



## Article

# Cytotoxic activity and phytochemical screening of eco-friendly extracted flavonoids from *Pueraria montana* var. *lobata* (Willd.) Sanjappa & Pradeep and *Trifolium pratense* L. flowers using HPLC-ESI-HRMS

Saied A. Aboushanab <sup>1,2,\*</sup>, Vadim A. Shevyrin <sup>1,2</sup>, Vsevolod V. Melekhin <sup>2,3,4</sup>, Elena I. Andreeva <sup>2</sup>, Oleg G. Makeev <sup>3,4</sup> and Elena G. Kovaleva <sup>1,2</sup>

<sup>1</sup> Institute of Chemical Engineering, Ural Federal University Named after the First President of Russia B. N. Yeltsin, Mira 19, Yekaterinburg 620002, Russia; vadim.shevyrin@gmail.com (V.A.S.); e.g.kovaleva@urfu.ru (E.G.K.)

<sup>2</sup> Educational and Innovative Center of Chemical and Pharmaceutical Technologies Chemical Technology Institute, Ural Federal University Named after the First President of Russia B. N. Yeltsin, Mira 19, Yekaterinburg 620002, Russia; melekhinvv@mail.ru (V.V.M.); andreev.pro@yandex.ru (E.I.A)

<sup>3</sup> Department of Biology, Ural State Medical University, Repina 3, Yekaterinburg 620014, Russia; larim@mail.ru (O.G.M)

<sup>4</sup> Department of Gene and Cell Therapy, Institute for Medical Cell Technologies, Karla Marksa 22a, Yekaterinburg 620026, Russia

\* Correspondence: sabushanab@urfu.ru (S.A.A.); Tel.: +7-996-188-3155 (S.A.A.)

## Supporting Information

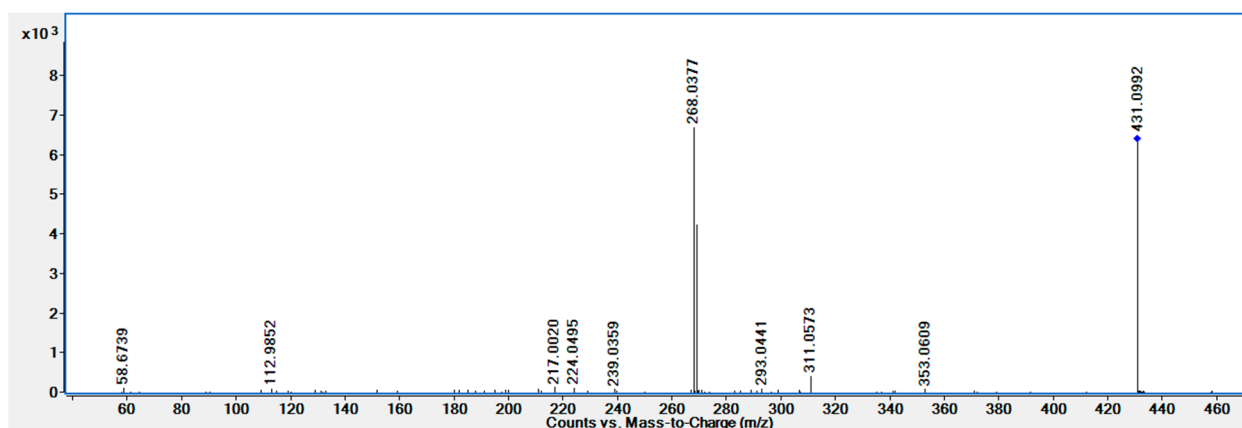
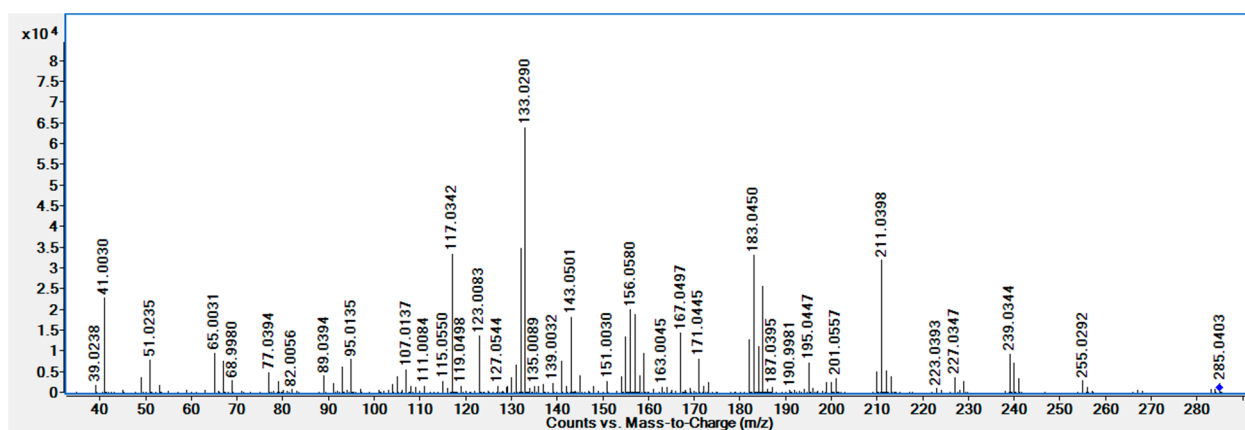
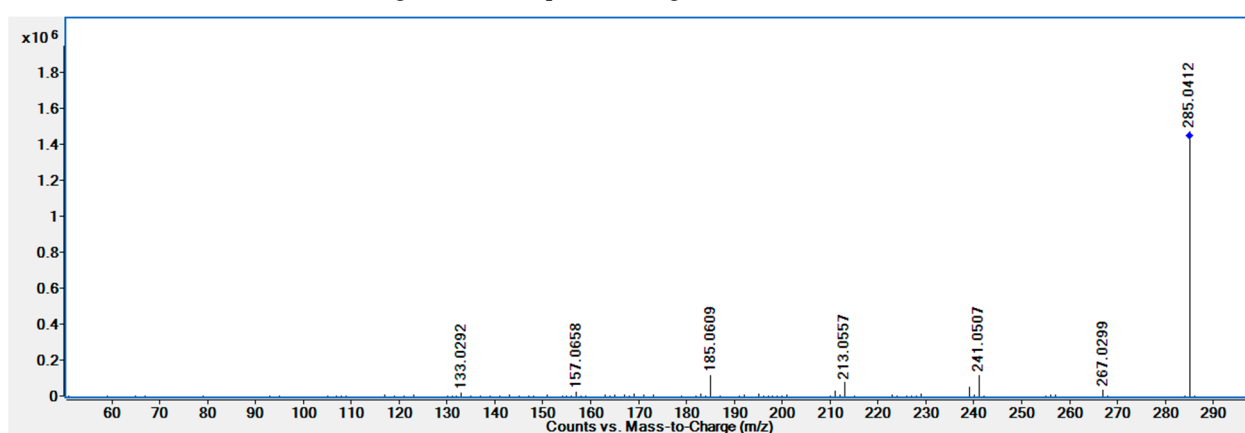
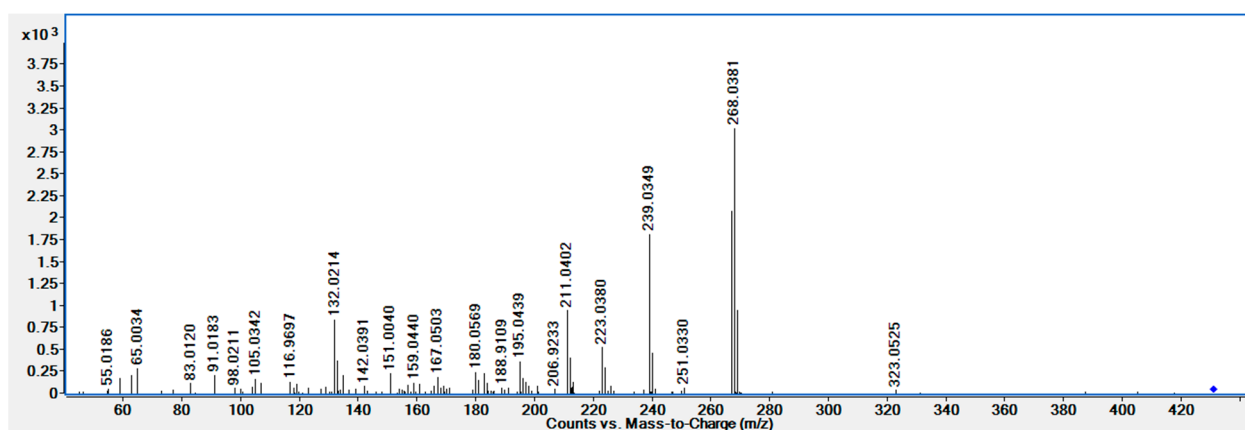


