*Article*

# Selectivity tuning by natural deep eutectic solvents (NADES) for extraction of bioactive compounds from *Cytinus hypocistis* – studies of antioxidative and enzyme inhibitive properties and LC-MS profiles

**Gokhan Zengin[1], María de la Luz Cádiz-Gurrea[2*], Álvaro Fernández-Ochoa[2*], Francisco Javier Leyva-Jiménez[3,4] Malwina Momotko[5], Evren Yildiztugay[6], Refik Karatas[1], Sharmeen Jugreet[7], Mohamad Fawzi Mahoomodally[7,8,9], Grzegorz Boczkaj[10,11]**

[1]Department of Biology, Science Faculty, Selcuk University, Konya, Turkey
[2]Department of Analytical Chemistry, Faculty of Sciences, University of Granada, Fuentenueva s/n, E- 18071 Granada, Spain
[3]Department of Analytical Chemistry and Food Science and Technology, University of Castilla-La Mancha, Ronda de Calatrava 7, 13071, Ciudad Real, Spain
[4]Regional Institute for Applied Scientific Research (IRICA), Area of Food Science, University of Castilla-La Mancha, Avenida Camilo Jose Cela, 10, 13071, Ciudad Real, Spain
[5]Gdansk University of Technology, Faculty of Chemistry, Department of Process Engineering and Chemical Technology, 80 – 233 Gdansk, G. Narutowicza St. 11/12, Poland
[6]Department of Biotechnology, Science Faculty, Selcuk University, Konya, Turkey
[7] Department of Health Sciences, Faculty of Medicine and Health Sciences, University of Mauritius, Réduit 80837, Mauritius
[8] Center for Transdisciplinary Research ,Department of Pharmacology ,Saveetha Dental College ,Saveetha Institute of Medical and Technical Science ,Chennai ,India
[9]Centre of Excellence for Pharmaceutical Sciences (Pharmacen), North West University, South Africa
[10]Gdansk University of Technology, Faculty of Civil and Environmental Engineering, Department of Sanitary Engineering, 80 – 233 Gdansk, G. Narutowicza St. 11/12, Poland
[11]Advanced Materials Center, Gdansk University of Technology, 80 – 233 Gdansk, G. Narutowicza St. 11/12, Poland
* Correspondence: mluzcadiz@ugr.es; alvaroferochoa@ugr.es

Table S1. Total phenolic (TPC) and flavonoid content (TFC) of the tested extracts.

| **Solvents** | **TPC (mg GAE/g)** | **TFC (mg RE/g)** |
|---|---|---|
| Hexane | 26.47±0.96$^{g}$ | 0.68±0.02$^{g}$ |
| Ethyl acetate | 127.83±1.93$^{d}$ | 12.55±0.35$^{a}$ |
| Dichloromethane | 43.28±0.06$^{f}$ | 1.85±0.01$^{f}$ |
| Ethanol | 123.68±0.59$^{e}$ | 8.82±0.44$^{c}$ |
| Ethanol/water | 123.51±0.86$^{e}$ | 11.44±0.14$^{b}$ |
| Water | 126.56±1.47$^{de}$ | 9.35±0.18$^{c}$ |
| NADES-A | 174.67±0.62$^{b}$ | 5.89±0.15$^{d}$ |
| NADES-B | 186.13±1.84$^{a}$ | 3.82±0.06$^{e}$ |
| NADES-C | 167.57±1.45$^{c}$ | 1.51±0.08$^{f}$ |

Values are reported as mean ±SD of three parallel experiments. GAE: Gallic acid equivalent; RE: Rutin equivalent. Different letters in same column indicate significant differences in the tested extracts ($p<0.05$)

Table S2. Proposed annotated compounds by UPLC-ESI-QTOF-MS in all Cytinus extracts.

