

# Metabolic Profiling in the Specific cells of Capitulate-Stalked Trichomes of Medicinal Cannabis

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## Introduction

*Cannabis sativa* belongs to the family of Cannabaceae and is originally spread from Eastern or Central Asia. It has long been used as a medicine in Asia, mainly in India, before the Christian era. Because of their biological activities, cannabinoids are the most studied and interesting compound class in this plant.

Recently some researchers tried to obtain more knowledge of the cellular localization of the cannabinoid biosynthesis with focus on trichomes. Trichomes are small protrusions of epidermal on the surfaces of leaves and other organs of plants. In *C. sativa*, trichomes are the main site of compounds storage and cannabinoids production, and classified into three types, namely bulbous, capitulate-sessile and capitulate-stalked. The presence of genes related to cannabinoids biosynthesis has been identified in the head of capitulate-stalked, however the function of the stem of capitulate-stalked is not known yet.

With regard to the unclear cannabinoids biosynthesis in the trichomes, here we reported a metabolic profiling analysis on the specific cells of trichomes at flowering period, particularly on the head and stem of capitulate-stalked, and intact capitulate-stalked. Dissections of the specific cells of trichomes were conducted using laser microdissection microscopy (LMD) and the metabolites were analyzed with liquid chromatography-mass spectrometry (LCMS).

