

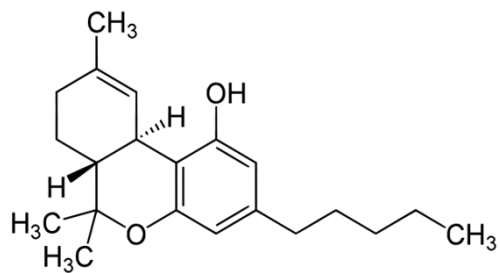
# Mass spectrometric analysis of cannabinoids in hemp in relation to health risk assessment

Dušan Žigon

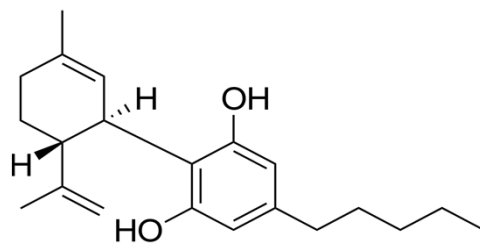
*Department for Environmental Sciences, Centre for mass spectrometry, Jozef Stefan Institute, Jamova 39, 1000 Ljubljana, Slovenia*



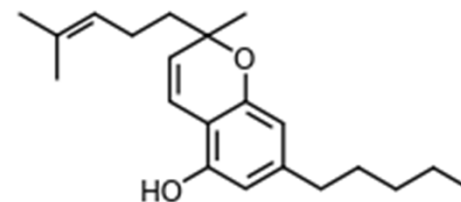
## Structure of some cannabinoids:



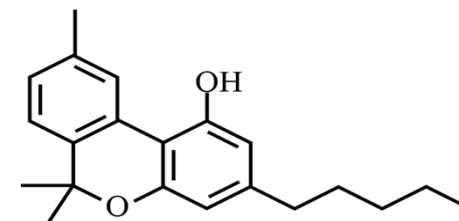
tetrahydrocannabinol (THC),



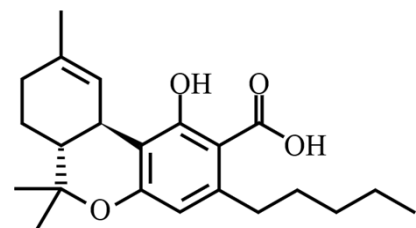
cannabidiol (CBD)



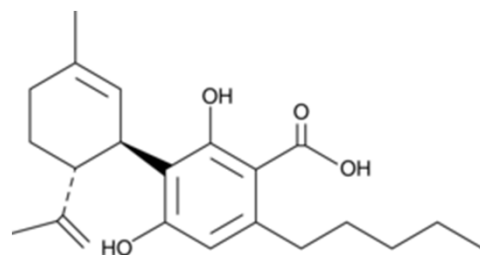
canabichromene (CBC)



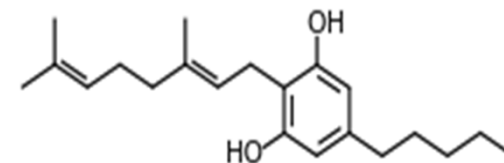
cannabinol (CBN),



acidic form THCA



acidic form CBDA



canabigerol (CBG)

Ultra performance liquid chromatography (UPLC) - quadrupole orthogonal acceleration time-of-flight (Q-ToF) mass spectrometer.



Figure 1. Total ion chromatogram of hemp oil.

