

Phenolic Compounds Profiling in Zero-Tannin and Tannin-Containing Lentil Seeds

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Introduction

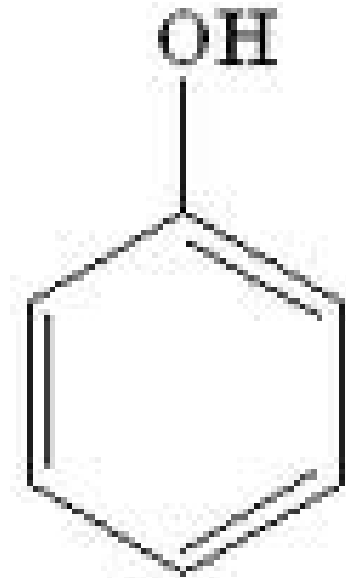
Phenolic compounds

a) For plants;

- Defending against stresses
- Colors
- Pollination

b) For human beings;

- Anti-nutritional
- Health benefits



Introduction

Lentil (*Lens culinaris* Medik.)

- Canada; Saskatchewan
- Seed coat colors

Introduction



Tannin-containing
Tgc Ggc Tan



Zero-tannin
Tgc Ggc tan

Objective

To compare the phenolic compound profile, obtained by liquid chromatography-mass spectrometry (LC-MS), of the zero-tannin and tannin-containing genotypes of lentil

Materials and Methods

RILs from LR-30 population (CDC Robin X 2670b)

Chemical standards: + 40 phenolics and internal standards

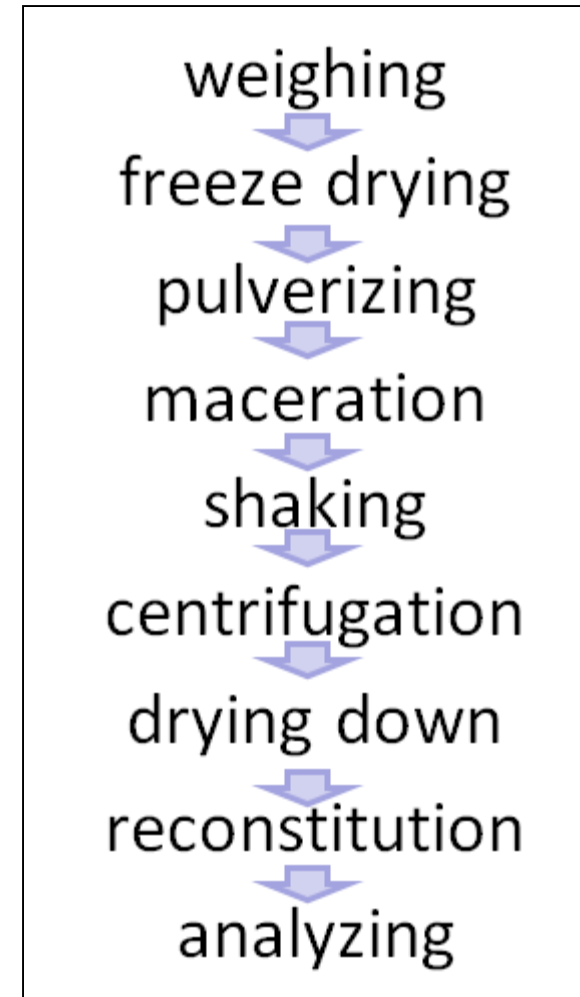
LC-MS coupled with UV detector

Statistical analysis: “R” (version 2.15.3)

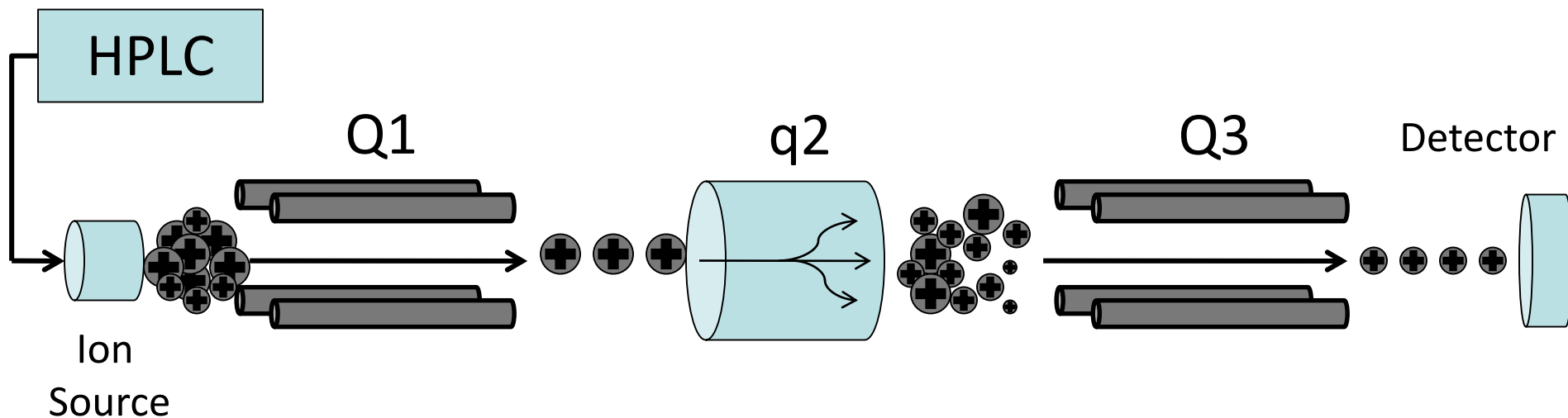
Randomized complete blocks

Materials and Methods

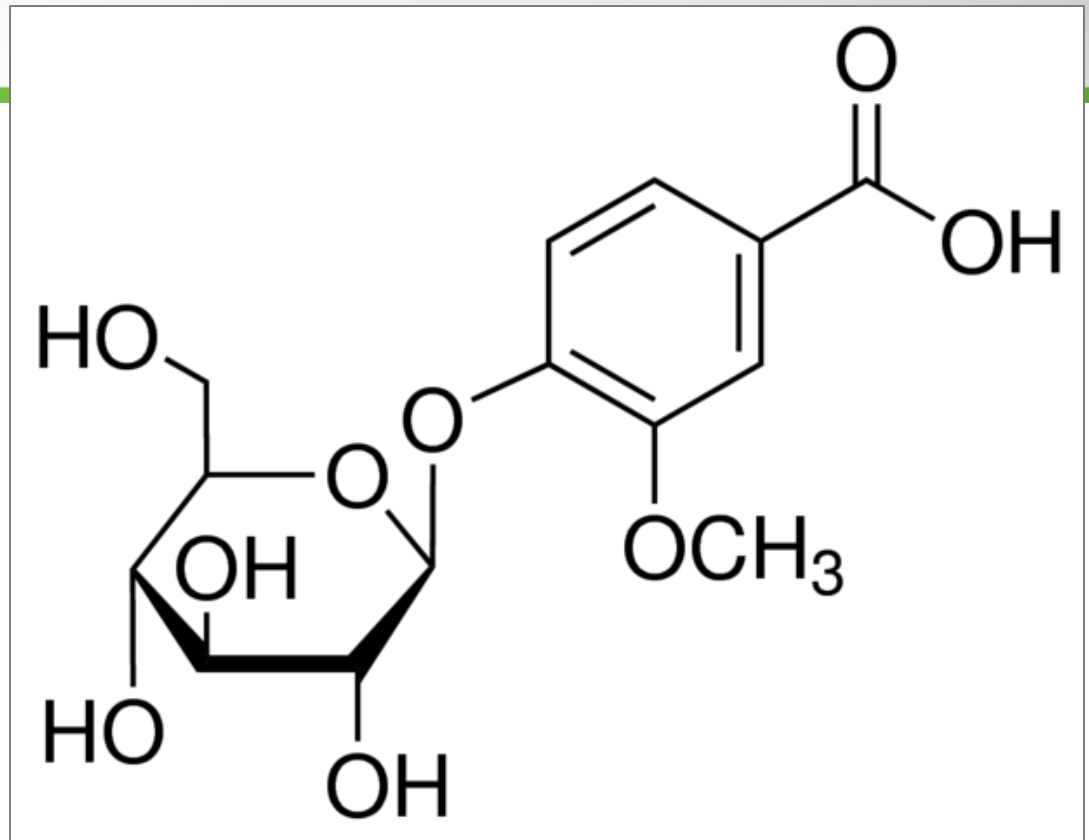
Extraction method



Multiple Reaction Monitoring (MRM)