## Experiments

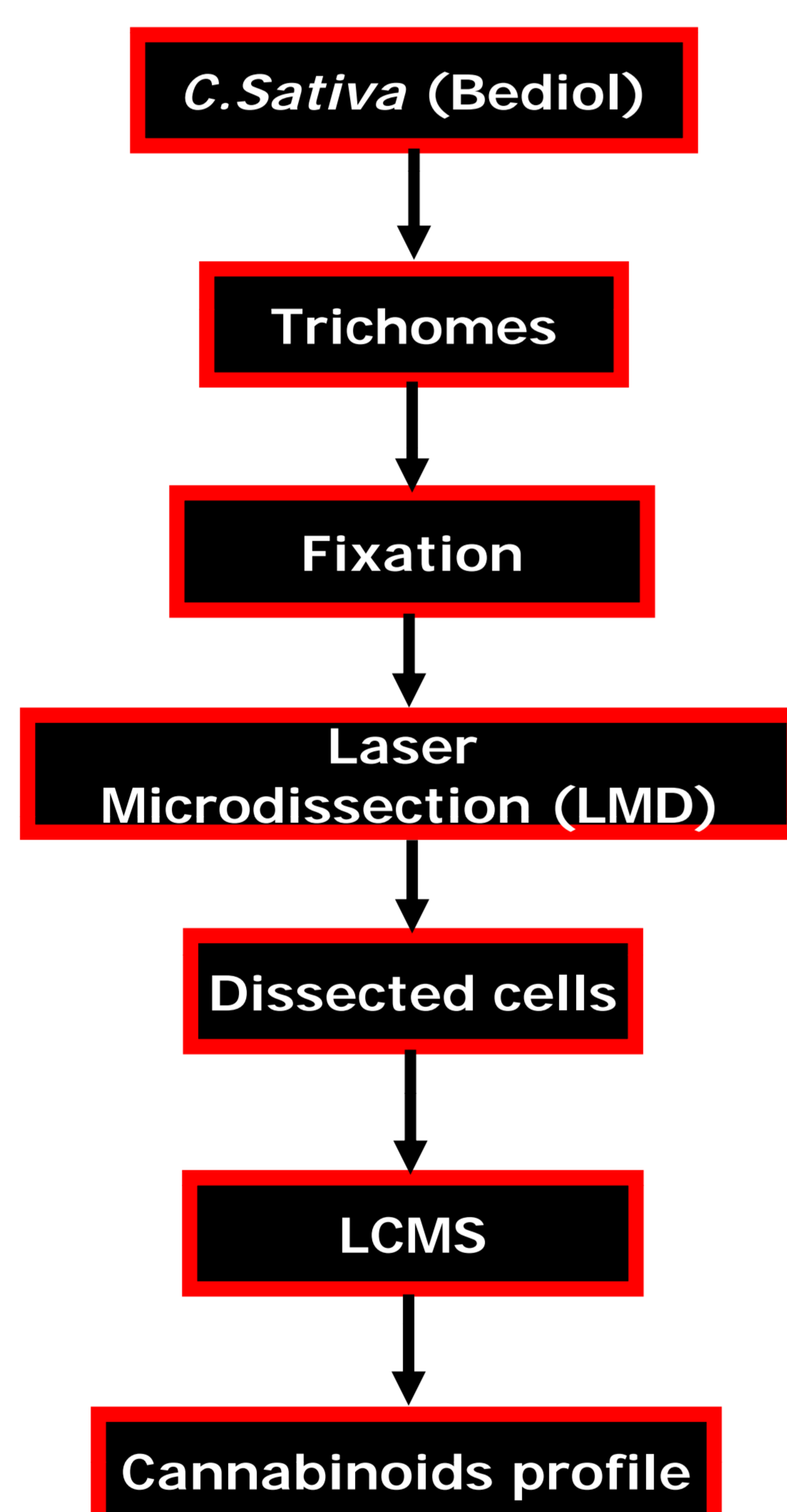


Figure 1. Workflow of experiments

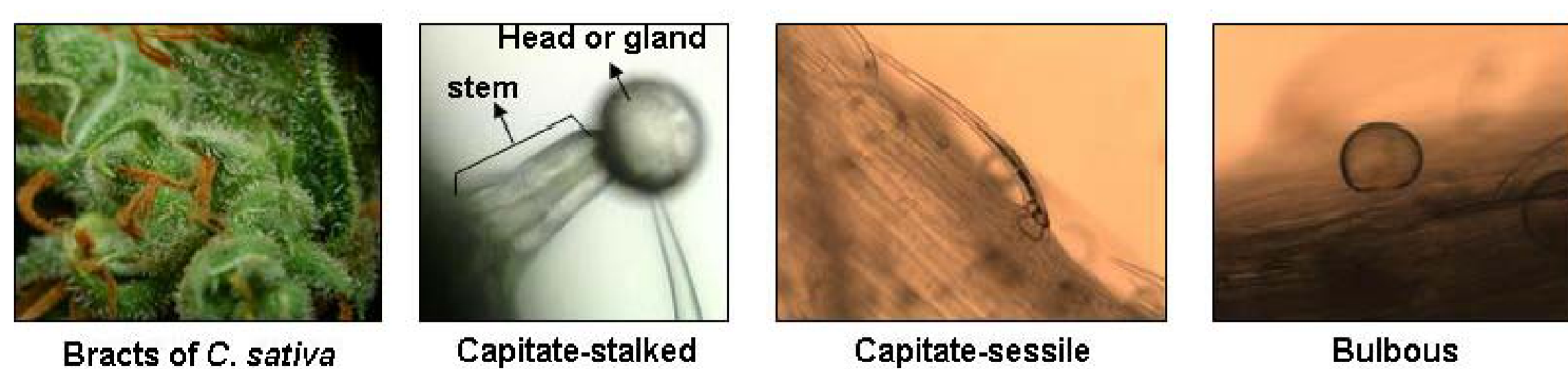