Figure S1. CID spectrum of genistin (CE = 20 eV)



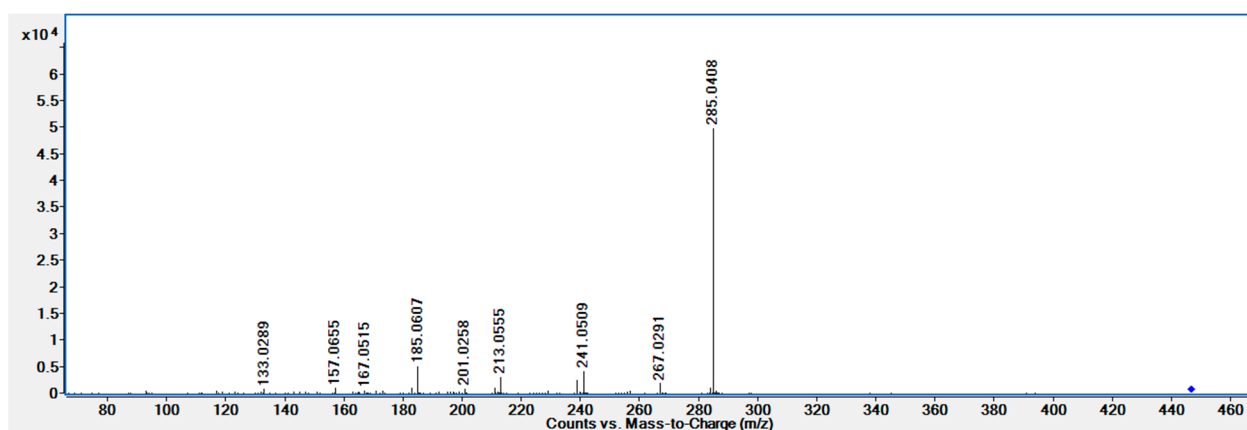


Figure S5. CID spectrum of 6- or 8- hydroxygenistein-glucoside (CE = 40 eV)