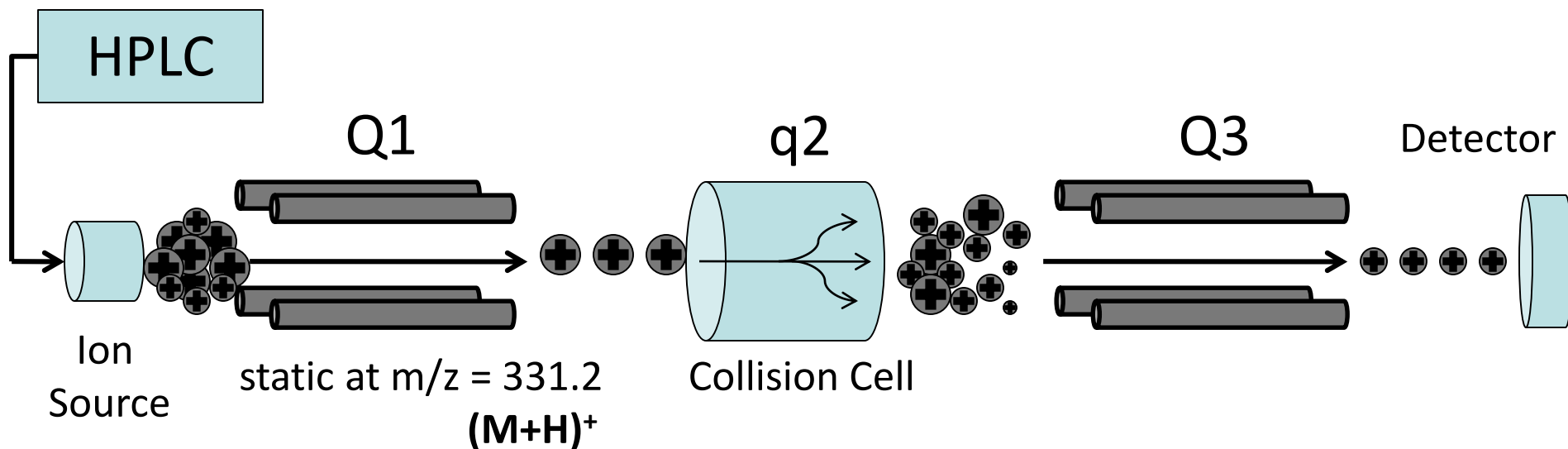
Adapted from S. Wood. (2011)



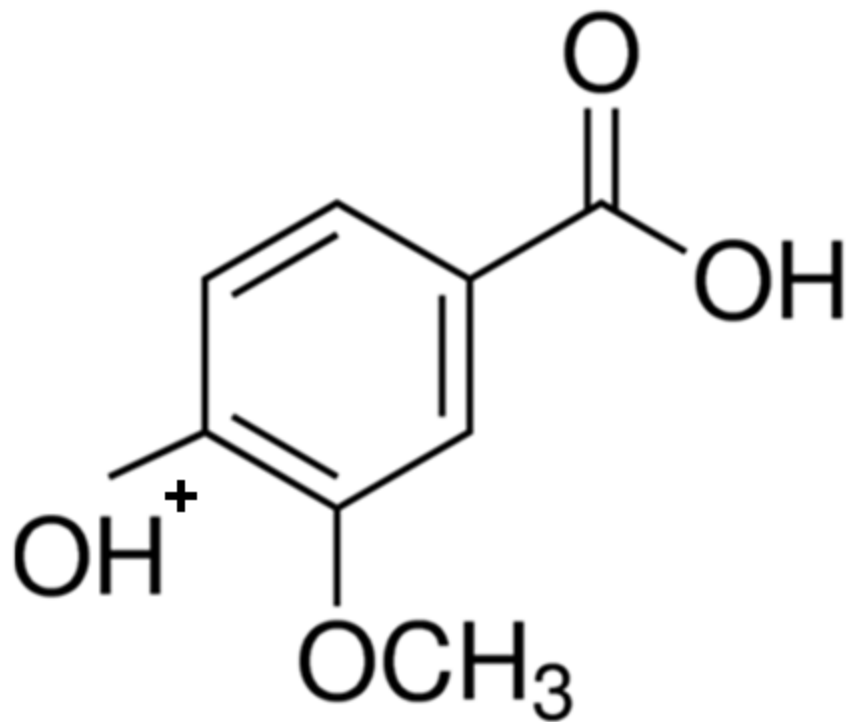
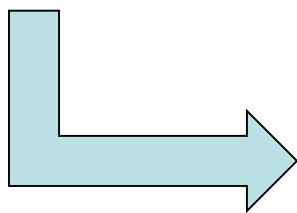
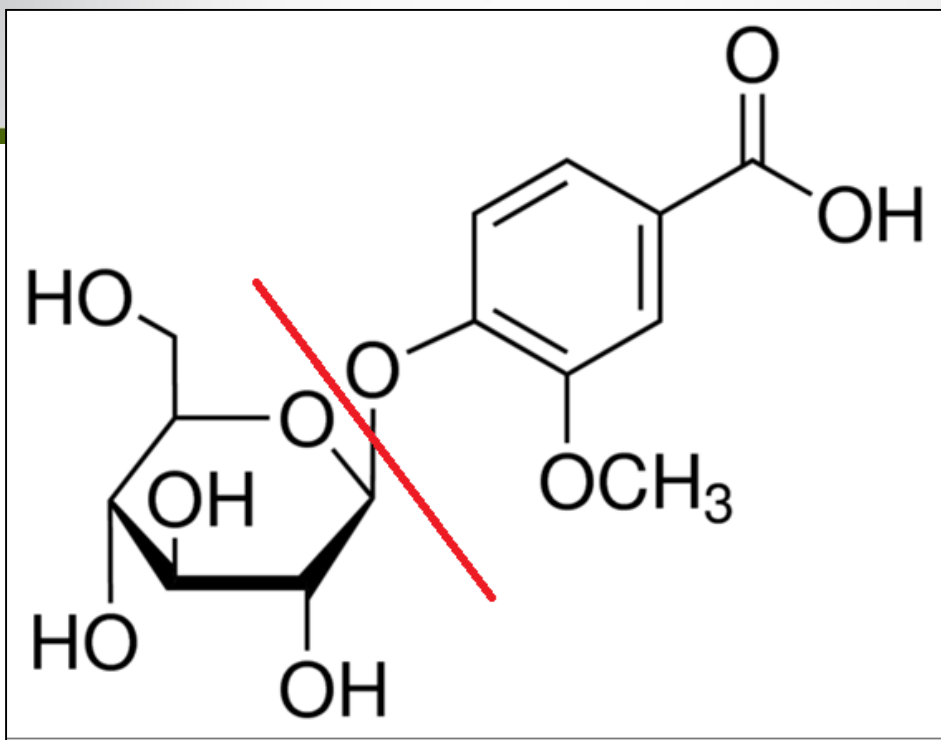
Vanillic acid-4-β-*D*-glucoside

Molecular weight: 330.3 g/mol

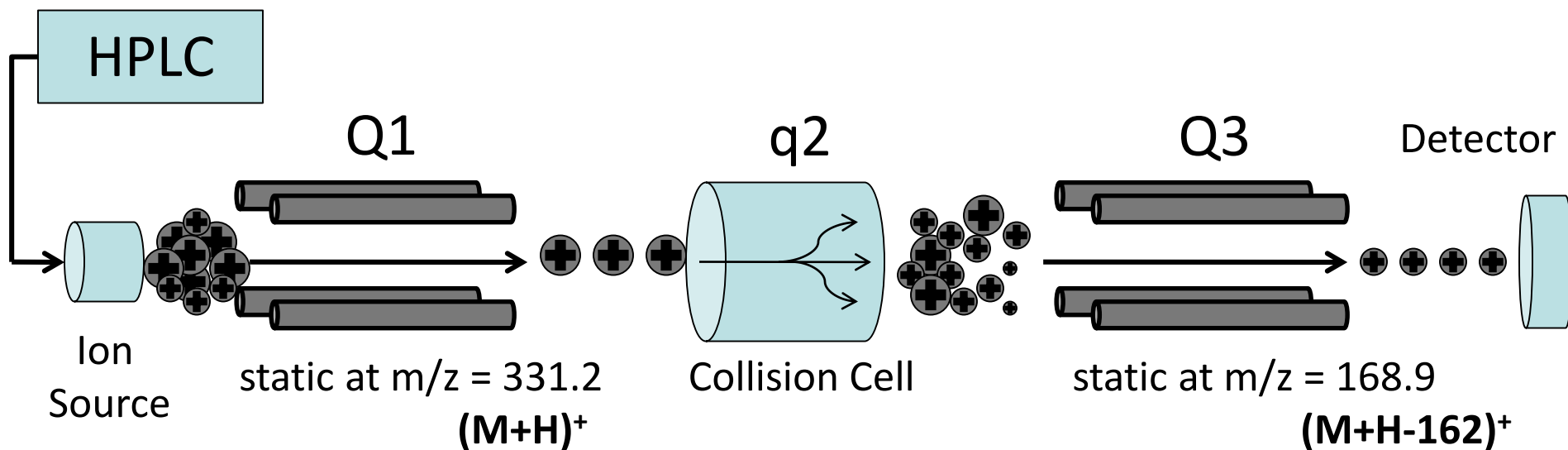
Multiple Reaction Monitoring (MRM)