Figure 2. Trichomes

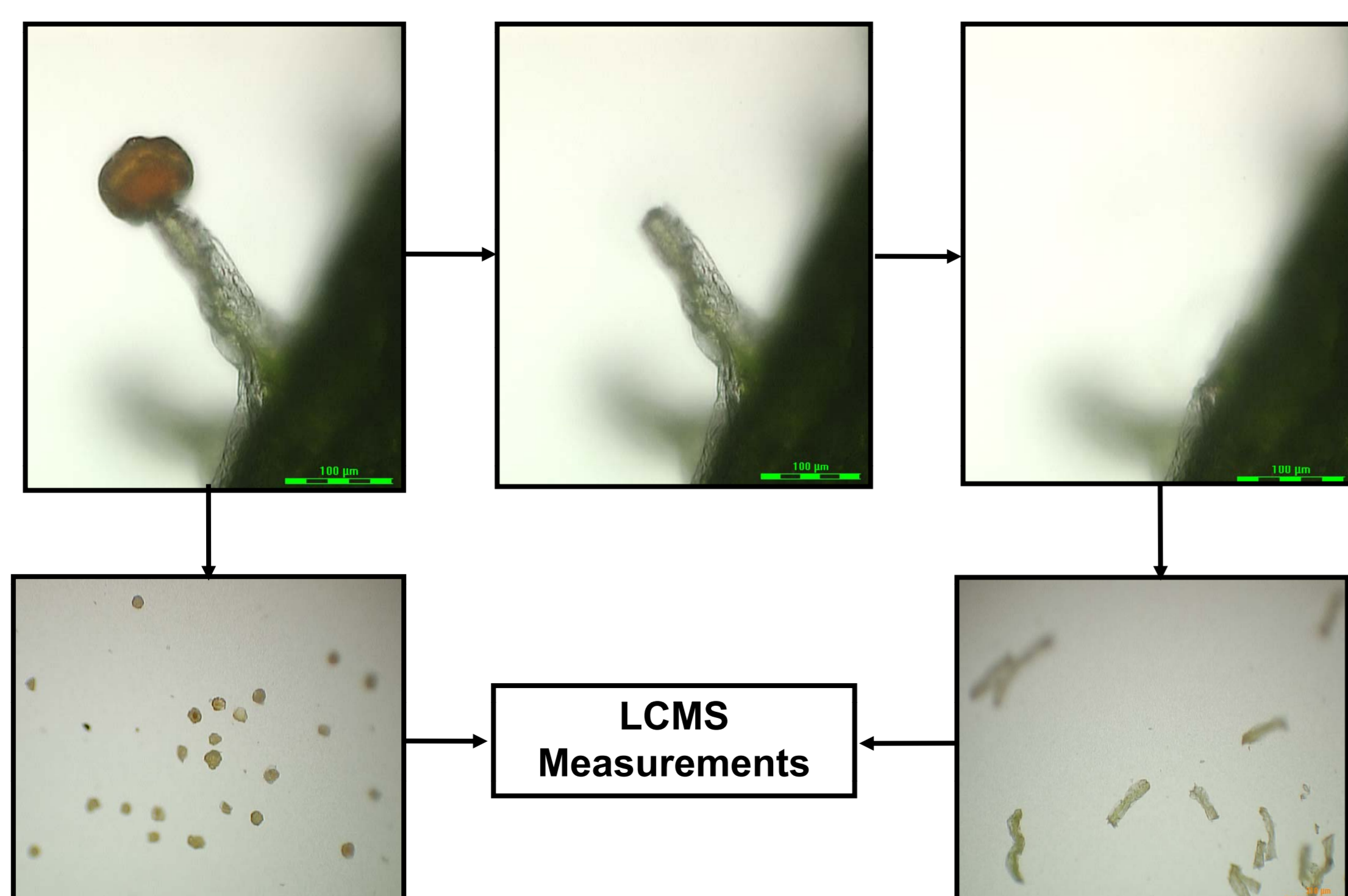


Figure 3. Dissection of specific cells using Laser Microdissection (LMD) Microscopy