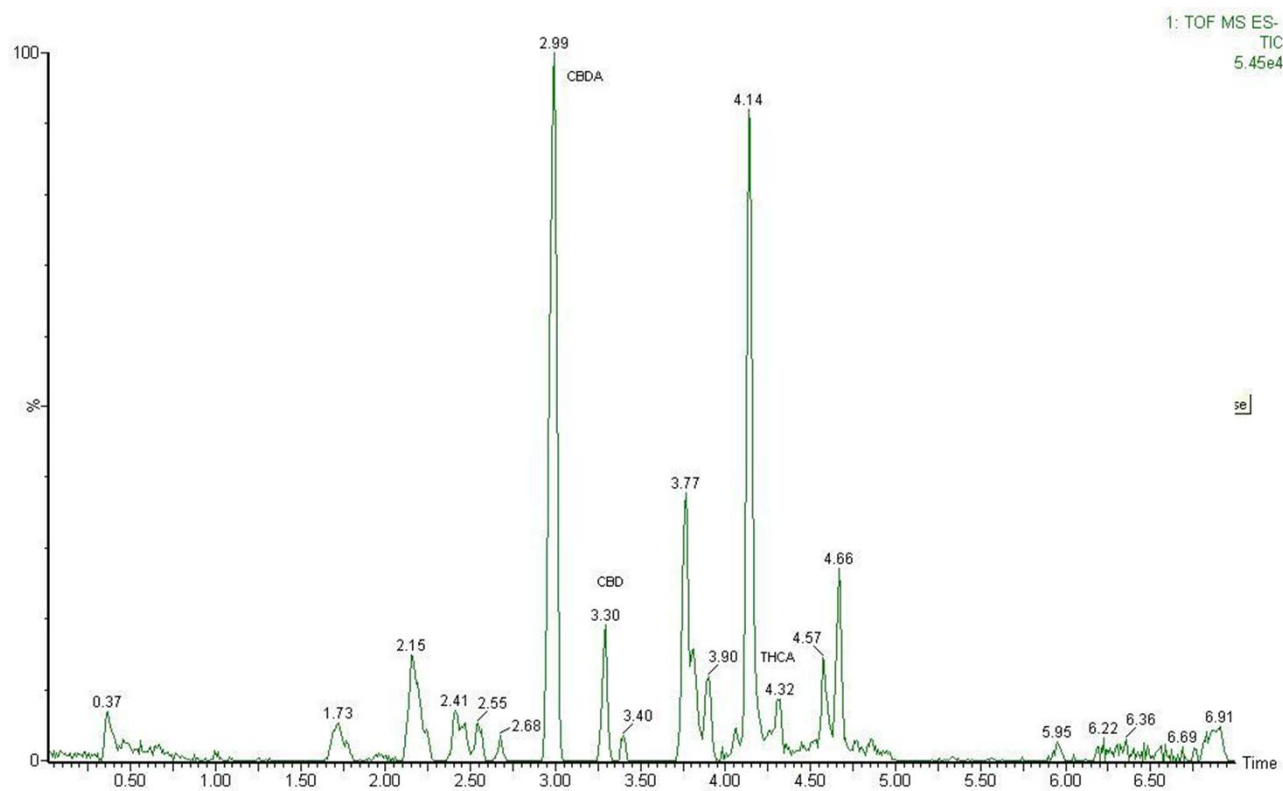


Figure 2. Selected ion chromatogram of m/z 313 in hemp oil sample for calculation of THC/CBD quantitative ratio.