Adapted from S. Wood. (2011)



Multiple Reaction Monitoring (MRM)

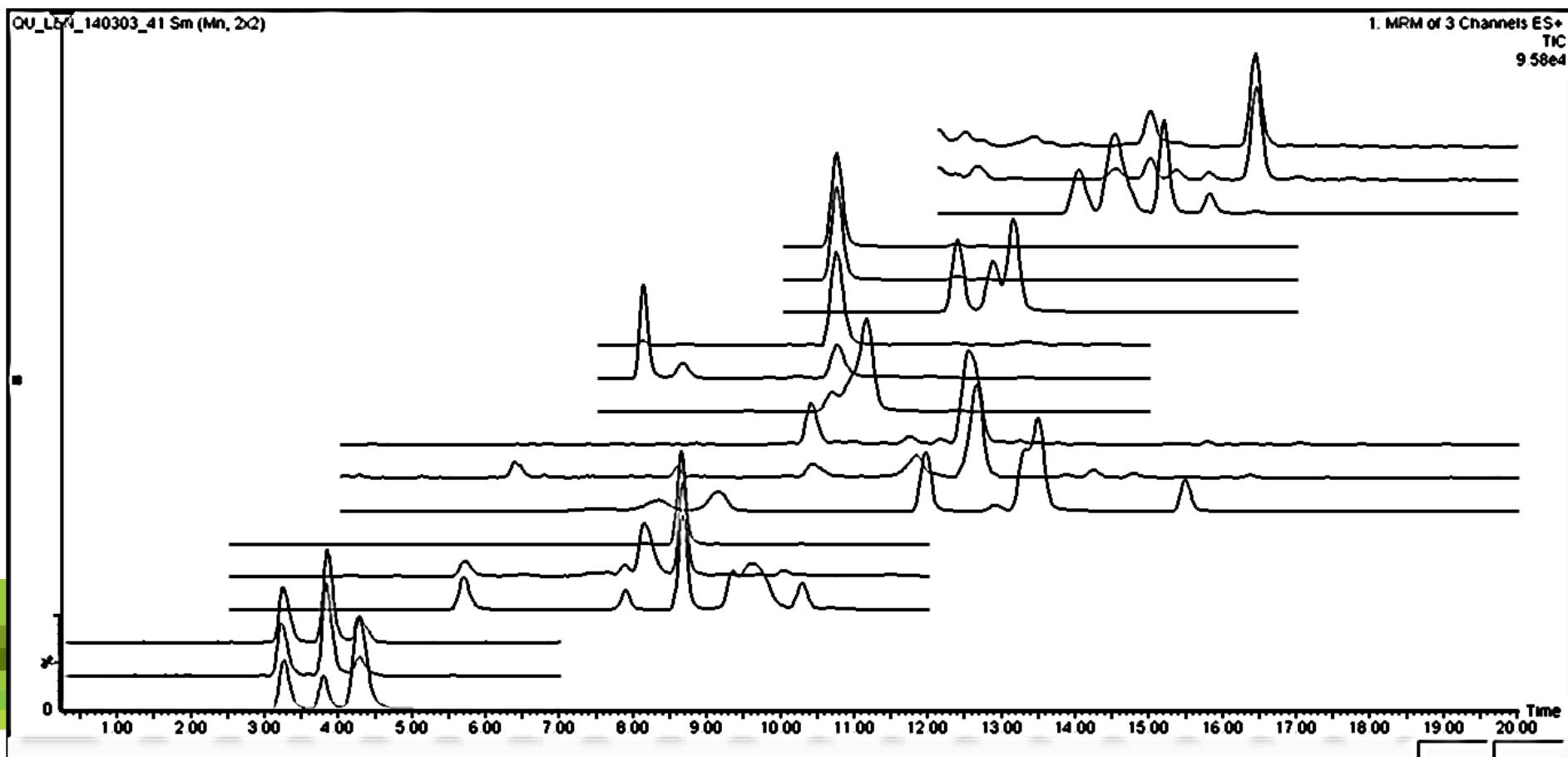


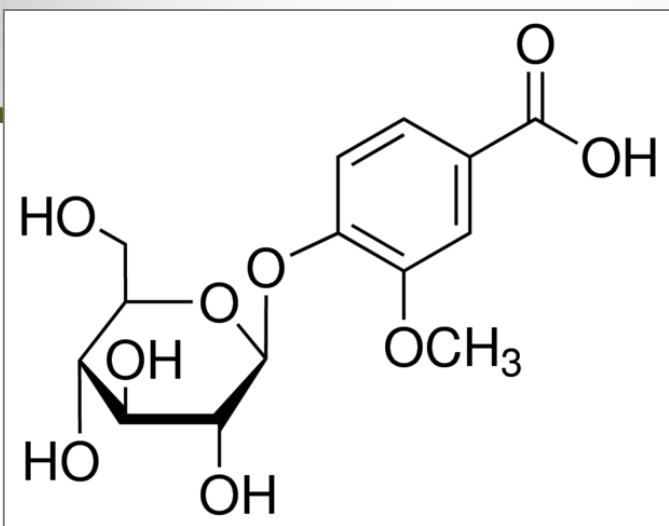
$331.2 > 168.9$

Molecular Ion > Fragment Ion

Results and Discussion

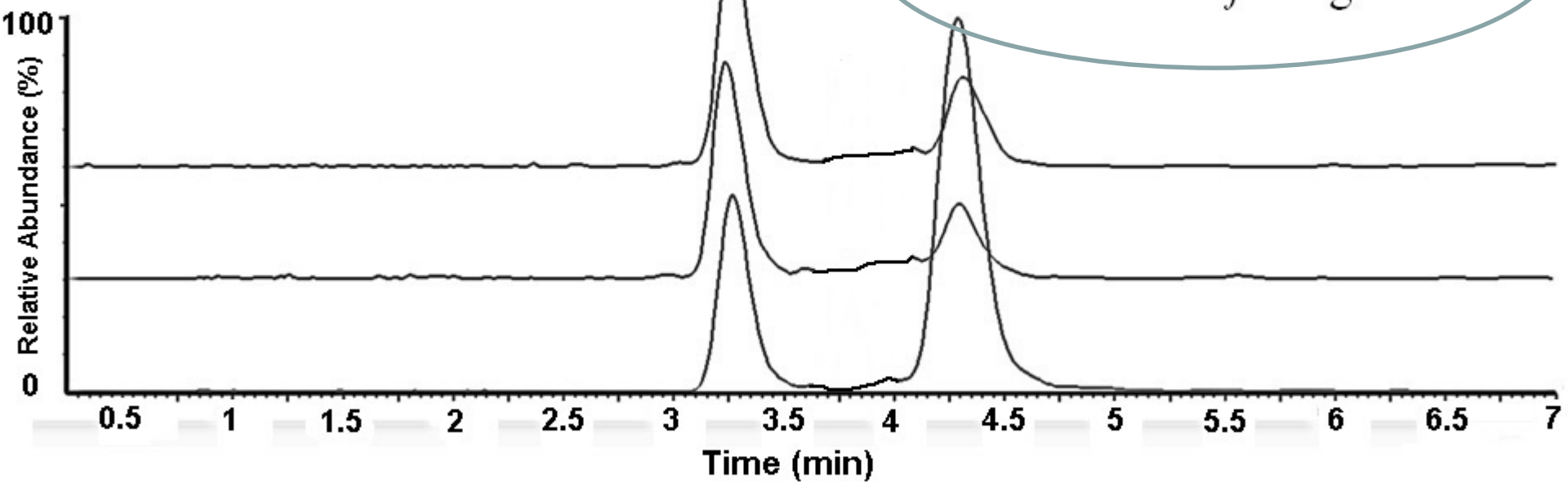
Total Ion Current (TIC) Chromatogram



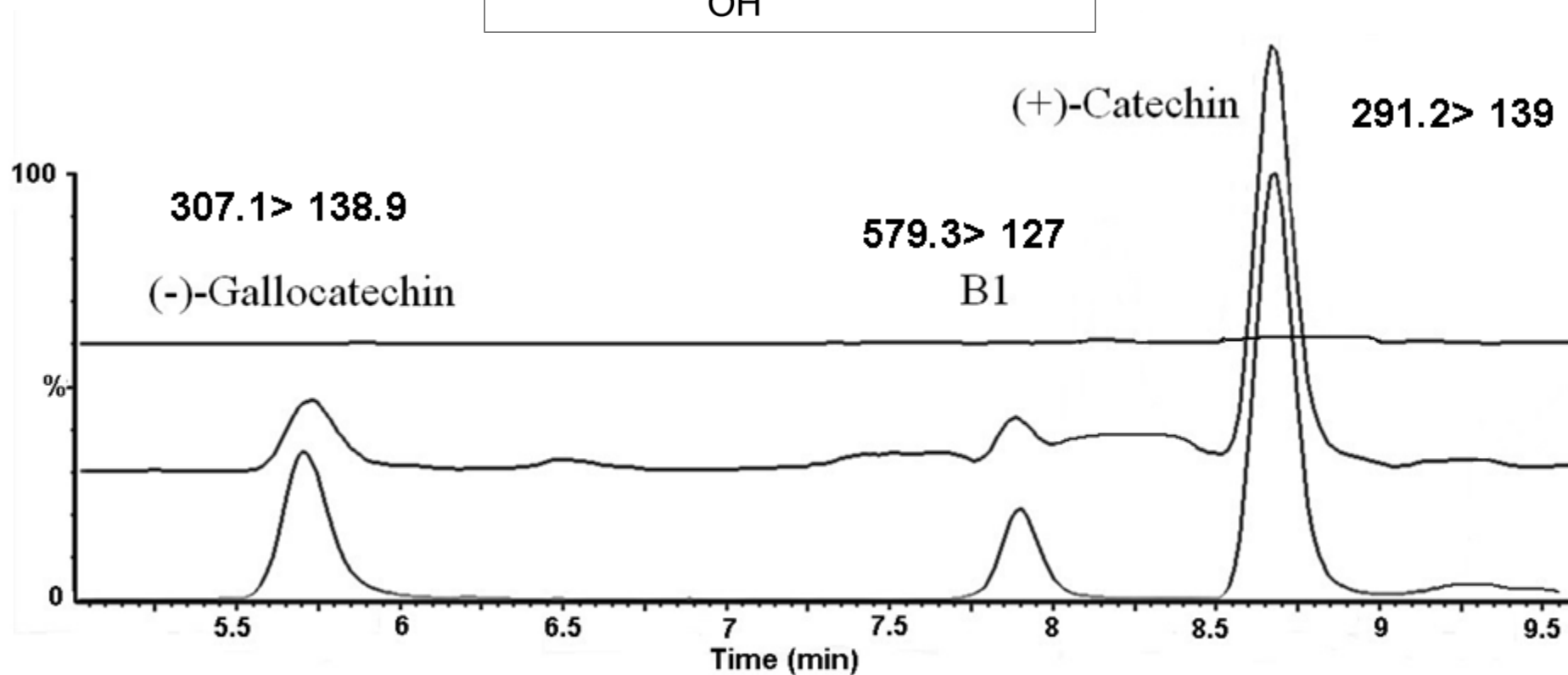
