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PHYTOACTIVITY OF SECONDARY COMPOUNDS IN AROMATIC PLANTS BY VOLATILE AND WATER-SOLUBLE WAYS OF RELEASE

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INTRODUCTION

Secondary metabolites of plants have been credited with a number of ecological roles, including metabolic wastes (Whittaker & Feeny, 1971), self-regulation (Robinson, 1974), and defence against phytophagous organisms (Ehrlich & Raven, 1964) or against co-occurring plants (Rice, 1984).

Against the primary "waste" nature it was argued that the cost of excretion would be too high whenever waste products are more complex than starting materials (Swain, 1977) and that the quantities and variability of by-products involved imply a too high amount of disorganization in the evolution of plant metabolism (Whittaker, 1970; Whittaker & Feeny, 1971).

In spite of the uncertainty about the type of defensive or protective function of the majority of them, it is reasonable to admit that a) most if not all secondary products we find today are those that proved advantageous to the plant producing them (Bell, 1980), b) evolutionary pressure operated also in the ways of release of secondary compounds, the result being a preferential production in forms that can be easily released by volatilization in dry climates, by leaching in wet climates (Whittaker, 1970).

However, defence against predators is not necessarily more relevant to plants than defence against competing plants (Dethier, 1970). Therefore, allelopathic activity of secondary compounds should be generalized and the volatile way of release of allelopathins should prevail in dry climates. In addition, if production and release of volatiles increases in response to dryness then highly aromatic species thriving in dry environments are especially suited to investigate these hypotheses.

MATERIALS AND METHODS

Four highly aromatic species (*Cistus salvifolius* L., *Myrtus communis* L., *Foeniculum vulgare* Miller, and *Rosmarinus officinalis* L.) were harvested in early summer in Serra da Arrábida (38º N, 9º W). Commercial stocks of seeds of cucumber (*Cucumis sativus* L.) were used.

Leaves (32.5 g) were soaked in 130 ml of distilled water for 24 h or 70 h at 20 ºC, with continuous

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