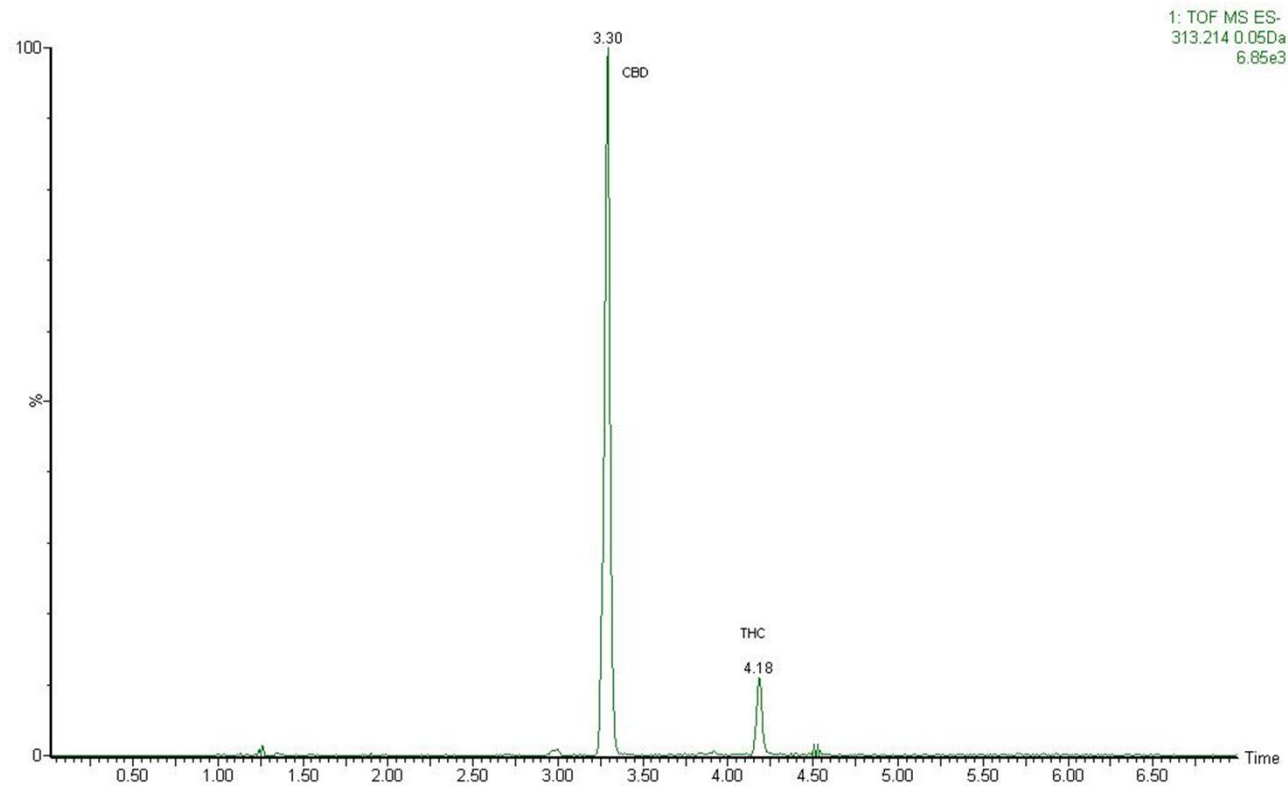


Figure 3. High resolution mass spectrometry report of elemental composition of THC deprotonated molecule at  $m/z = 313$ .