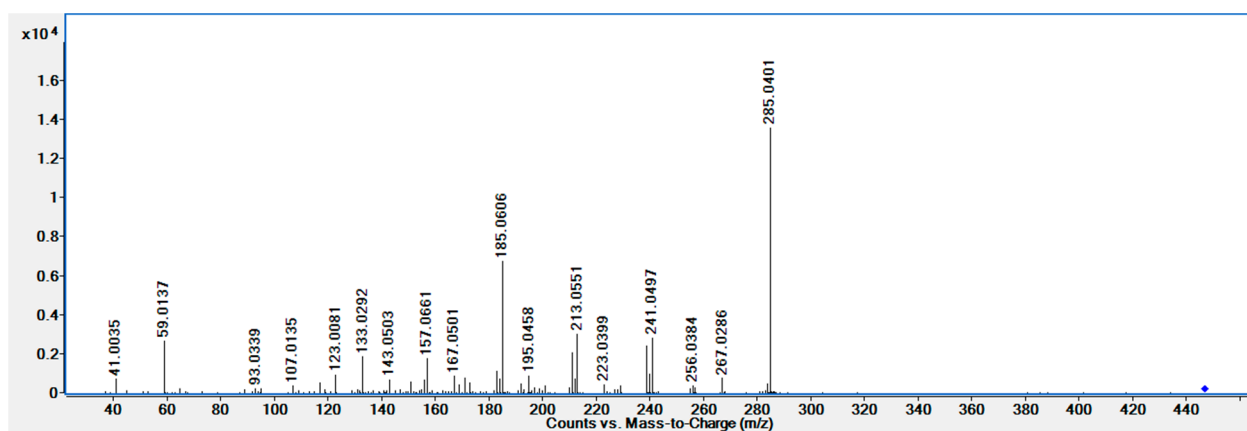


Figure S6. CID spectrum of 6- or 8- hydroxygenistein-glucoside (CE = 50 eV)

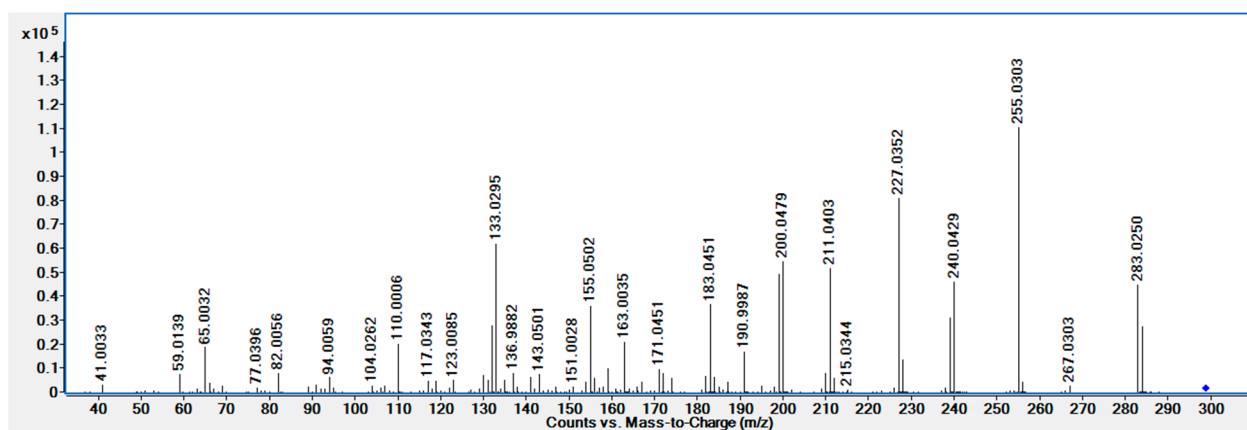


Figure S7. CID spectrum of tectorigenin (CE = 40 eV)

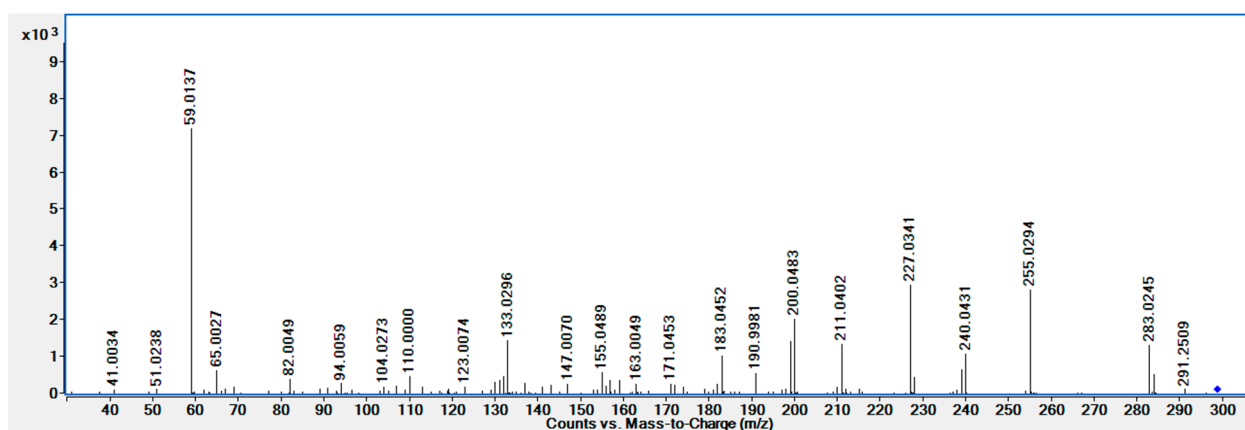


Figure S8. CID spectrum of tectorigenin isomer 1 (CE = 40 eV)