| Peak | RT (min) | m/z | m/z theorical | Error (ppm) | Formula | Proposed identification of the compounds | MS Fragments |
|---|---|---|---|---|---|---|---|
| 1 | 0.46 | 201.0248 | 201.0265 | -8.86 | C5H6N4O5 | Hydroxy-pseudouric acid | 201.0248 |
| 2 | 0.47 | 343.0364 | 343.0307 | 16.54 | C13H12O11 | Galloyl-galactarolactone | 343.0364 |
| 3 | 0.47 | 217.0023 | 217.0006 | 7.71 | C4H5N5O4P | Unknown 1 | --- |
| 4 | 0.61 | 222.1344 | 222.1347 | -1.15 | C9H21NO5 | Unknown 2 | --- |
| 5 | 0.64 | 114.0555 | 114.0561 | -4.90 | C5H9NO2 | Proline | 114.0555 |
| 6 | 0.66 | 341.1083 | 341.1089 | -1.79 | C12H22O11 | Disaccharide | 101.0265/179.0698 |
| 7 | 0.67 | 328.0698 | 328.0674 | 7.43 | C13H15NO9 | Unknown 3 | --- |
| 8 | 0.67 | 179.0557 | 179.0561 | -2.18 | C6H12O6 | Glucose | 179.0557 |
| 9 | 0.71 | 231.0172 | 231.0180 | -3.72 | C5H12O8S | Unknown 4 | --- |
| 10 | 0.71 | 191.0552 | 191.0561 | -4.95 | C7H12O6 | Quinic acid | 85.0231/93.0368 |
| 11 | 0.76 | 493.1202 | 493.1199 | 0.70 | C19H26O15 | Galloyl-diglucose | 125.0312/169.0213/493.1202 |
| 12 | 0.79 | 331.0666 | 331.0671 | -1.50 | C13H16O10 | Galloylglucose isomer 1 | 125.0312/169.0213 |
| 13 | 1.09 | 331.0661 | 331.0671 | -2.85 | C13H16O10 | Galloylglucose isomer 2 | 125.0247/169.0160 |
| 14 | 1.32 | 331.0660 | 331.0671 | -3.17 | C13H16O10 | Galloylglucose isomer 3 | 125.0244/169.0147 |
| 15 | 1.64 | 125.0235 | 125.0244 | -6.98 | C6H6O3 | Pyrogallol | 125.0235 |
| 16 | 1.65 | 169.0137 | 169.0142 | -3.17 | C7H6O5 | Gallic acid | 125.0231/169.0137 |
| 17 | 1.78 | 331.0662 | 331.0671 | -2.64 | C13H16O10 | Galloylglucose isomer 4 | 169.0128/331.0662 |
| 18 | 1.89 | 271.0458 | 271.0459 | -0.44 | C11H12O8 | Fukiic acid | 271.0458 |
| 19 | 4.35 | 483.0775 | 483.0780 | -1.18 | C20H20O14 | Digalloylglucose isomer 1 | 125.0240/169.0130/331.0633 |
| 20 | 4.70 | 483.0769 | 483.0780 | -2.28 | C20H20O14 | Digalloylglucose isomer 2 | 125.0228/169.0113/313.0548/331.0644 |
| 21 | 5.11 | 483.0775 | 483.0780 | -1.18 | C20H20O14 | Digalloylglucose isomer 3 | 125.0266/169.0122/331.0709 |
| 22 | 5.96 | 483.0774 | 483.0780 | -1.28 | C20H20O14 | Digalloylglucose isomer 4 | 125.0236/169.0122/313.0616/331.0616 |
| 23 | 6.17 | 291.0140 | 291.0146 | -2.32 | C13H8O8 | Brevifolin carboxylic acid | 191.0273/247.0242 |
| 24 | 6.39 | 321.0248 | 321.0252 | -1.16 | C14H10O9 | Digallate isomer 1 | 125.0238/169.0127 |
| 25 | 6.82 | 601.0463 | 601.0530 | -11.08 | C19H22O22 | Unknown 5 | --- |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 26 | 6.83 | 635.0876 | 635.0890 | -2.20 | C27H24O18 | Trigalloyl-glucoside isomer 1 | 107.0138/125.0246/169.0147/465.0677 |
| 27 | 6.84 | 633.0715 | 633.0733 | -2.97 | C27H22O18 | HHDP-galloylglucose isomer 1 | 125.0251/169.0129/300.9979/463.0687 |
| 28 | 6.84 | 465.0660 | 465.0675 | -3.11 | C20H18O13 | Galloylnorbergenin isomer 1 | 125.0229/169.0125 |
