Do you know that some legume species have great isoflavone contents?

Different plant species are often indicated as natural sources of healthy components, such as the well-known phenolic compounds. However, considering the great variety of plant species, as also the diversity of their compounds, the true potential of several species remains unknown. A specific type of phenolic compounds, generally known as isoflavones, are produced in plants in response to pathogen attack, contributing to the global strategies of plant defense mechanisms, and to modulate the interaction with nitrogen-fixing bacteria in rhizobium-legume symbiosis. Soybean is commonly highlighted as the species with highest isoflavones contents, mainly for its levels in daidzein, glycitein and genistein. However, other well-known plants (despite rarely associated with isoflavones production), such as alfalfa, clover, pea, peanut or beans contain interesting levels of isoflavones. Besides alfalfa (Medicago sativa), which is the main Medicago species grown throughout the world, not much attention has been given to other Medicago species. In a recent work, different species from the genus Medicago were studied regarding their isoflavones content. To evaluate the influence of the growth stage, plants were harvested in three different periods: vegetative elongation, late bud and late flowering.

Fig. 1. Medicago orbicularis in late bud stage.

Besides the significant differences among each growth stage, species from Medicago genus revealed high levels of formononetin, genistein and irilone. These isoflavones were previously associated with valuable effects on human health. The detected quantities were inclusively higher than those present in acknowledged plant sources like soy or red clover. In addition, to their potential inclusion in food supplements destined to human nutrition, these compounds might be advantageously added to fodder, providing a controlled animal development. Despite their wide range of beneficial activities in the human body, the overconsumption of isoflavones has been suggested as potentially causing adverse effects. Hence, the intake of isoflavones has been limited

by International Organisms (such as Food Safety Commission of Japanese Government or The Nutrient Data Laboratory of the Agricultural Research Service of the United States Department of Agriculture) to very restrict values.

Accordingly, the main usefulness of this study is to know the exact quantities and type of isoflavones present in the analyzed species, besides characterizing how these profiles evaluate throughout the plant ripening. Combining the plant species with the harvesting time is surely a more natural approach of obtaining desirable isoflavone concentrations, when compared to the metabolic engineering techniques. Hence, the results obtained in this work might be considered as a step forward in the process of using Medicago spp. as isoflavone sources, particularly because the effects of these compounds are highly dependent on their type and concentration.

Besides their application as foodstuff, leaves of Medicago spp. (especially M. truncatula, M. orbicularis and M. rigidula) can be useful to the nutraceutical and pharmacological industries as a potential source of isoflavones, particularly genistein and formononetin. These novel applications might boon the increase of agronomical exploitations, either in number, as well as in surface, boosting the local development of economically constrained areas.

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