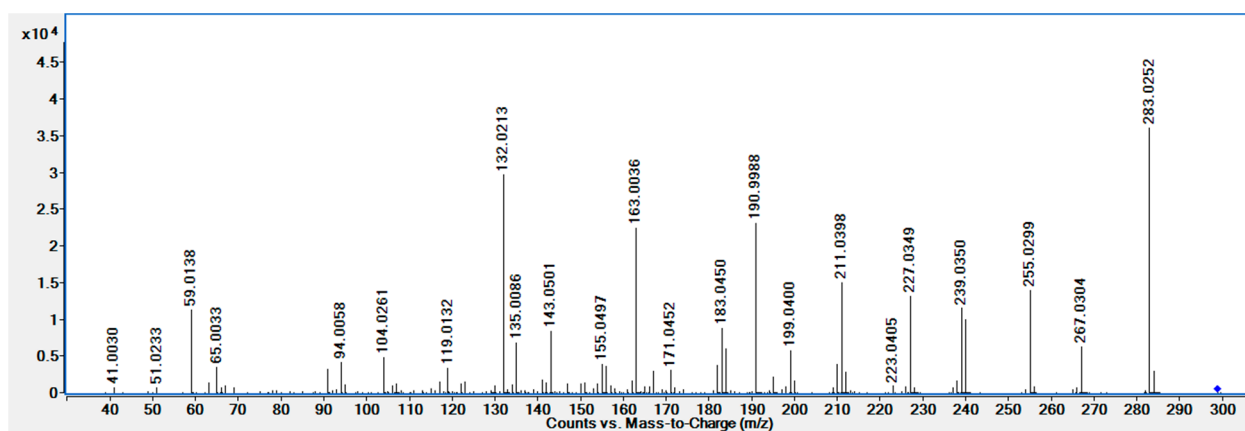


Figure S9. CID spectrum of tectorigenin isomer 2 (CE = 40 eV)

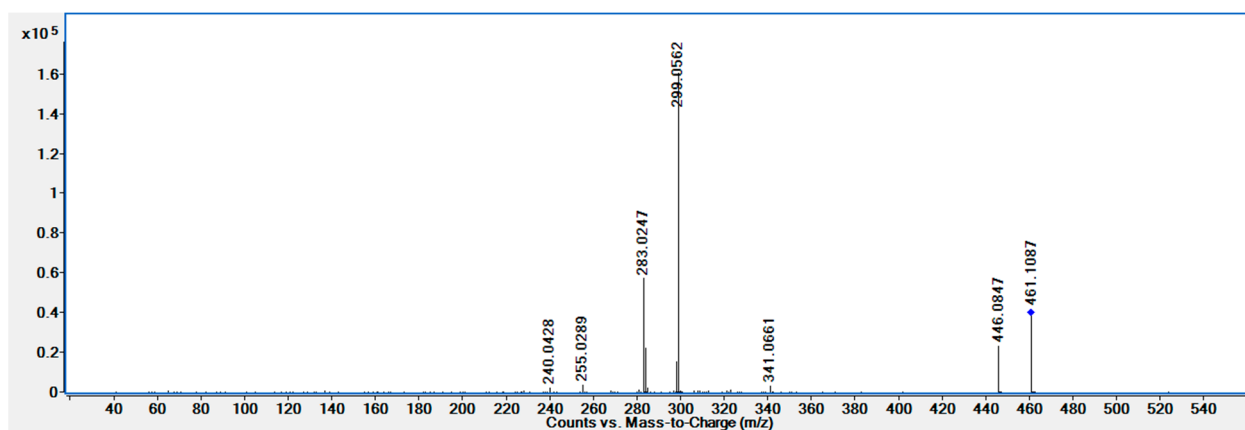


Figure S10. CID spectrum of tectoridine (CE = 20 eV)

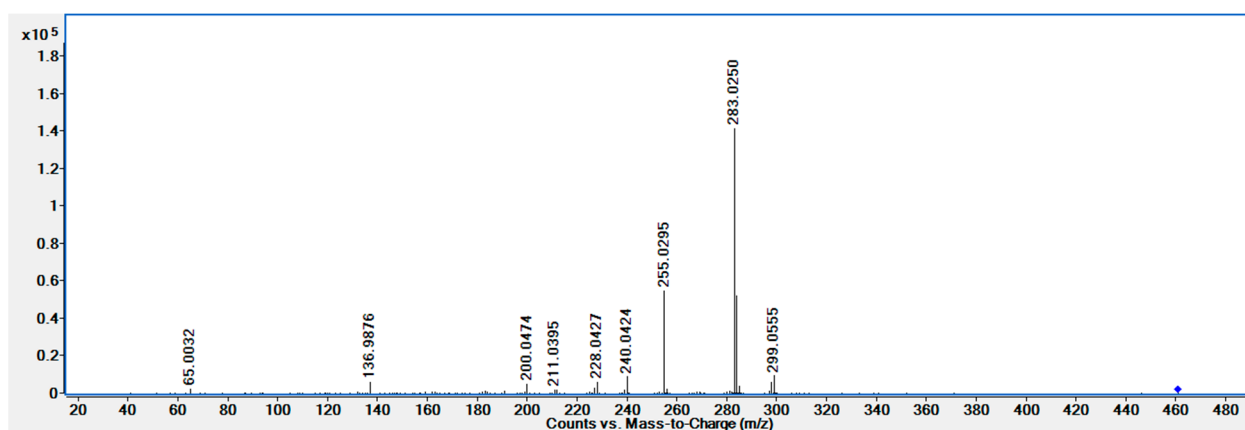


Figure S11. CID spectrum of tectoridine (CE = 40 eV)