| 29 | 7.39 | 247.0239 | 247.0248 | -3.59 | C12H8O6 | Brevifolin | 191.0313/219.0316 |
| 30 | 7.49 | 465.0669 | 465.0675 | -1.11 | C20H18O13 | Galloylnorbergenin isomer 2 | 125.0228/169.0122 |
| 31 | 7.81 | 785.0836 | 785.0843 | -0.82 | C34H26O22 | Digalloyl-HHDP-glucose isomer 1 | 169.0134/301.0093/483.0655 |
| 32 | 7.91 | 465.0671 | 465.0675 | -0.88 | C20H18O13 | Galloylnorbergenin isomer 3 | 125.0230/169.0127 |
| 33 | 7.91 | 635.0890 | 635.0890 | -0.04 | C27H24O19 | Trigalloyl-glucoside isomer 2 | 125.0235/169.0149/211.0183/313.0580/ 465.0672 |
| 34 | 7.93 | 633.0734 | 633.0733 | 0.15 | C27H22O18 | HHDP-galloylglucose isomer 2 | 125.0244/169.0147/249.0323/275.0092/ 301.0023/ |
| 35 | 8.00 | 635.0885 | 635.0890 | -0.76 | C27H24O18 | Trigalloyl-glucoside isomer 3 | 125.0245/169.0143/211.0254/313.0564/ 465.0665 |
| 36 | 8.30 | 785.0828 | 785.0843 | -1.87 | C34H26O22 | Digalloyl-HHDP-glucose isomer 2 | 125.0240/169.0123/300.9958/313.0535/ 463.0874 |
| 37 | 8.39 | 633.0723 | 633.0733 | -1.64 | C27H22O18 | HHDP-galloylglucose isomer 3 | 125.0271/169.0146/300.9971/463.0655 |
| 38 | 8.40 | 635.0880 | 635.0890 | -1.57 | C27H24O19 | Trigalloyl-glucoside isomer 4 | 125.0278/169.0143/313.0576/483.0790 |
| 39 | 8.91 | 783.0687 | 783.0686 | 0.10 | C34H24O22 | Terflavin B isomer 1 | 450.9983/631.0520 |
| 40 | 8.93 | 617.0775 | 617.0784 | -1.55 | C27H22O17 | Galloyl-HHDP-glucose isomer 1 | 169.0123/300.9988 |
| 41 | 8.94 | 787.0977 | 787.0999 | -2.86 | C34H28O22 | Tetragalloyl-glucoside isomer 1 | 169.0097/313.0591/465.0709/617.0779/ 635.0878 |
| 42 | 9.18 | 757.0863 | 757.0894 | -4.05 | C33H26O21 | Balanophotannin E isomer 1 | 125.0219/169.0131 |
| 43 | 9.27 | 937.0925 | 937.0953 | -2.93 | C41H30O26 | Trigalloyl-HHDP-glucose isomer 1 | 169..0131/295.0461/300.9969 |
| 44 | 9.28 | 783.0683 | 783.0686 | -0.44 | C34H24O22 | Terflavin B isomer 2 | 783.0663 |
| 45 | 9.39 | 276.9971 | 276.9990 | -6.65 | C12H6O8 | Galloflavin | 169.0141 |
| 46 | 9.47 | 300.9977 | 300.9990 | -4.43 | C14H6O8 | Ellagic acid | 145.0327/245.0069/300.9953 |
| 47 | 9.57 | 783.0671 | 783.0686 | -2.04 | C34H24O22 | Terflavin B isomer 3 | 450.9964/631.0720 |
| 48 | 9.57 | 937.0949 | 937.0953 | -0.36 | C41H30O26 | Trigalloyl-HHDP-glucose isomer 2 | 169.0134/275.0200/295.0451/300.9987/ 313.0562/465.0669 |
| 49 | 9.58 | 935.0806 | 935.0796 | 1.01 | C41H28O26 | Digalloyl-lactonised valoneoyl-d-glucose isomer 1 | 125.0246/169.0140/300.9976/450.9925 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 50 | 9.59 | 909.0993 | 909.1003 | -1.13 | C40H30O25 | trigalloyl-brevifolincarboxyl-glucose isomer 1 | 247.0258/435.0508/ |
| 51 | 9.61 | 787.0993 | 787.0999 | -0.81 | C34H28O22 | Tetragalloyl-glucoside isomer 2 | 125.0241/169.0135/313.0585/465.0690/ 617.0760/635.0874 |
| 52 | 9.63 | 289.0708 | 289.0718 | -3.43 | C15H14O6 | Catechin | 245.0830 |