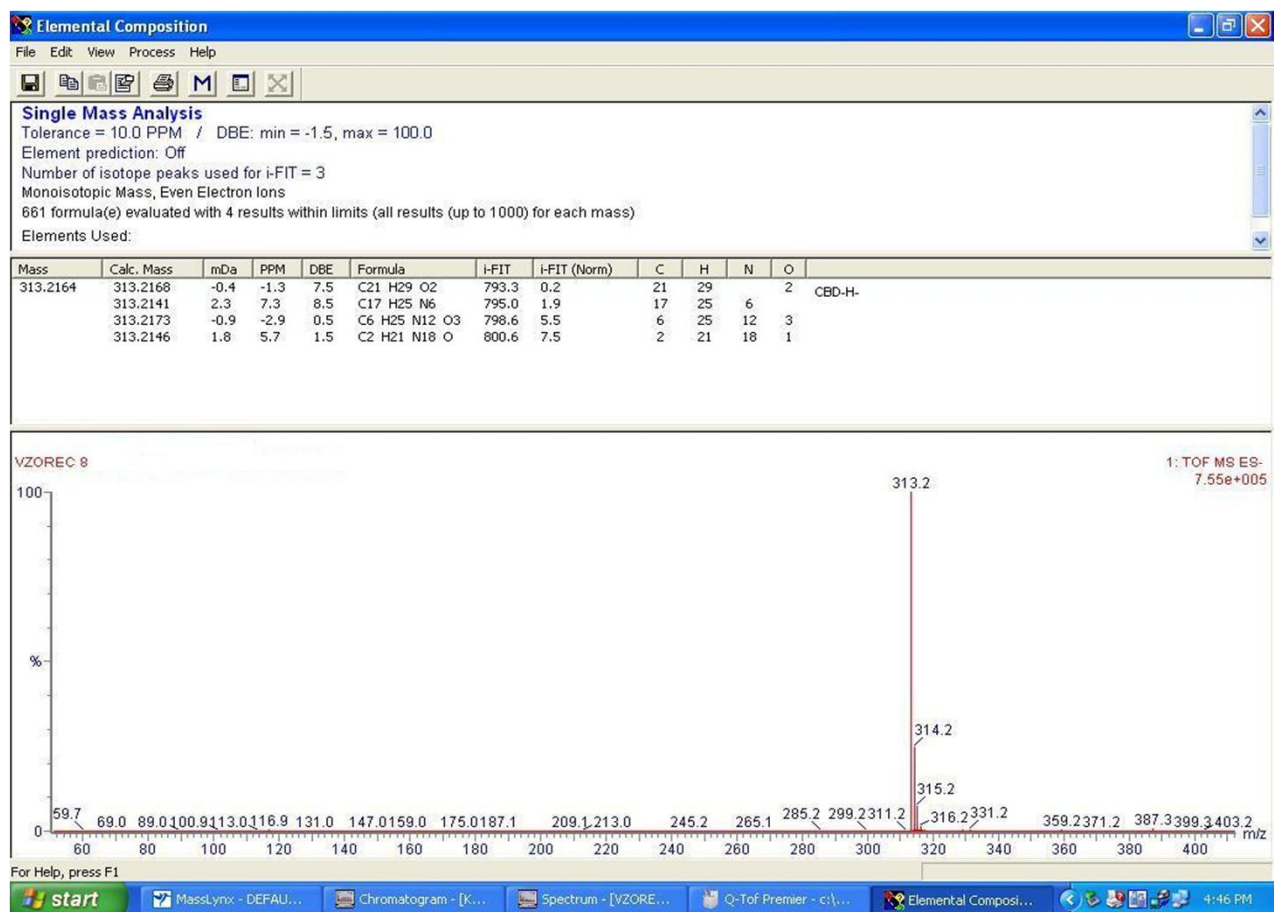
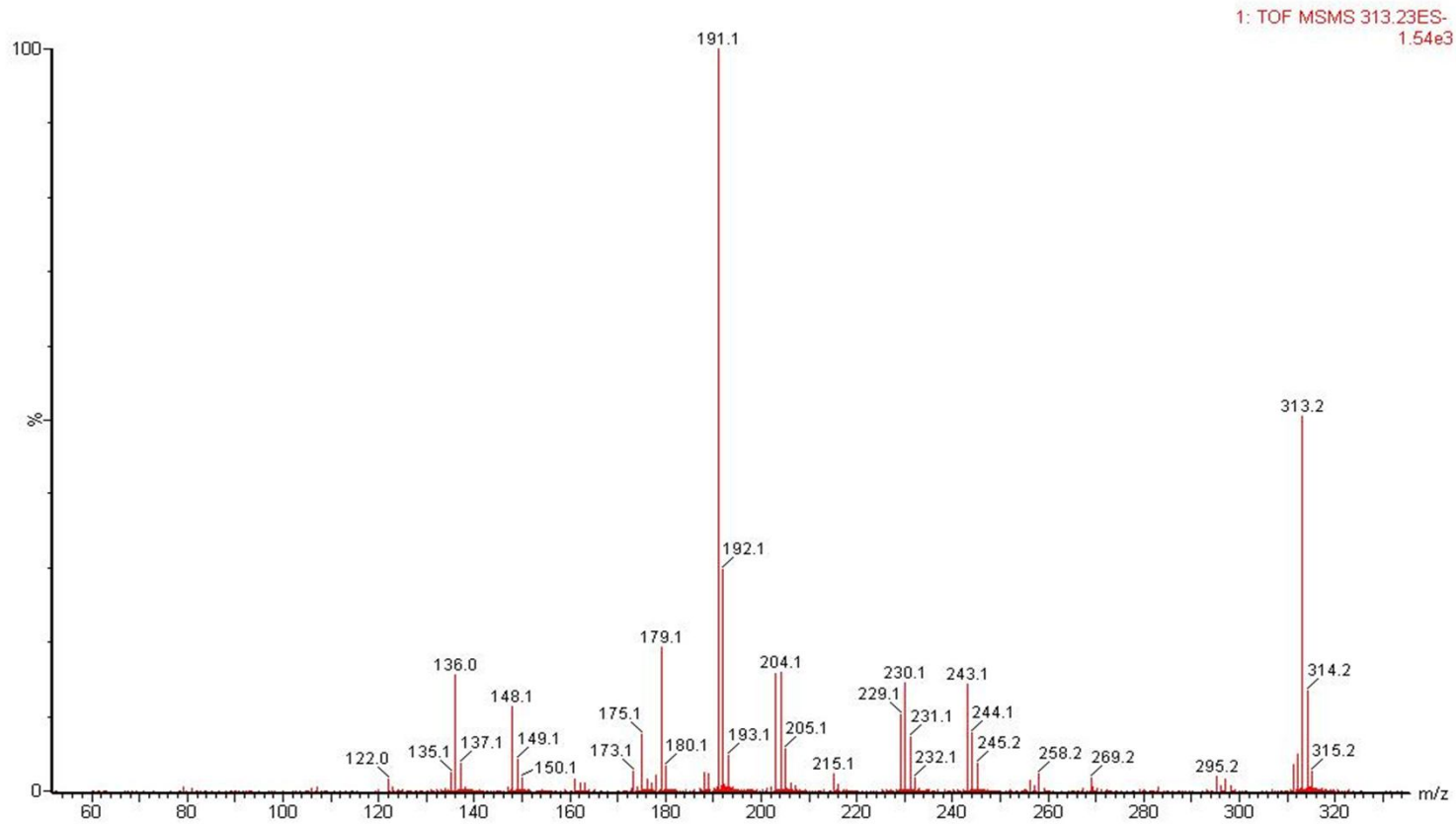


Figure 4. MS-MS spectrum of deprotonated molecular ion of THC at  $m/z = 313$ .



## Conclusions

- LC-MS method was used in our application for rapid determination of THC to CBD ratio in hemp.
- Identification of other cannabinoids and ingredients in cannabis oil to characterize and grade oil material for medical treatment.
- The information of THC/CBD ratio in hemp food supplement is of primary importance to the medical personnel prescribing cannabis for medicinal and therapeutic purposes (1).
- Ultra performance liquid chromatography (UPLC) - hybrid quadrupole orthogonal acceleration time-of-flight (Q-ToF) mass spectrometer is successfully applied for identification and characterization of products of hemp.

*(1) Department of Child, Adolescent & Developmental Neurology, University Children's Hospital  
Bohoriceva 20, 1525 Ljubljana, Slovenia*