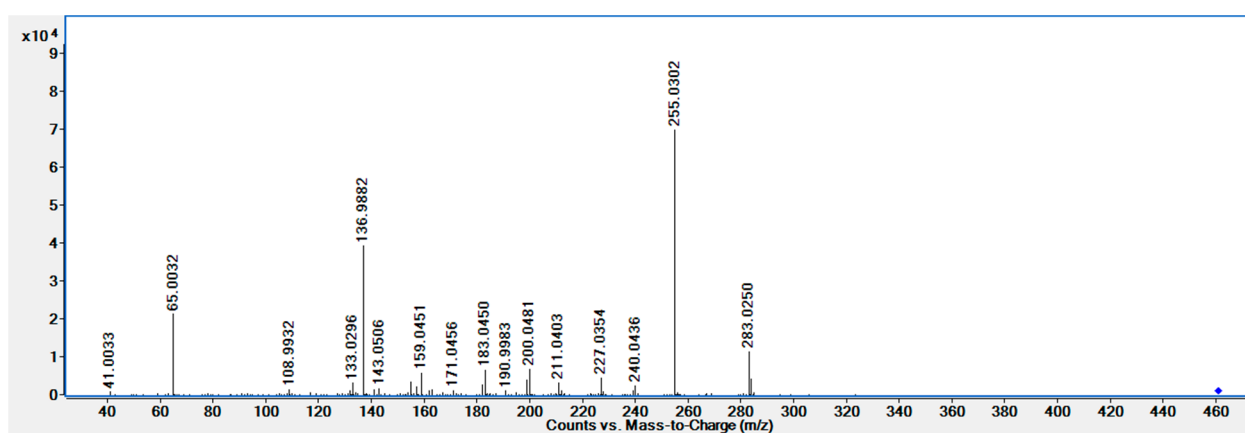


Figure S12. CID spectrum of tectoridine (CE = 60 eV)

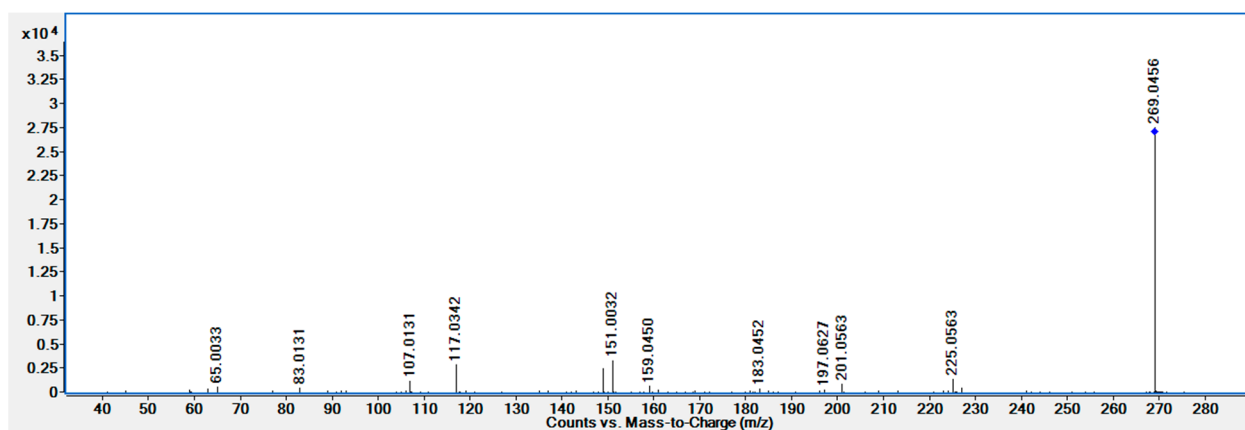


Figure S13. CID spectrum of apigenin (CE = 20 eV)

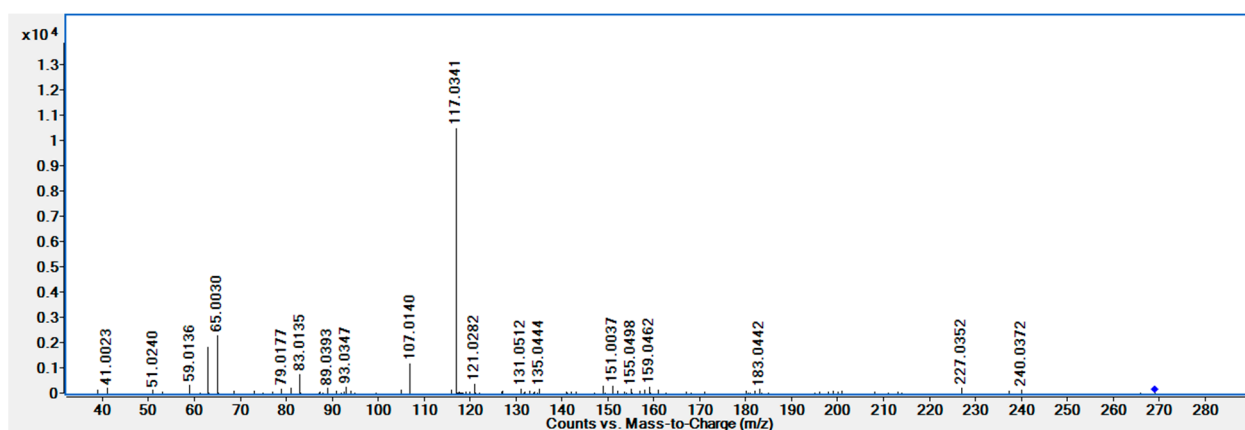


Figure S14. CID spectrum of apigenin (CE = 40 eV)

