Variation of secondary metabolites in the aerial biomass of cryptocarya alba

Giordano A.

Fuentes-Barros G.

Castro-Saavedra S.

González-Cooper A.

Suárez-Rozas C.

Salas-Norambuena J.

Acevedo-Fuentes W.

Leyton F.

Tirapegui C.

Echeverría J.

Claros S.

Cassels B.K.

Cryptocarya alba is an important tree species in the Chilean sclerophyllous forest. Its leaves and bark are used in traditional medicine to treat liver diseases and rheumatism. Analyses of the essential oil (EO) show serious discrepancies, and information on other constituents is limited. The aerial biomass of individual trees from 3 wild populations, some old trees, and farmed saplings were analyzed (n = 132). The EO profiles were studied by gas chromatography/mass spectrometry (GC/MS). The alkaloidal and polyphenol compositions were determined by ultra-high-performance liquid chromatography (UHPLC)/ MS-MS. The total polyphenol content, the total flavonoid content, and the antioxidant capacity (diphenylpicrylhydrazyl, azi-nobisethylbenzothiazolinesulfonic acid, and ferric reducing antioxidant power: DPPH, ABTS, and FRAP respectively) were determined by standard methods. Significant differences were found at the individual and population levels in the contents of polyphenols, total flavonoids, antioxidant capacity, and specific alkaloids for leaves, bark, and wood. Farmed saplings grown under less light showed higher concentrations of higenamine, N-methylcoclaurine, N-methyllaurotetanine, and isocorydine, while those receiving

more light were richer in laurolitsine, boldine, coclaurine, catechin, quercetin, epicatechin, quercitrin, and procyanidins. Important variations were found according to the season, age of the tree and of the leaves. The EO composition also varied considerably. These results support the idea that the natural variability of medicinal species is an important subject for study.

Alkaloids

Cryptocarya alba

GC-MS

Polyphenols

UHPLC-MS/MS

alkaloid derivative

antiinfective agent

antiinflammatory agent

antioxidant

boldine

camphene

chlorogenic acid

cineole

coclaurine

Cryptocarya alba extract

epicatechin

essential oil

higenamine

isocorydine

laurolitsine

limonene

myrcene

n methylcoclaurine

n methyllaurotetanine

pinene

plant extract

plant medicinal product

polyphenol derivative

procyanidin

quercetin

quercitrin

unclassified drug

ABTS radical scavenging assay

aerial plant part

aged tree

antiinflammatory activity

antioxidant activity

Article

bark

biomass

Chilean

DPPH radical scavenging assay

ferric reducing antioxidant power assay

forest

liquid chromatography-mass spectrometry

liver disease

mass fragmentography

medicinal plant

medicinal species

metabolite

plant leaf

rheumatic disease

sapling

season

standard

ultra performance liquid chromatography

wood