

柠檬醛型香樟叶片发育过程中精油及油细胞动态特征

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摘要:【目的】明确柠檬醛型香樟叶片发育过程中叶精油、柠檬醛、油细胞的形成和积累动态特征。

【方法】采用超临界二氧化碳萃取法提取不同发育阶段叶片的精油,气相色谱-质谱联用法检测叶精油化学成分,采用组织透明法观察油细胞,通过叶面积仪测定叶形指标。【结果】在柠檬醛型香樟叶片发育过程中,叶长、叶宽、叶面积随着叶片发育逐渐增大,其中叶片形状在第1~4周变化迅速;叶精油得率总体呈现增加趋势,各发育阶段精油得率差异显著($P < 0.05$),12周叶片精油得率最高,达到 $2.82 \pm 0.20\%$;叶精油的化学成分主要属于醛类、醇类、烃类等,各发育阶段叶精油化学成分的个数较为稳定,但相对含量的变化较大,叶片发育初期以醇类物质的相对含量最高,随着叶片发育,醛类物质逐渐积累,叶片发育3~6周是柠檬醛快速积累期,6周时柠檬醛相对含量最高达74.33%,其次为12周达72.3%;叶片发育过程中,油细胞逐渐变大,精油得率与油细胞所处的发育阶段紧密相关,精油得率较低的1~2周以处于未形成精油期和精油形成期的油细胞为主,精油得率较高的12~24周以饱和期油细胞为主。【结论】本柠檬醛型香樟叶片发育、油细胞、精油数量(精油得率)和质量(精油组成成分)的存在密切关系。

关键词: 柠檬醛型香樟; 叶片发育; 精油; 油细胞; GC-MS

Essential oil and oil cells in leaves of the citral chemotype of *Cinnamomum camphora* at different growth stages

Abstract: 【Objective】 The aim of this study was to clarify the dynamic characteristics of essential oil, citral and oil cells during leaf development of the citral chemotype of *Cinnamomum camphora*, 【Method】 The essential oils of leaves at different development stages were extracted by supercritical carbon dioxide extraction, the chemical components of leaf oils were detected by gas chromatography-mass spectrometry, the oil cells were observed by the tissue transparency method, and the leaf shapes were determined by a leaf area meter. 【Result】 The results showed that the leaf length, width and area increased with leaf development, and the shape of the leaf changed rapidly across the 1st to 4th weeks. The oil yield of the leaf showed an increasing trend in general, and there was a significant difference in the oil yield across development stages ($P < 0.05$); the oil yield was the highest at the 12th week, reaching $2.82\% \pm 0.20\%$. The chemical components of leaf oil mainly included aldehydes, alcohols, hydrocarbons, etc.; the number of chemical components in the leaf oil was relatively stable across developmental stages, but the relative content changed greatly. The relative content of alcohols was higher than that of others in the early stage of leaf development; as the leaves developed, aldehydes gradually accumulated, and the period containing the 3rd to 6th weeks of leaf development was the rapid accumulation period for citral. T

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he highest relative content of citral was 74.33% at the 6th week, followed by 72.3% at the 12th week. During the development of leaves, the oil cells gradually became larger, and the oil yield was closely related to the developmental stage of oil cells. The oil cells in the non-essential oil forming stage and essential oil forming stage were the most common in the 1st-2nd weeks, with lower oil yield, and oil cells in the saturated stage were the most common in the 12th-24th weeks, with higher oil yield. 【Conclusion】 This study clarified the close relationship between leaf development, oil cells, and the quantity (oil yield) and quality (chemical components) of essential oil.

Keywords: *Cinnamomum camphora* (Linn.) Presl.; Citral chemotype; Leaf development; Oil yield; Oil cell