| 53 | 9.67 | 787.0997 | 787.0999 | -0.31 | C34H28O22 | Tetragalloyl-glucoside isomer 3 | 125.0232/169.0134/313.0546/617.0777/ 635.0831 |
| 54 | 9.70 | 321.0238 | 321.0252 | -4.34 | C14H10O9 | Digallate isomer 2 | 125.0229/169.0133 |
| 55 | 9.76 | 787.0988 | 787.0999 | -1.43 | C34H28O22 | Tetragalloyl-glucoside isomer 4 | 125.0232/169.0140/313.0562/465.0684/ 617.0783/635.0871 |
| 56 | 9.78 | 321.0242 | 321.0252 | -3.11 | C14H10O9 | Digallate isomer 3 | 125.0238/169.0138 |
| 57 | 9.78 | 783.0677 | 783.0686 | -1.19 | C34H24O22 | Terflavin B isomer 4 | 450.0698/631.0460 |
| 58 | 9.89 | 617.0776 | 617.0784 | -1.30 | C27H22O17 | Galloyl-HHDP-glucose isomer 2 | 169.0141/300.9985 |
| 59 | 9.91 | 787.0987 | 787.0999 | -1.64 | C34H28O22 | Tetragalloyl-glucoside isomer 5 | 125.0238/169.0141/313.0553/465.0697/ 617.0778/635.0883 |
| 60 | 9.95 | 971.1000 | 971.1007 | -0.76 | C41H32O28 | Neochebulagic acid isomer 1 | 300.9972/467.0727/935.0848/971.1000 |
| 61 | 10.04 | 971.0992 | 971.1007 | -1.61 | C41H32O28 | Neochebulagic acid isomer 2 | 300.9980/467.0734/971.0992 |
| 62 | 10.05 | 477.1027 | 477.1039 | -2.41 | C22H22O12 | Isorhamnetin glucoside isomer 1 | 271.0299/285.0424/317.0688 |
| 63 | 10.06 | 289.0708 | 289.0718 | -3.18 | C15H14O6 | Epicatechin | 109.0343/123.0090/245.0076 |
| 64 | 10.25 | 301.0334 | 301.0354 | -6.72 | C15H10O7 | Quercetin | 121.0292/151.0386/179.0370 |
| 65 | 10.26 | 757.0882 | 757.0894 | -1.61 | C33H26O21 | Balanophotannin E isomer 2 | 125.0219/169.0131/757.0882 |
| 66 | 10.26 | 463.0867 | 463.0823 | 9.41 | C28H16O7 | Unknown 6 | --- |
| 67 | 10.27 | 935.0740 | 935.0796 | -5.99 | C41H28O26 | Digalloyl-lactonised valoneoyl-d-glucose isomer 2 | 125.0240/169.0144/301.0026//767.0713 |
| 68 | 10.29 | 909.0990 | 909.1003 | -1.47 | C40H30O25 | trigalloyl-brevifolincarboxyl-glucose isomer 2 | 247.0258/435.0553/605.0803 |
| 69 | 10.30 | 939.1064 | 939.1109 | -4.83 | C41H32O26 | Pentagalloyl-glucose isomer 1 | 125.0228/169.0139/313.0529/465.0643/ 617.0801 |
| 70 | 10.41 | 971.1002 | 971.1007 | -0.56 | C41H32O28 | Neochebulagic acid isomer 3 | 300.9987/465.0658/935.0884/971.1002 |
| 71 | 10.49 | 1087.0912 | 1087.0906 | 0.58 | C48H32O30 | Trigalloyl-lactonised valoneoyl glucose isomer 1 | 125.0228/169.0129/300.9972/615.0730 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 72 | 10.49 | 1089.1055 | 1089.1062 | -0.61 | C48H34O30 | (Galloyl)galloyl-tetragalloylglucose isomer 1 | 125.0227/169.0134/447.0501/465.0643/ 617.0733/769.0824/939.1045 |
| 73 | 10.59 | 909.0995 | 909.1003 | -0.91 | C40H30O25 | trigalloyl-brevifolincarboxyl-glucose isomer 3 | 247.0263/435.0539/605.0590 |
| 74 | 10.65 | 953.0909 | 953.0902 | 0.74 | C41H30O27 | Trigalloyl-DHHDP-glucose isomer 1 | 125.0250/169.0134/275.0188/300.9972/ 445.0373 |
| 75 | 10.66 | 935.0791 | 935.0796 | -0.57 | C41H28O26 | Digalloyl-lactonised valoneoyl-d-glucose isomer 3 | 125.0235/169.0149/300.9918/767.0920 |