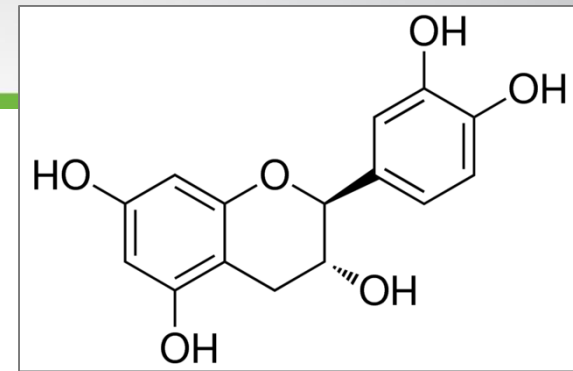
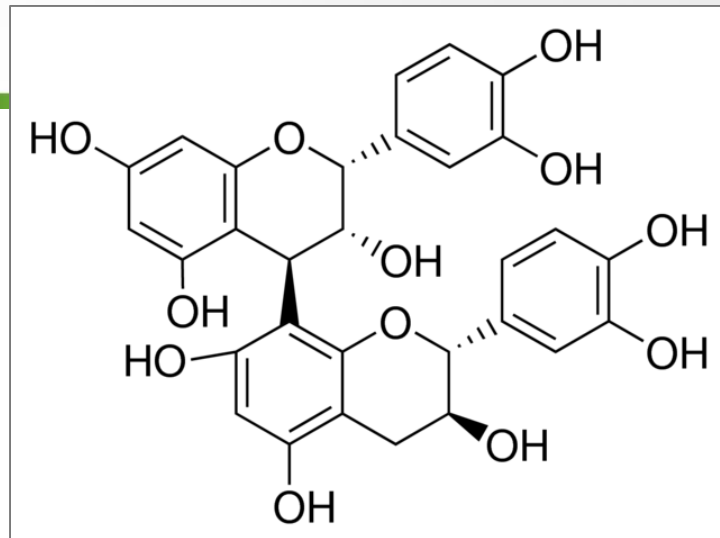
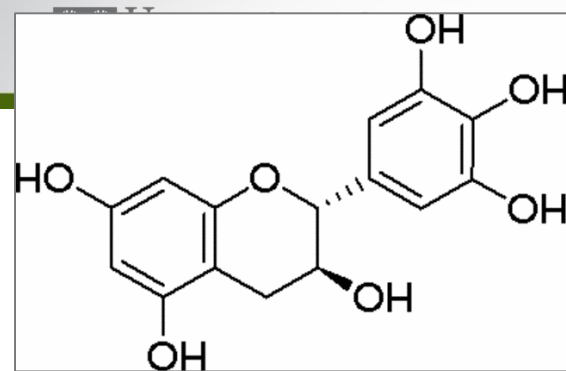


287.4 > 107
Salicin (IS)

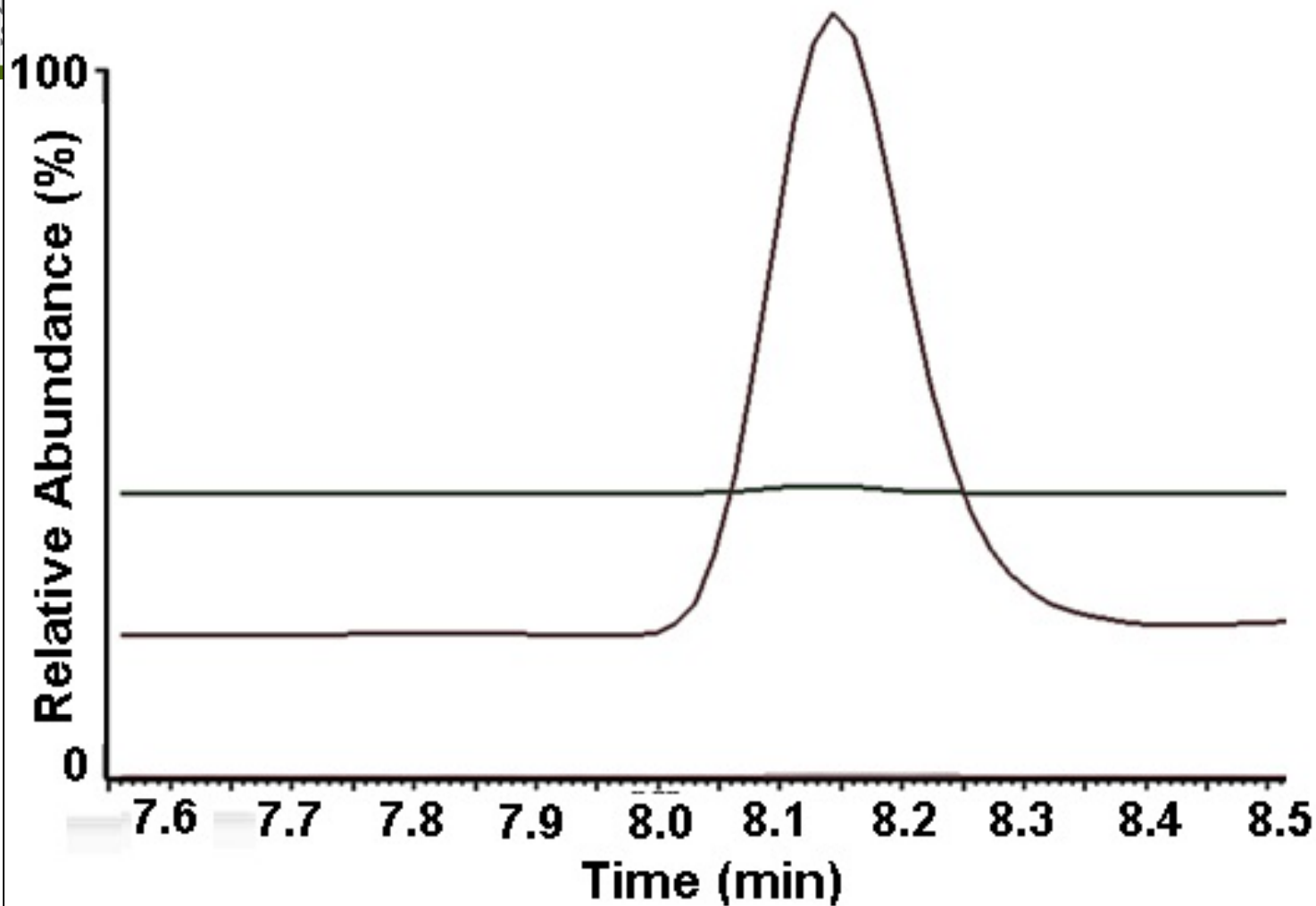
331.2 > 168.9
Vanillic acid-4-β-D-glucoside



Chromatograms from bottom to the top are standards, tannin-containing, and zero-tannin.

