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Camptothecin Accumulation and Variations in Camptotheca

Abstract

Camptotheca (Nyssaceae) is a major source of anticancer camptothecin (CPT). It is imperative to understand CPT accumulation and variations in Camptotheca in order to develop CPT production strategies for endangered germplasm. Our study results showed that CPT is primarily accumulated in glandular trichomes of leaves and stems, and CPT content varies among species and varieties but even more significantly within the plant (with different tissues, tissue ages, and seasons). Because of higher CPT yield and desirable biological and ecological features, 'Hicksii' and 'Katie' should be considered the major management germplasm as CPT sources in the future. Young leaves and mature fruits have higher CPT contents than other tissues in the plants. Young photosynthetic leaves and stems contain higher CPT contents than old ones, but 'sink' tissues such as wood, roots, and fruits show different patterns. CPT content also shows a great seasonal change, but is less influenced by tree age. Intact clipping of young leaves and stems should be managed for harvest for CPT production. Preservation and treatment methods influence the CPT extraction. CPT is better preserved in fresh or freeze-dried material than in air or oven-dried material. CPT can be more efficiently extracted after homogenizer treatment of plant materials because more trichome walls can be broken to allow solvent extraction.