| 76 | 10.70 | 933.0624 | 933.0640 | -1.64 | C41H26O26 | Castalagin | 933.0624 |
| 77 | 10.70 | 937.0936 | 937.0953 | -1.81 | C41H30O26 | Trigalloyl-HHDP-glucose isomer 3 | 169.0125/295.0440/300.9983/313.051/599. 0624 |
| 78 | 10.71 | 941.0959 | 941.0902 | 6.05 | C41H34O26 | Galloyl-penta-hydroxy-benzoic-brevifolincarboxyl-glucose isomer 1 | 247.0227/291.0133/435.0532/757.0858 |
| 79 | 10.72 | 939.1108 | 939.1109 | -0.10 | C41H32O26 | Pentagalloyl-glucose isomer 2 | 125.0245/169.0139/465.0652/617.0781/ 769.0894 |
| 80 | 10.75 | 951.0757 | 951.0745 | 1.28 | C41H28O27 | Trisgalloyl HHDP glucose isome isomer 1 | 275.0240/300.9964/605.0799/783.0612/ 951.0757 |
| 81 | 10.82 | 439.0658 | 439.0671 | -2.84 | C22H16O10 | Amurensisin | 439.0658 |
| 82 | 10.92 | 953.0899 | 953.0902 | -0.31 | C41H30O27 | Trigalloyl-DHHDP-glucose isomer 2 | 125.0234/169.0140/301.0017/785.0820 |
| 83 | 10.92 | 935.0794 | 935.0796 | -0.18 | C41H28O26 | Digalloyl-lactonised valoneoyl-d-glucose isomer 4 | 125.0232/169.0142/300.9996/767.0502 |
| 84 | 10.93 | 939.1104 | 939.1109 | -0.57 | C41H32O26 | Pentagalloyl-glucose isomer 3 | 169.0144/313.0536/465.0673/617.0775/ |
| 85 | 10.94 | 941.0942 | 941.0902 | -4.25 | C40H30O27 | Galloyl-penta-hydroxy-benzoic-brevifolincarboxyl-glucose isomer 2 | 247.0238/291.0046/757.0898 |
| 86 | 11.06 | 909.1003 | 909.1003 | -0.06 | C40H30O25 | trigalloyl-brevifolincarboxyl-glucose isomer 4 | 169.0134/247.0242/291.0148/435.0642/ |
| 87 | 11.23 | 925.0937 | 925.0953 | -1.64 | C40H30O26 | Phyllanthusiin C isomer 1 | 169.0133/247.0226/300.9927/435.0593/ 925.0937 |
| 88 | 11.28 | 953.0887 | 953.0902 | -1.52 | C41H30O27 | Trigalloyl-DHHDP-glucose isomer 3 | 125.0241/169.0128/301.0095 |
| 89 | 11.29 | 197.0448 | 197.0455 | -3.77 | C9H10O5 | Ethyl gallate | 169.0131/124.0169/197.0448 |
| 90 | 11.30 | 909.0991 | 909.1003 | -1.33 | C40H30O25 | trigalloyl-brevifolincarboxyl-glucose isomer 5 | 247.0229/291.0147/435.0540/605.0792 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 91 | 11.31 | 951.0737 | 951.0745 | -0.85 | C41H28O27 | Trisgalloyl HHDP glucose isome isomer 2 | 301.0014/605.0767/783.0887 |
| 92 | 11.39 | 1087.0901 | 1087.0906 | -0.40 | C48H32O30 | Trigalloyl-lactonised valoneoyl glucose isomer 2 | 125.0228/169.0129/300.9972/615.0730 |
| 93 | 11.44 | 1089.1045 | 1089.1062 | -1.56 | C48H34O30 | (Galloyl)galloyl-tetragalloylglucose isomer 2 | 125.0227/169.0130/447.0501/465.0662/ 617.0750/769.0837/939.1060 |
| 94 | 11.47 | 1105.1029 | 1105.1011 | 1.58 | C48H34O31 | Digalloyl-HHDP-iso DHDG-glucose isomer 1 | 169.0140/275.0172/300.9943/767.0491 |
| 95 | 11.47 | 757.0888 | 757.0894 | -0.76 | C33H26O21 | Balanophotannin E isomer 3 | 125.0219/169.0131/757.0882 |
| 96 | 11.47 | 477.1029 | 477.1039 | -2.04 | C22H22O12 | Isorhamnetin glucoside isomer 2 | 271.0297/285.0422/317.0684 |