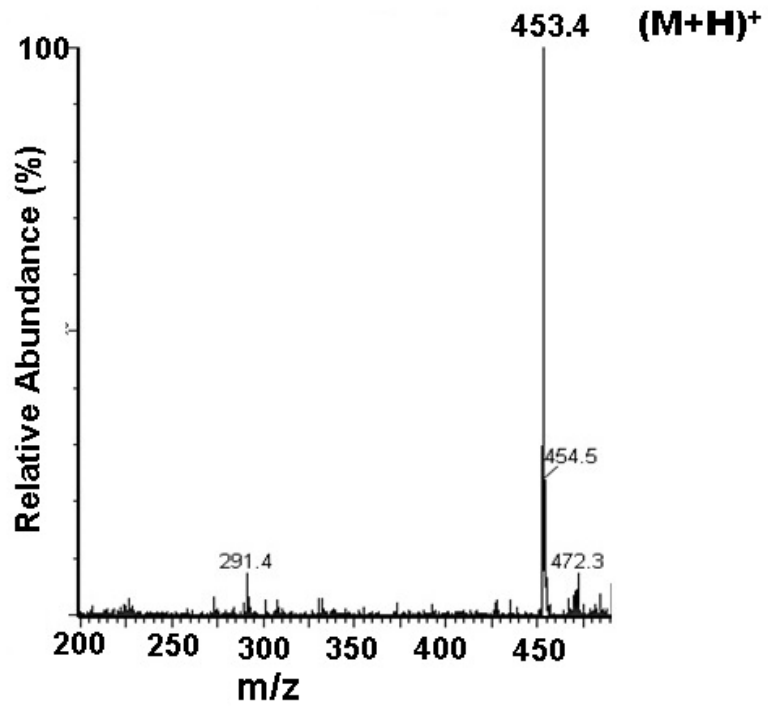


Chromatograms from bottom to the top are standards, tannin-containing, and zero-tannin.

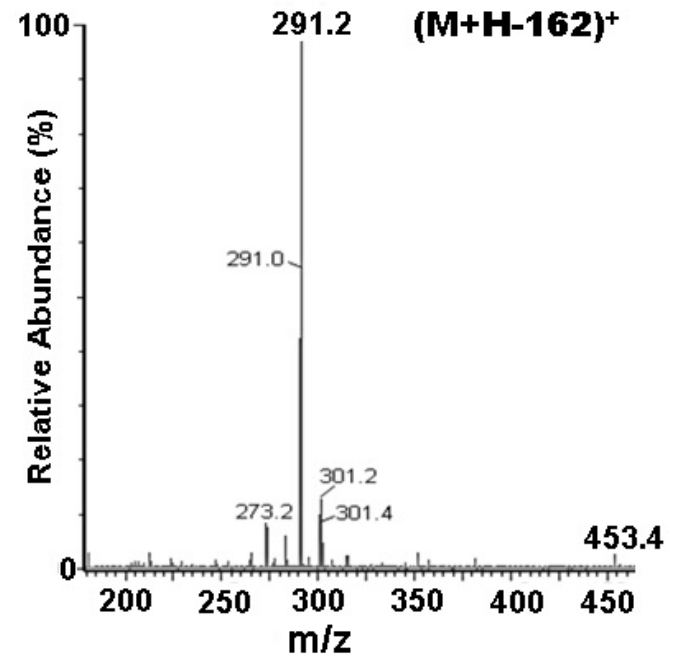


Chromatograms from bottom to the top are standards, tannin-containing, and zero-tannin.

