natural sources. However, since most of the source plants are wildlife rather than domesticated species harvesting in their natural habitats puts them at greater risk of exploitation as well as creating barriers to compound production. Other problems include the slow growth of many resource plants, the low concentration of active chemicals of interest and more often the need for biotic or abiotic stress to create biosynthesis. All of these factors make the extraction of secondary metabolites from different sources less efficient and emphasize the need for novel methods for the production of secondary metabolites. The *in vitro* culture of plant and tissue cells under controlled conditions provides a well-established technology platform for the production of natural plant products. *In vitro* propagation (micro-propagation) of plants or *in vitro* culture of plant organs (usual root) or callus can usually provide plant material that can produce secondary metabolites. Micro-propagation therefore has become a highly commercial enterprise and offers significant advantages over conventional field distribution practices by facilitating the production of large quantities of homogeneous plants throughout the year the production of disease-free propagules and the improvement of repetitive levels. Currently, a large number of protocols are available to enhance micro-propagation of medicinal plants and other important commercial plants, such as *Agave salmiana*. However, the high cost of micro-propagation compared to traditional counterparts like collection from the wild and uncertainty of market demand have limited the use of micro-propagation at the commercial level. Significantly, however, recent micro-propagation efforts are aimed at conserving overgrown medicinal plants, with special emphasis on plants used in traditional medicine in China and India. The recent development of plant cell culture brought about by a system established by the process of cell and animal cells has led to an active growth from the experimental phase to the industrial scale. The plant culture now represents an effective way to produce several important natural products. A wide range of commercially important products includes pigments like anthocyanins and betacyanins, anti-inflammatory agents like berberine and rosmarinic acid, and anti-cancer molecules like paclitaxel and podophyllotoxin.