| 97 | 11.56 | 1091.1213 | 1091.1219 | -0.47 | C48H36O30 | Hexagalloyl-glucose isomer 1 | 169.0143/431.0576/617.0773/769.0881/ 939.1062 |
| 98 | 11.56 | 1087.0894 | 1087.0906 | -1.05 | C48H32O30 | Trigalloyl-lactonised valoneoyl glucose isomer 3 | 125.0219/169.0133/300.9963 |
| 99 | 11.60 | 299.9898 | 299.9912 | -4.58 | C14H5O8 | Ellagic acid derivative | 299.9898 |
| 100 | 11.63 | 1089.1052 | 1089.1062 | -0.96 | C48H34O30 | (Galloyl)galloyl-tetragalloylglucose isomer 3 | 125.0227/169.0142/447.0501/465.0662/ 617.0765/769.0887/939.1076 |
| 101 | 11.68 | 1089.1068 | 1089.1062 | 0.51 | C48H34O30 | (Galloyl)galloyl-tetragalloylglucose isomer 4 | 125.0227/169.0149/447.0501/465.0662/ 617.0771/769.0980/939.1094 |
| 102 | 11.69 | 941.0932 | 941.0902 | -3.18 | C40H30O27 | Galloyl-penta-hydroxy-benzoic-brevifolincarboxyl-glucose isomer 3 | 247.0244/291.0181/435.0531/757.0914 |
| 103 | 11.72 | 1091.1222 | 1091.1219 | 0.35 | C48H36O30 | Hexagalloyl-glucose isomer 2 | 169.0133/313.0620/617.0771/769.0848/ 939.1060 |
| 104 | 11.77 | 617.0779 | 617.0784 | -0.87 | C27H22O17 | Galloyl-HHDP-glucose isomer 3 | 169.0134/300.9969 |
| 105 | 11.86 | 1091.1223 | 1091.1219 | 0.38 | C48H36O30 | Hexagalloyl-glucose isomer 3 | 169.0128/313.0544/483.0786/617.0781/ 787.0980/939.1072 |
| 106 | 12.02 | 1105.0998 | 1105.1011 | -1.16 | C48H34O31 | Digalloyl-HHDP-iso DHDG-glucose isomer 2 | 169.0141/275.0171/300.9980/767.0490 |
| 107 | 12.06 | 907.1187 | 907.1211 | -2.62 | C41H32O24 | Tetragalloyl-hydroxybenzoyl-glucopyranoside isomer 1 | 169.0131/300.9990 |
| 108 | 12.09 | 1243.1330 | 1243.1328 | 0.10 | C55H40O34 | Heptagalloyl hexose isomer 1 | 169.0145/617.0778/787.1007/939.1128/ 1091.1259 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 109 | 12.11 | 469.0511 | 469.0471 | 8.55 | C15H18O17 | Galloylmyricetin | 169.0141/469.0511 |
| 110 | 12.18 | 1243.1329 | 1243.1328 | 0.08 | C55H40O34 | Heptagalloyl hexose isomer 2 | 169.0141/617.0781/769.0922/939.1141/ 1091.1246 |
| 111 | 12.18 | 925.0942 | 925.0953 | -1.09 | C40H30O26 | Phyllanthusiin C isomer 2 | 169.0141/247.0245/300.9989/755.0680 |
| 112 | 12.25 | 1105.0996 | 1105.1011 | -1.36 | C48H34O31 | Digalloyl-HHDP-iso DHDG-glucose isomer 3 | 169.0140/275.0170/300.9983/767.0493 |
| 113 | 12.27 | 909.0997 | 909.1003 | -0.71 | C40H30O25 | trigalloyl-brevifolincarboxyl-glucose isomer 6 | 247.0229/291.0147/435.0540/605.0792 |
| 114 | 12.30 | 1243.1334 | 1243.1328 | 0.47 | C55H40O34 | Heptagalloyl hexose isomer 3 | 169.0147/617.0800/769.0877/939.1129/ 1091.1222 |
| 115 | 12.55 | 907.1194 | 907.1211 | -1.80 | C41H32O24 | Tetragalloyl-hydroxybenzoyl-glucopyranoside isomer 2 | 169.0126/300.9985 |
| 116 | 12.64 | 907.1194 | 907.1211 | -1.82 | C41H32O24 | Tetragalloyl-hydroxybenzoyl-glucopyranoside isomer 3 | 169.0122/300.9987 |
| 117 | 13.97 | 983.1718 | 983.1793 | -7.62 | C37H44O31 | Unknown 7 | --- |