MS

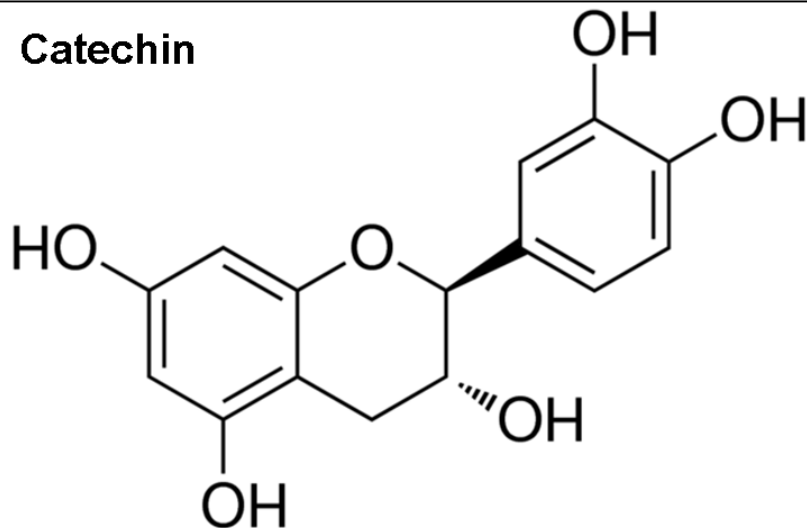


MS/MS

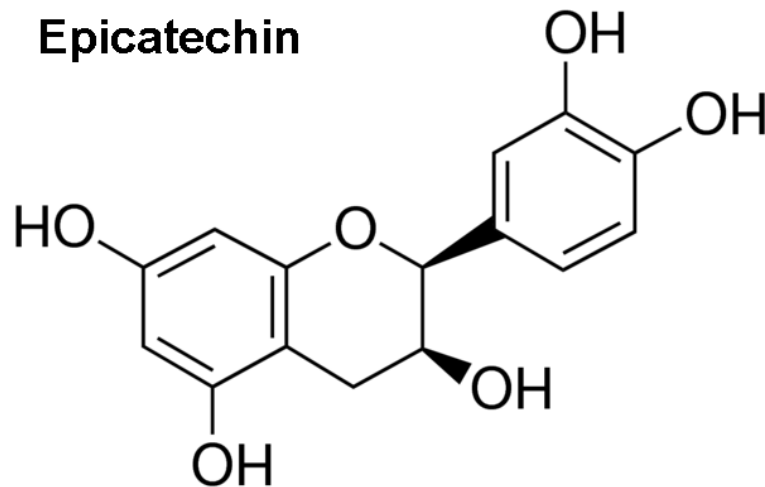


(epi) Catechin-glucoside 453.4 > 291.2

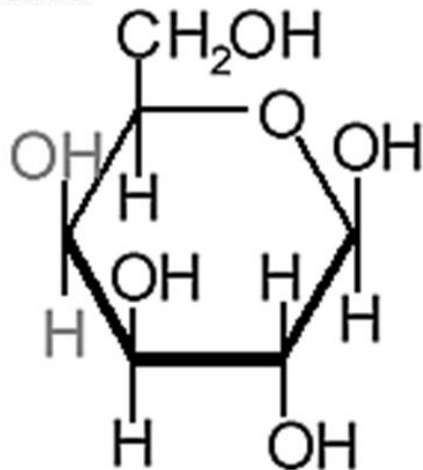
Catechin



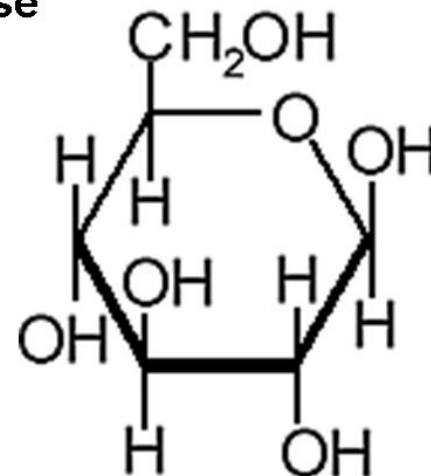
Epicatechin

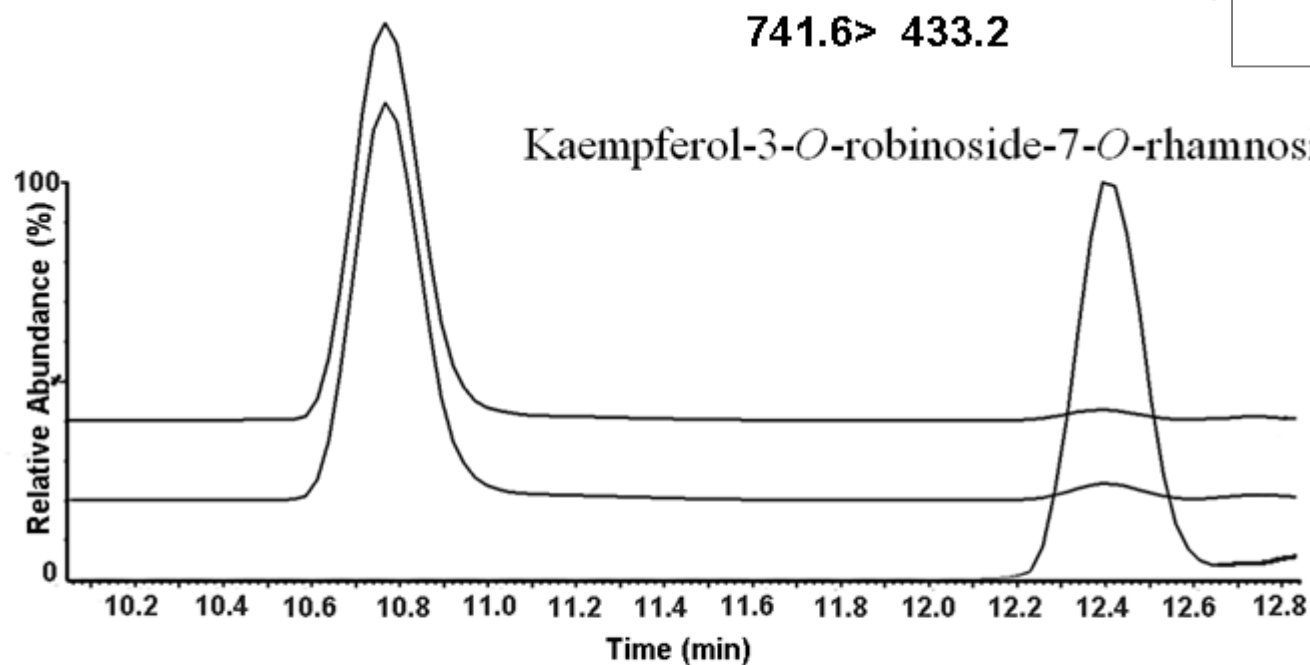
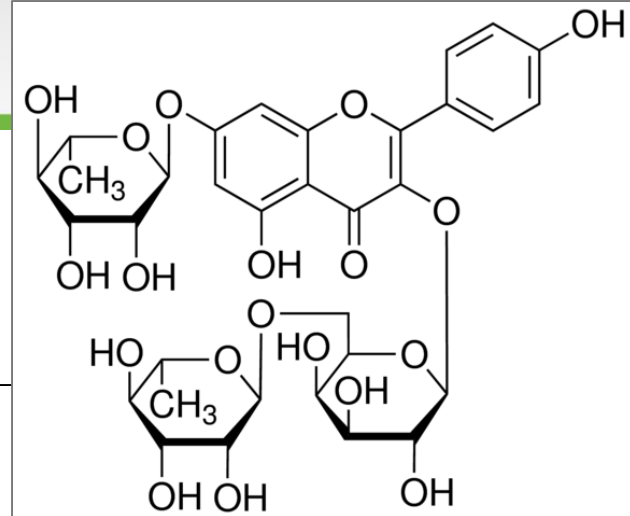


