Phytochemical and Genotypes Diversity of *Arrabidaea chica* (Humb.&Bonpl.) Verl.(Bignoniaceae).

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Abstract

The combination of ESI-MS phytochemical profile and genetic analysis showed a better phenotype selection of chemotypes for active principles production.

Introduction

Arrabidaea chica Verlot (Bignoniaceae) is extensively used in folk medicine. Indians of the South America prepared a red pigment from the leaves for tattooing. The color was attributed to the presence of carajurin, a 3-desoxyanthocyanidin found in the plant leaves. Numerous studies have demonstrated that anthocyanins possess antioxidant activity, antiinflammatory effects, and antimutagenic action against various mutagens. For standardization of plant material, the screening of several anthocyanidins and their *O*-glycosides was investigated using electrospray ionization mass spectrometry with tandem mass spectrometry by direct infusion using different crude extracts. Microsatellite markers were also found, optimized, and characterized and they were found to provide molecular tools to investigate the genetic structure and diversity of natural populations and germplasm collections of this species.

Results and Discussion

The ESI(+)-MS fingerprints of the germplasm collection samples (different geographic origin: (1) Belém/PA , (2) Campo Grande/MS, (3) Tijucas/PR, (4) Manaus/AM, (5) Curitiba/PR, (6) Paulinia/SP, (7) Campinas/SP, (8) Belém/PA, (9) Manaus/AM, (10) Nazaré/SP, (13) Manaus/AM, (14) Manaus/AM and (15) Uberlândia/MG) showed clear differences between the crude extracts of *A. chica*. The phytochemical profile is mainly characterized by the ions (M+) of *m/z* 285 (carajurone), 299 (carajurin) and 301 (6, 7, 3', 4'-tetrahidroxy-5-metoxy-flavinium), which have been identified as the cationic 3-deoxianthocyanidins, as well as the ions of others *O*-methyl deoxyanthocyanidins and 3-*O*-methyl anthocyanidins.

The identification of anthocyanin ions were obtained by ESI(+)-MS/MS experiments. The cationic anthocyanidins showed a very common and favored fragmentation route in which the first process is the loss of methyl radical ($[M - CH_3]^{+\cdot}$) followed by the neutral loss of CO ($[M - CH_3 - CO]^{+\cdot}$). This type of fragmentation is observed in both *O*-methyl deoxyanthocyanidins and 3-*O*-methyl anthocyanidins.

The phytochemical profile of samples 6 (Paulinia/SP) and 9 (Belém/AM) had a major ion for carajurin (*m/z* 299) with high abundance detected as well as other important characteristic desoxyanthocyanidins with *m/z* 285 and 301, respectively. The other samples displayed high abundant ions with *m/z* 287 (cianidin) and 301 or glycosylated forms. For the molecular biology, eight highly polymorphic microsatellite markers revealed a multibanded pattern, suggesting that the species is polyploid. The total number of bands per locus ranged from 9 to 17, revealing high levels of polymorphism. The high level of polymorphism detected with these markers indicates their utility in devising conservation strategies and rational exploitation of *A. chica*.

Conclusion

The statistical analysis, both in relation of phytochemical profile even as microsatellites markers, grouped the same samples, 9 and 6 varieties, in a distinctive group.

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