| 118 | 14.64 | 329.2325 | 329.2333 | -2.67 | C18H34O5 | Trihydroxy-octadecenoic acid | 329.2325 |
| 119 | 16.82 | 315.1955 | 315.1966 | -3.54 | C20H28O3 | Hydroxyretinoic acid | 315.1955 |
| 120 | 17.44 | 277.1798 | 277.1809 | -4.13 | C17H26O3 | Unknown 8 | --- |
| 121 | 17.64 | 285.2057 | 285.2071 | -4.96 | C16H30O4 | Hexadecanedioic acid | 285.2057 |
| 122 | 17.64 | 321.2423 | 321.2435 | -3.73 | C20H34O3 | Hydroxyeicosatrienoic acid | 321.2423 |
| 123 | 17.68 | 233.1537 | 233.1547 | -4.47 | C15H22O2 | Valerenic acid | 233.1537 |
| 124 | 17.77 | 295.2267 | 295.2279 | -3.80 | C18H32O3 | Hydroxylinoleic acid | 295.2267 |
| 125 | 17.81 | 279.2320 | 279.2330 | -3.49 | C18H32O2 | Linoleic acid | 279.2320 |
| 126 | 17.87 | 293.2115 | 293.2122 | -2.43 | C18H30O3 | Hydroxylinolenic acid | 293.2115 |
| 127 | 17.93 | 265.1795 | 265.1809 | -5.33 | C16H26O3 | Dodecenyl-succinic anhydride | 265.1795 |
| 128 | 18.17 | 299.2007 | 299.2017 | -3.05 | C20H28O2 | Retinoic acid | 299.2007 |
| 129 | 18.24 | 281.2477 | 281.2486 | -3.16 | C18H34O2 | Oleic acid | 281.2477 |
| 130 | 18.33 | 239.2003 | 239.2017 | -5.57 | C15H28O2 | Pentadecenoic acid | 239.2003 |
| 131 | 18.36 | 443.3010 | 443.3014 | -0.89 | C24H44O7 | Oleiyl glucoside | 443.3010 |
| 132 | 18.36 | 277.2165 | 277.2173 | -2.93 | C18H30O2 | Linolenic acid | 277.2165 |
| 133 | 18.41 | 283.2629 | 283.2643 | -4.77 | C18H36O2 | Stearic acid | 283.2629 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 134 | 18.41 | 443.3367 | 443.3378 | -2.58 | C25H48O6 | Unknown 9 | --- |
| 135 | 18.42 | 447.2741 | 447.2752 | -2.60 | C26H40O6 | Unknown 10 | --- |
| 136 | 18.49 | 301.2166 | 301.2173 | -2.44 | C20H30O2 | Eicosapentaenoic acid | 301.2166 |
| 137 | 18.50 | 253.2163 | 253.2173 | -3.89 | C16H30O2 | Palmitoleic acid | 253.2163 |
| 138 | 18.56 | 279.2320 | 279.2330 | -3.50 | C18H32O2 | Linoleic acid | 279.2320 |
| 139 | 18.58 | 243.1222 | 243.1238 | -6.41 | C12H20O5 | Oxodecanedioic acid | 243.1222 |
| 140 | 18.62 | 317.2475 | 317.2486 | -3.46 | C21H34O2 | Methyl arachidonate | 317.2475 |
| 141 | 18.65 | 503.3379 | 503.3378 | 0.24 | C30H48O6 | Arjungenin | 503.3379 |
| 142 | 18.65 | 267.2321 | 267.2330 | -3.04 | C17H32O2 | Heptadecenoic acid | 267.2321 |
| 143 | 18.66 | 465.3578 | 465.3585 | -1.51 | C28H50O5 | Unknown 11 | --- |
| 144 | 18.70 | 471.3681 | 471.3691 | -2.15 | C27H52O6 | Unknown 12 | --- |
| 145 | 18.70 | 369.2699 | 369.2646 | 14.15 | C21H38O5 | Glycerylmonooleate | 369.2699 |
| 146 | 18.76 | 255.2321 | 255.2330 | -3.27 | C16H32O2 | Palmitic acid | 255.2321 |
| 147 | 18.84 | 355.3209 | 355.3218 | -2.44 | C22H44O3 | Hydroxydocosanoic acid | 355.3209 |
| 148 | 20.83 | 283.1909 | 283.1915 | -2.05 | C16H28O4 | Dodecenylsuccinic acid | 283.1909 |

RT: retention time

Table S3. Compound areas extracted for each *Cytinus* extract.

