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Phenolic Content and Molecular Markers of Different Yacon [*Smallanthus sonchifolius* (Poepp. et Endl.) H. Robinson] Landraces

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Abstract

Yacon [*Smallanthus sonchifolius* (Poepp. et Endl.) H. Robinson, *Asteraceae*] is a perennial herb originally cultivated in South America and now introduced and cultivated in several other countries. The productivity and other valuable agronomic traits of yacon strongly suggest that it is a species with a great potential and recently, the attention on it is grown up, also due to its nutritional characteristics and its phytoterapeutic use. It is cultivated for its tuberous roots that have exceptional qualities for low-calorie diets thanks to its abundant content of fructooligosaccharide and for the absence of starch. Otherwise leaves extract is very rich in phenolic components with strong antioxidant activities and, recently, it was demonstrated that it also possess hypoglycaemic properties. The aim of this work is to investigate total phenolic content and genetic distance among five different yacon landraces collected in different countries. Total phenolic content was measured in the five clones and it resulted to be undoubtedly different among landraces analysed from 34,94 mg g⁻¹ to 68,49 mg g⁻¹. Results obtained were compared with those shown applying RAPD (Random Amplified Polymorphic DNA) and AFLP (Amplified Fragment Length Polymorphism) markers for the analysis of genetic diversity. Using 61 RAPD primers, 85 information bands were identified, corresponding to 28.7% of polymorphism. In comparison, only six selected AFLP primer pairs produced 84 information bands, with a similar percentage of polymorphism (23.4%). Polymorphic markers were analysed separately. Cluster obtained for each molecular marker showed two main groups that include the same genotypes but with different clustering. It is interesting to underline that the two branches divide landraces in two groups that include landraces with the higher and the lower phenolic content, respectively. Moreover, the two groups respect some phenotypic characters but they do not reflect faithfully their geographical origin. Data obtained suggest that the two molecular markers applied are useful to investigate intraspecific genetic variability in *Smallanthus sonchifolius*. The dendrograms based on these data sets graphically depicted the ability of both methods to differentiate all the cultivars studied and as results reflect their phenolic content.

Keywords: AFLP, genetic diversity, phenolic content, RAPD, yacon

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