## Results

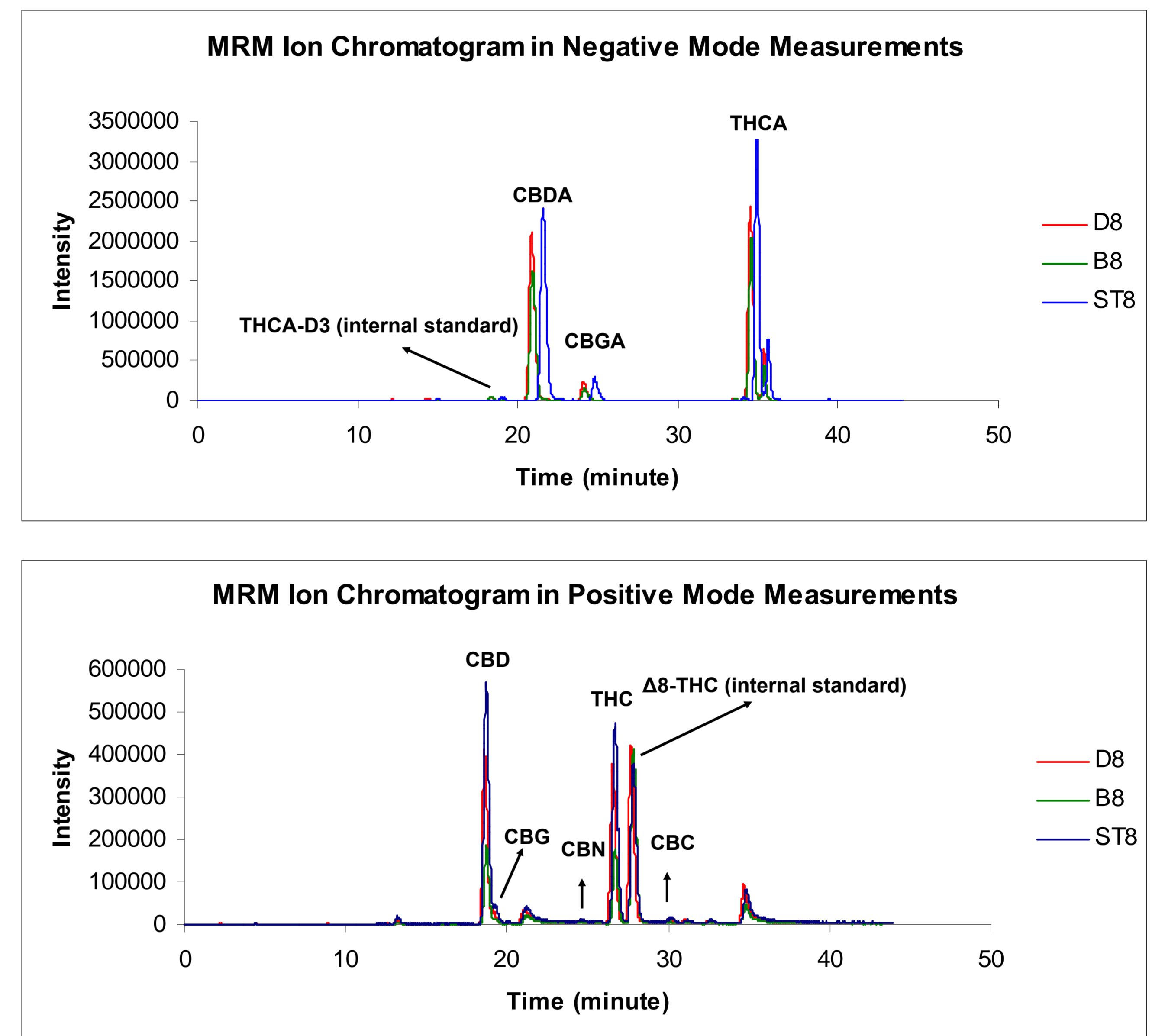


Figure 4. MRM ion pair chromatograms (LCMS) at week 8. ST: dissected intact capitulate-stalked; D: dissected head of capitulate-stalked; B: dissected stem of capitulate-stalked.