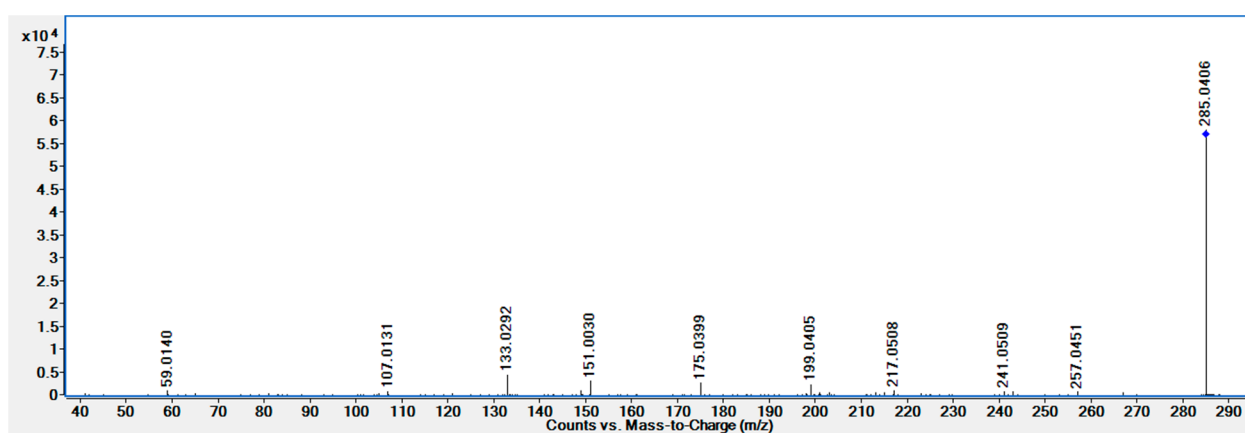


Figure S15. CID spectrum of luteolin (CE = 20 eV)

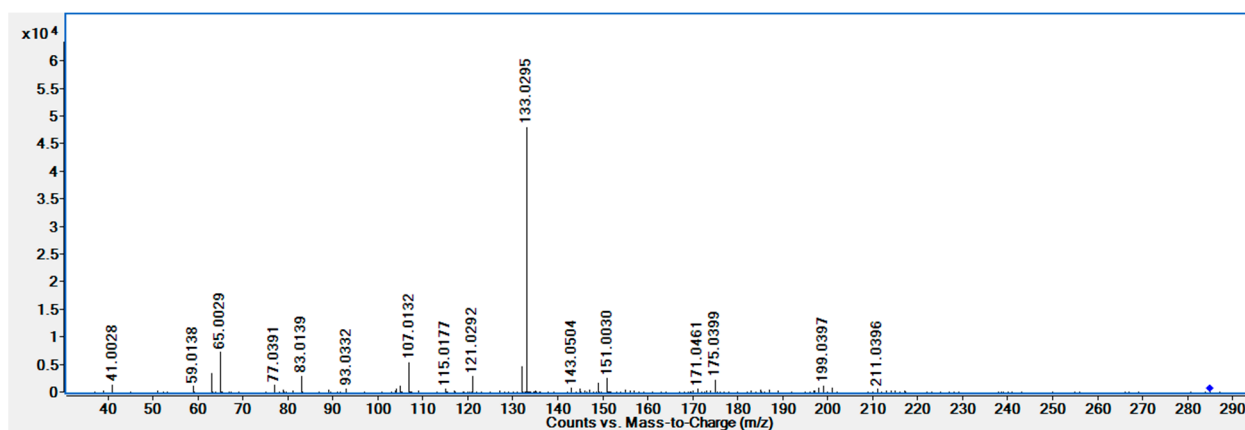


Figure S16. CID spectrum of luteolin (CE = 40 eV)

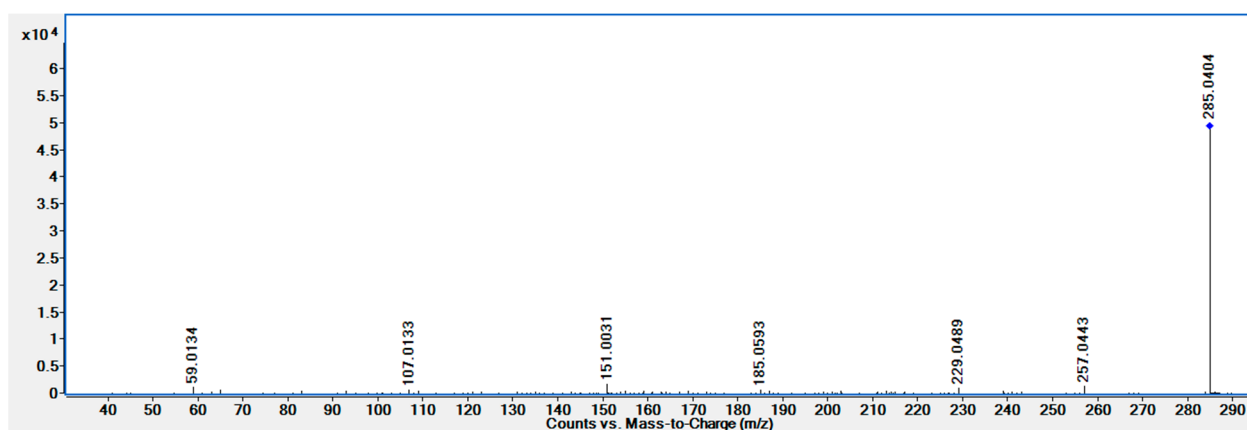


Figure S17. CID spectrum of kaempferol (CE = 20 eV)