Galactose



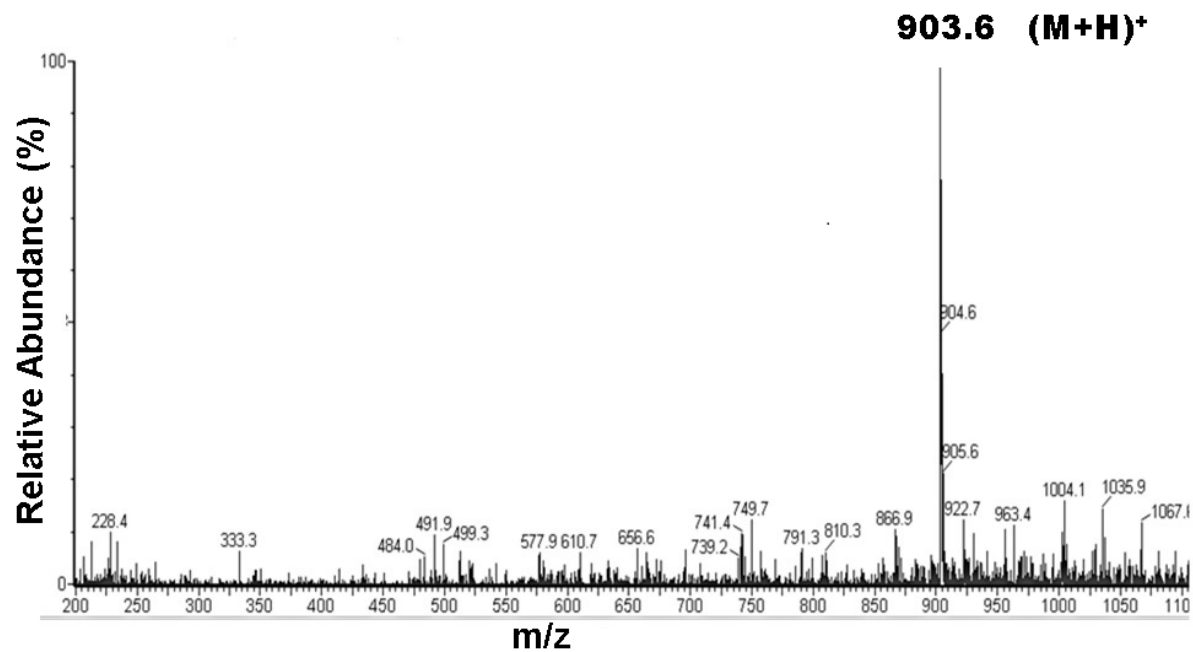
Glucose



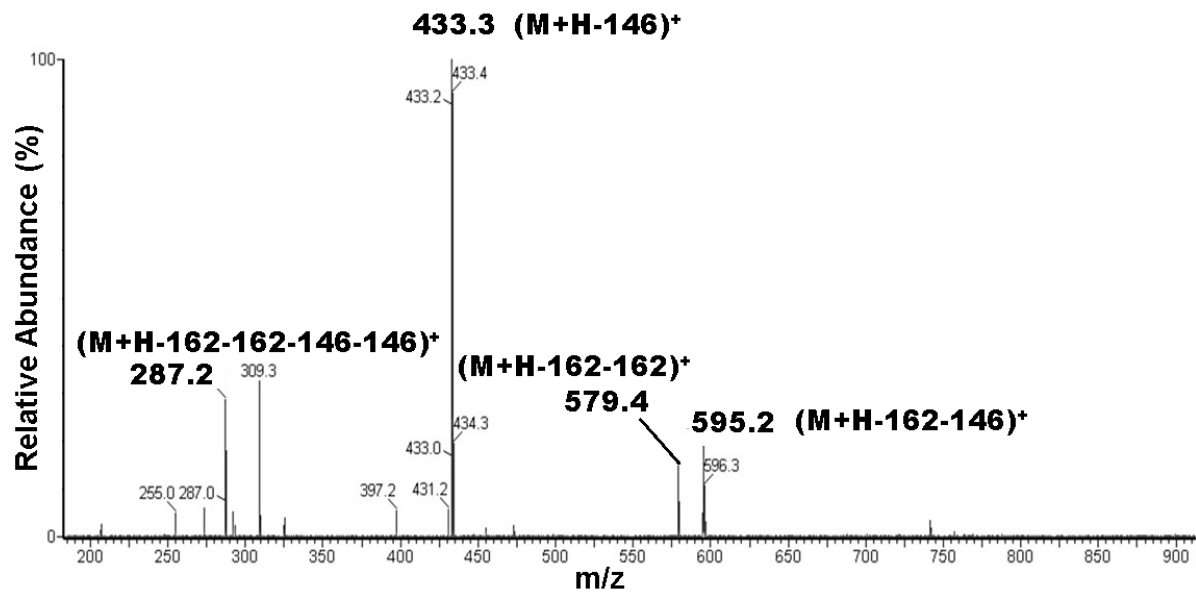


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MS



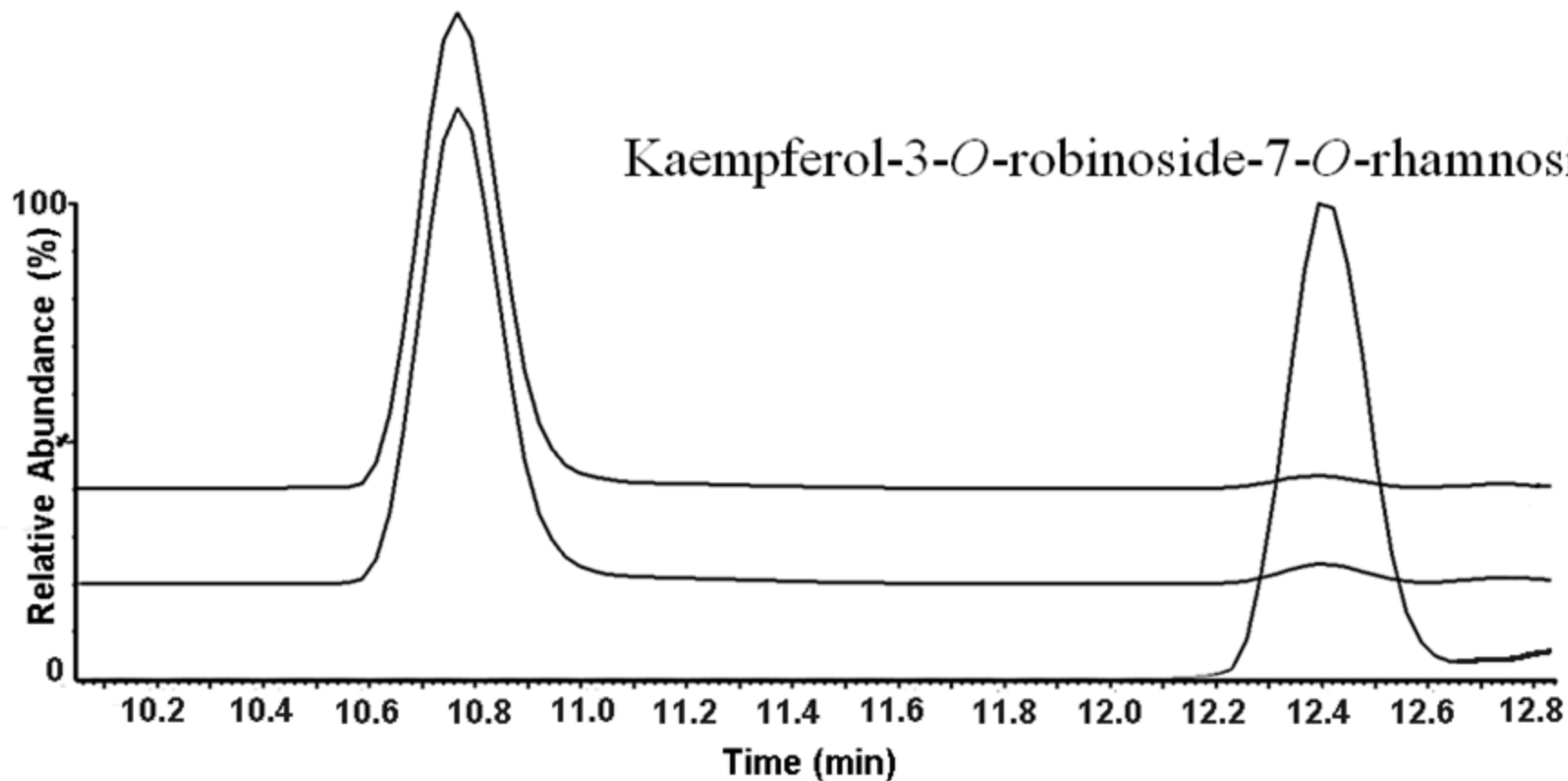
MS/MS



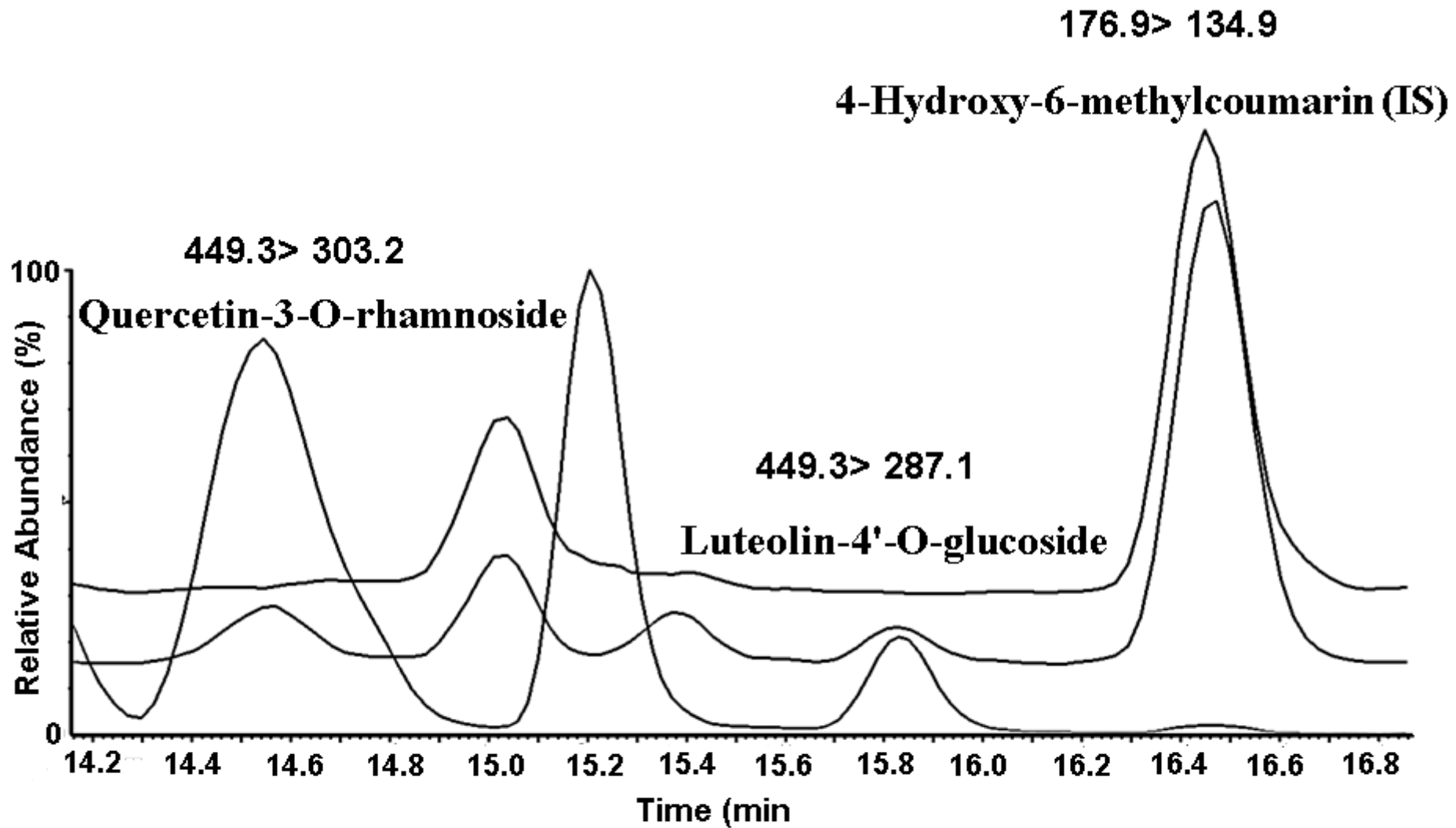
Kaempferol-di-rutinoside

903.6 > 433.3

Kaempferol-3-*O*-rabinoside-7-*O*-rhamnoside

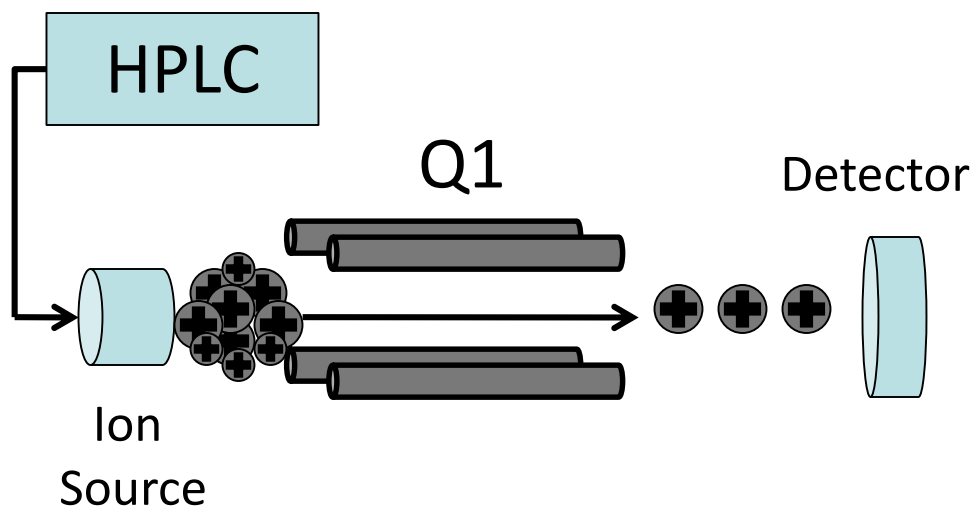


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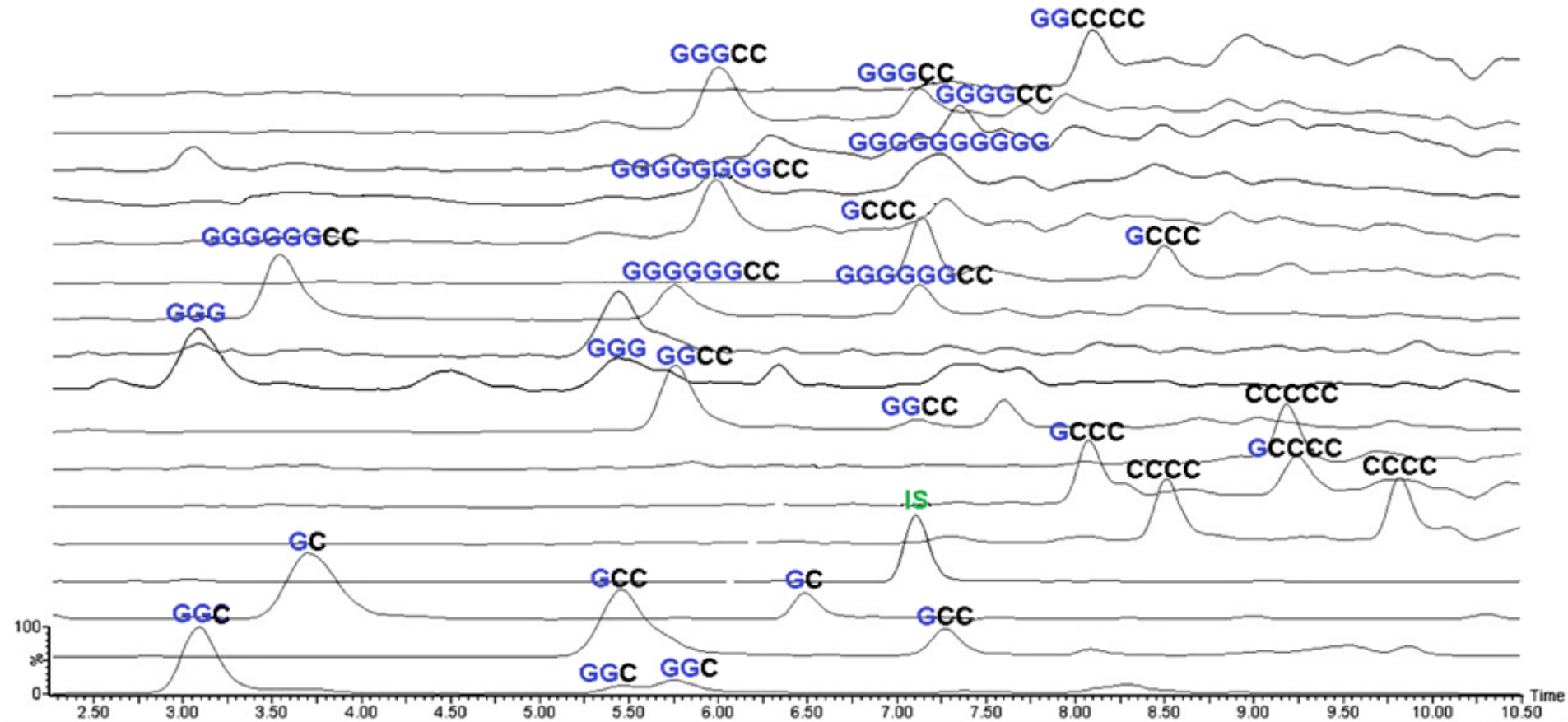


Chromatograms from bottom to the top are standards, tannin-containing, and zero-tannin.