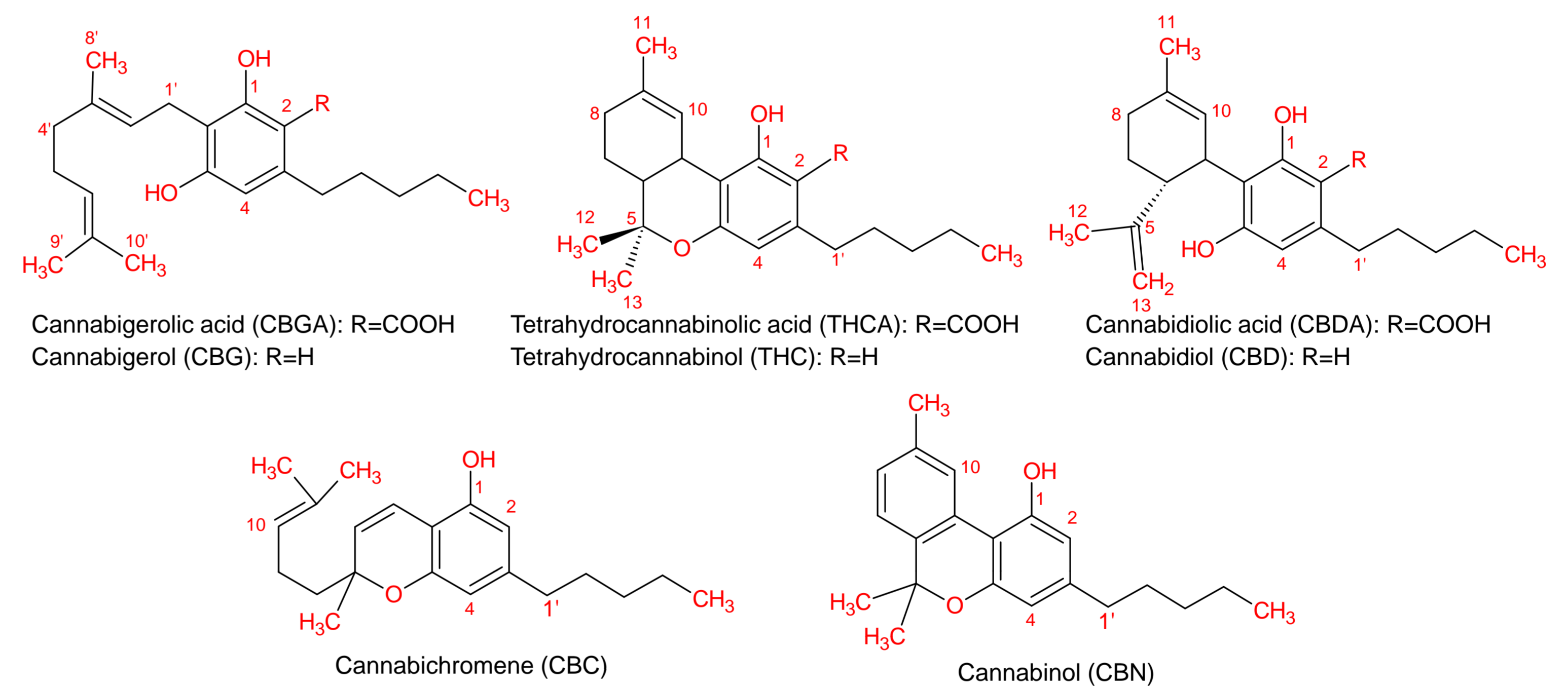


Figure 5. Structures of identified cannabinoids

## Conclusions

- ❖ LMD combined with LCMS have been used successfully for analyzing cannabinoids in the specific cells of capitulate-stalked trichomes.
- ❖ Cannabinoids profiles on the head of capitulate-stalked, stem of capitulate-stalked, and intact capitulate-stalked qualitatively did not differ significantly over the flowering periode. THCA, CBDA, CBGA, THC, CBD, CBG, were identified in all samples, while CBC and CBN also could be detected in the intact capitulate-stalked and head of capitulate-stalked at week 8.
- ❖ The discovery of cannabinoids in the stem of capitulate-stalked is new and confirms the appearance of other spots for cannabinoid production beside the head of capitulate-stalked. Moreover this result suggests that the stem of capitulate-stalked plays an important rule in cannabinoid biosynthesis.

## References

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