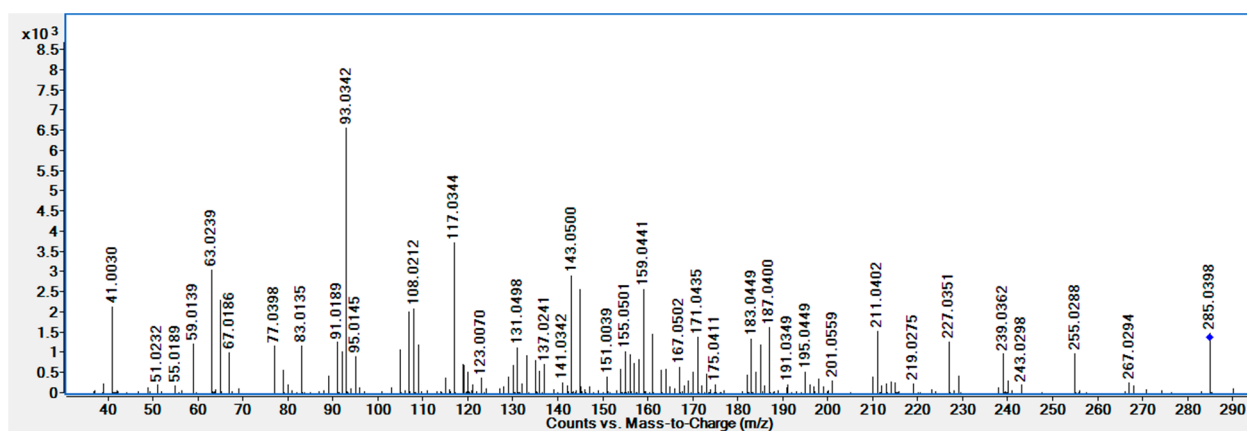


Figure S18. CID spectrum of kaempferol (CE = 40 eV)

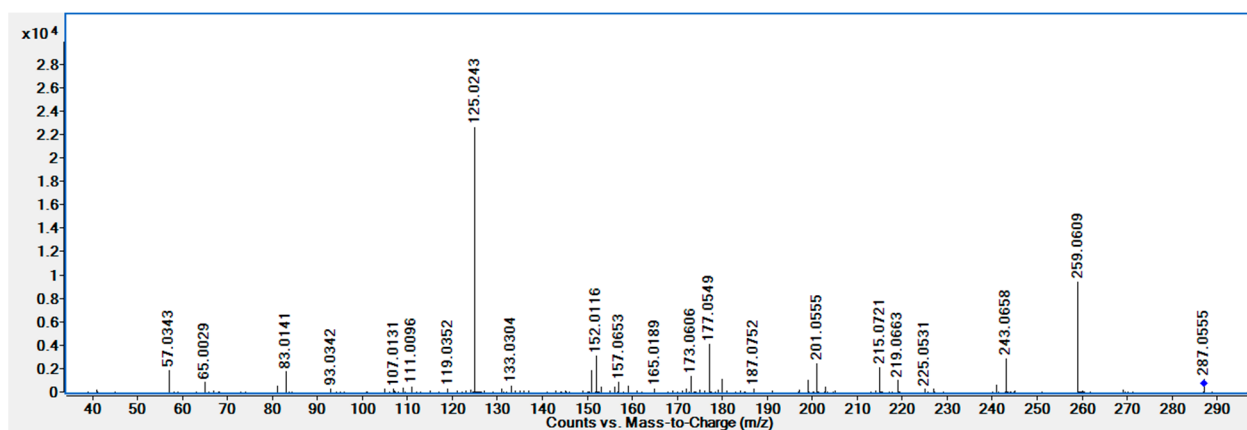


Figure S19. CID spectrum of dihydrokaempferol (CE = 20 eV)