Single Ion Reaction (SIR)



Adapted from S. Wood. (2011)



Single ion reaction (SIR) chromatograms for tannin-containing genotypes; G, C, IS represent (epi)gallocatechin, (epi)catechin and internal standard.

Assigned Structure

G: (epi)gallocatechin, C(epi)catechin

GC

GCC

GGC

GGG

CCCC

GCCC

GGCC

CCCCC

GCCCC

GGGCC

GGCCCC

GGGGCC

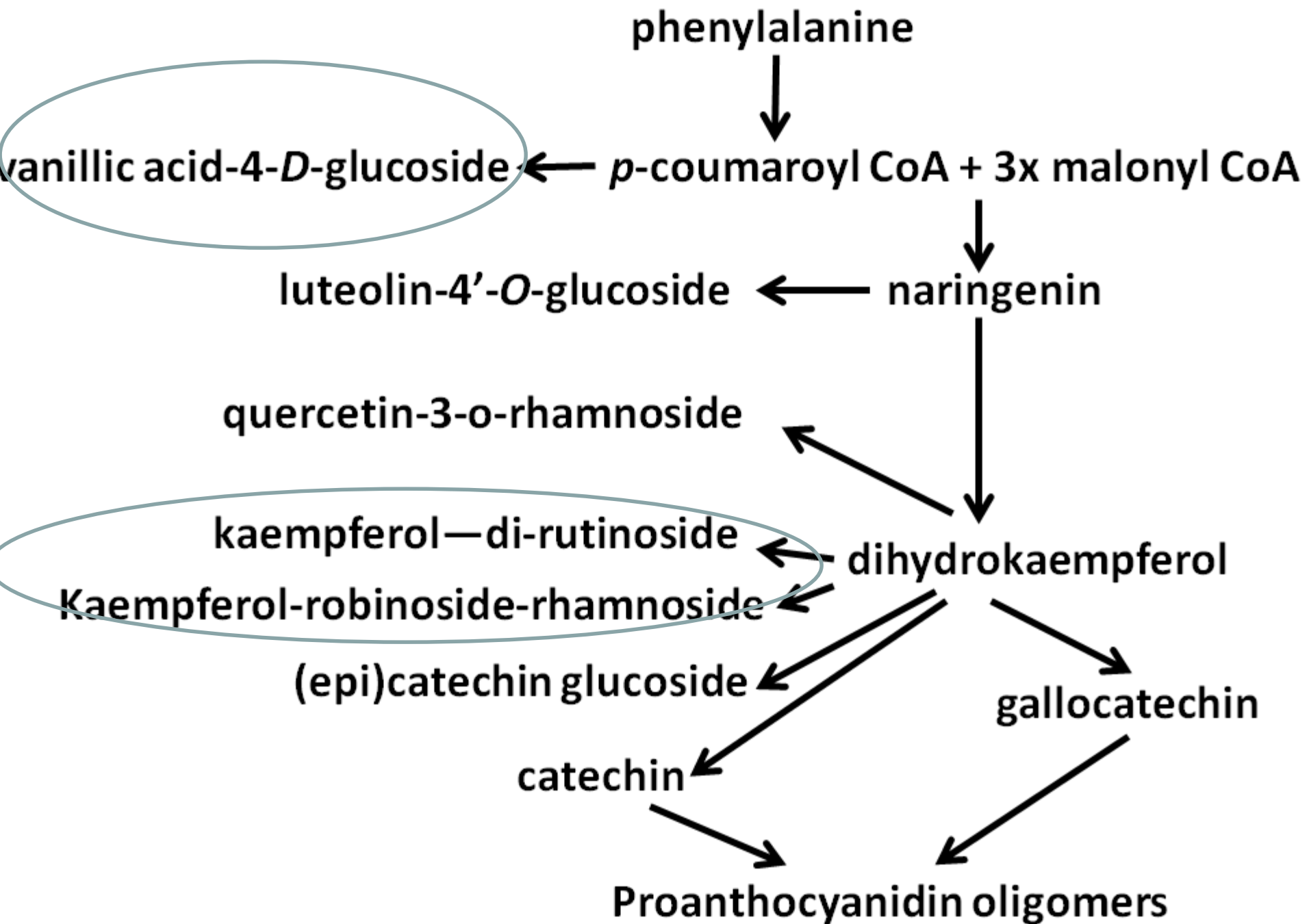
2(GGGC)

2(GGGGC)

2(GGGGG)

Conclusion

LC-MS analysis showed distinctive differences in phenolic compound profiles between zero-tannin and tannin-containing genotypes in lentil



Thank you