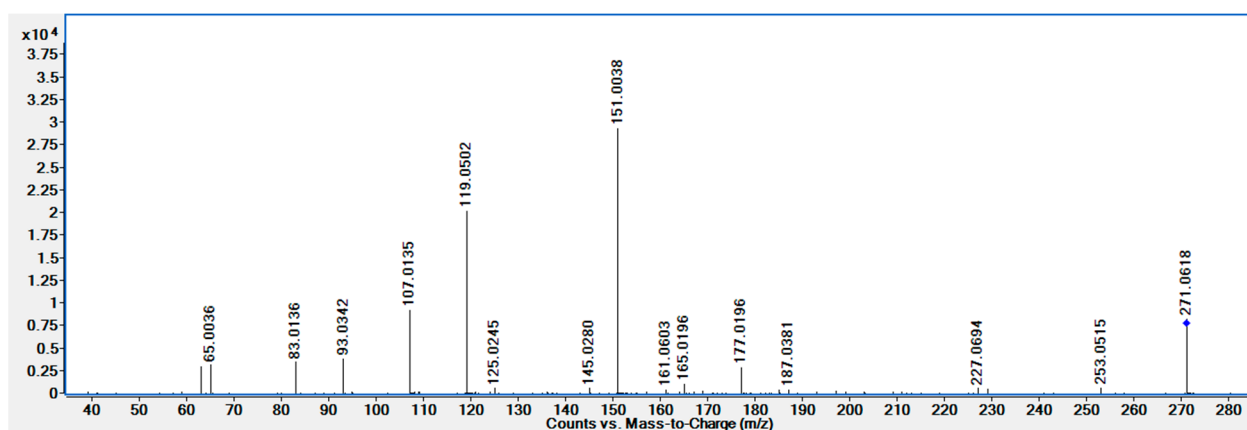


Figure S20. CID spectrum of naringenin (CE = 20 eV)

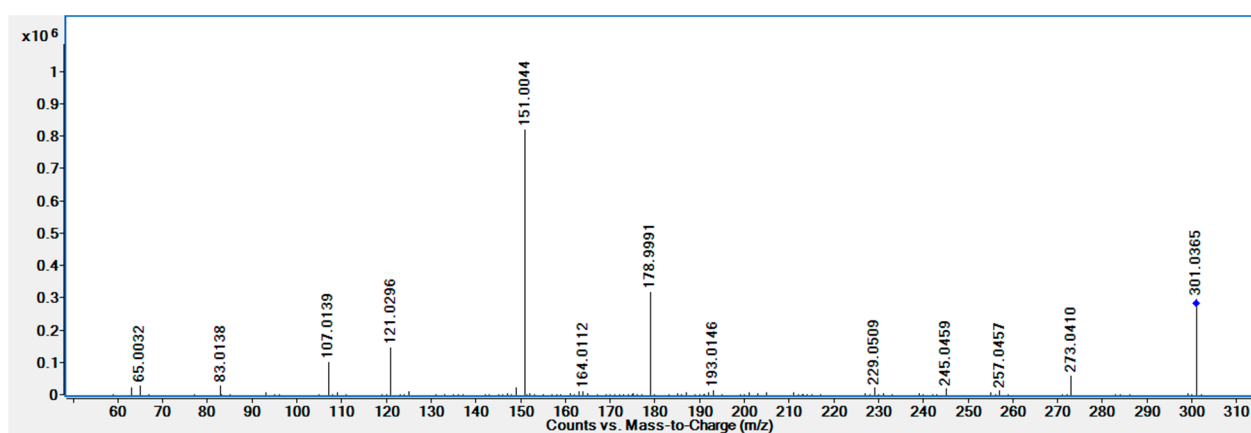


Figure S21. CID spectrum of quercetin (CE = 20 eV)

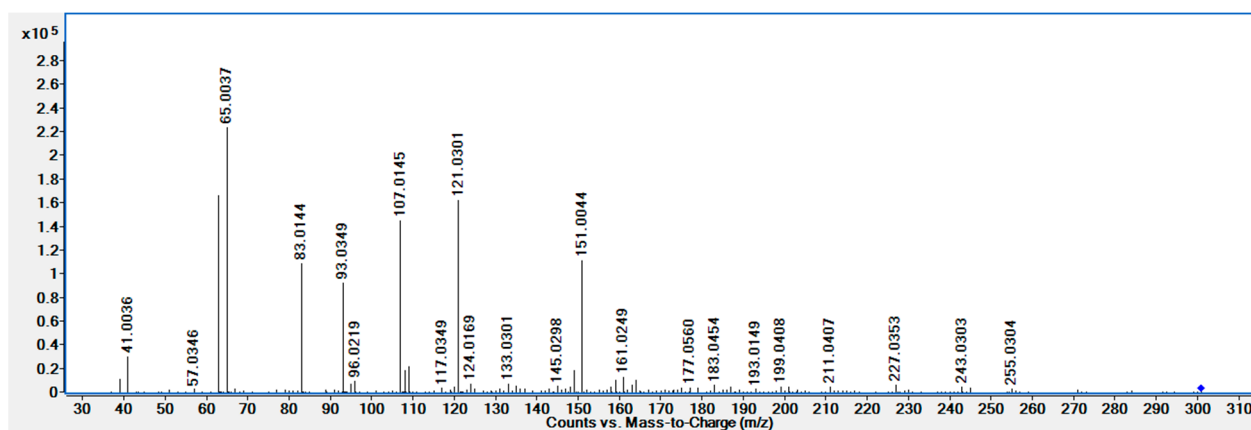


Figure S22. CID spectrum of quercetin (CE = 40 eV)





Table S1. Qualitative and quantitative analysis of cells stained with a mixture of AO/EB after 72 hours of incubation with RC and KF extracts at a concentration of 64  $\mu\text{g/mL}$  compared to intact cells (control).

Cell line	Preparation	Living cells	Dead cells (EB+)	Apoptotic bodies	Cells with impaired morphology	Total quantity Cells
Rd	Control	552	13	5	6	576
	RC	33	115	25	175	348
	KF	75	38	39	219	371
HOS	Control	463	7	0	0	470
	RC	192	95	31	1	319
	KF	120	174	28	5	317

Rd; human embryonic rhabdomyosarcoma cell line, HOS; human osteosarcoma cell line, AO/EB; acridine orange and ethidium bromide, KF; kudzu flower, RC; red clover.