| Peak | HEXANE | ETHYL ACETATE | DICHLOROMETHANE | ETHANOL | ETHANOL/WATER | WATER | NADES A | NADES B | NADES C |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4338.84 | 7065.39 | 1722.18 | ND | 30270.76 | 9196.48 | ND | 4257.48 | ND |
| 2 | 1472.37 | 2555.67 | ND | ND | 26658.72 | 4787.31 | ND | ND | ND |
| 3 | 3701.65 | 10686.53 | 3525.34 | 1193.59 | 11130.14 | 9630.11 | 5258.70 | 8258.92 | 6534.77 |
| 4 | ND | ND | ND | ND | ND | ND | ND | 23668.11 | ND |
| 5 | ND | ND | ND | ND | ND | ND | 43410.37 | ND | 26187.67 |
| 6 | 5529.35 | 11446.12 | ND | 5575.87 | 11922.77 | 3647.79 | ND | ND | ND |
| 7 | ND | ND | ND | ND | ND | ND | ND | ND | 127404.30 |
| 8 | ND | ND | ND | 3027.69 | 4149.75 | ND | ND | ND | ND |
| 9 | ND | ND | ND | ND | ND | ND | ND | ND | 79290.61 |
| 10 | ND | 5836.29 | ND | 2196.18 | 4929.46 | 2246.15 | ND | ND | ND |
| 11 | ND | ND | ND | 5409.12 | 3206.05 | ND | ND | ND | ND |
| 12 | 14467.47 | 11996.40 | ND | 188302.61 | 71834.92 | 27602.13 | ND | 15803.16 | ND |
| 13 | 1901.12 | 61452.56 | ND | 63652.51 | 4150ND | 31270.43 | ND | 9826.70 | ND |
| 14 | 18705.91 | 131115.08 | ND | 104956.04 | 105101.51 | 167287.82 | ND | 7125.64 | ND |
| 15 | ND | 17787.67 | ND | 16084.88 | 25204.94 | 28606.73 | 4668.04 | 7010.09 | 6979.67 |
| 16 | ND | 7640.96 | ND | 24611.76 | 28140.39 | 35129.83 | 7661.75 | 6806.10 | 4156.76 |
| 17 | ND | 8006.45 | ND | 6522.83 | 22798.39 | 18574.97 | ND | 2330.38 | ND |
| 18 | ND | 8475.20 | ND | ND | ND | 7478.05 | ND | 6556.02 | ND |
| 19 | ND | 4098.23 | ND | 8596.24 | 41135.99 | 36057.78 | ND | 9140.80 | ND |
| 20 | ND | ND | ND | 4565.72 | 48566.66 | 35115.73 | ND | 2311.39 | ND |
| 21 | ND | 11659.83 | ND | 21870.97 | 33172.35 | 2909.42 | ND | 4106.42 | ND |
| 22 | ND | 6319.32 | ND | 18824.92 | 39406.30 | 24698.35 | ND | 5947.75 | ND |
| 23 | ND | ND | ND | ND | 20328.68 | 6145.20 | ND | ND | ND |
| 24 | ND | ND | ND | 1324.12 | 14369.48 | 5911.97 | ND | ND | ND |
| 25 | 1397.47 | 9276.60 | ND | ND | ND | ND | ND | ND | ND |
| 26 | ND | 58810.84 | ND | 81787.34 | 216160.54 | 142065.89 | 9038.45 | ND | ND |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 27 | ND | 18678.25 | ND | 6843.51 | 11057.52 | 14186.62 | ND | ND | ND |
| 28 | 2417.88 | 33927.38 | ND | 25050.89 | 49735.92 | 46090.20 | 5170.67 | ND | ND |
| 29 | ND | ND | ND | 3591.30 | 56844.72 | 25903.39 | 2442.57 | ND | ND |
| 30 | ND | 6370.92 | ND | 11661.74 | 32055.64 | 11802.14 | ND | ND | ND |
| 31 | ND | ND | ND | 4987.80 | 26798.91 | 1254.77 | ND | ND | ND |
| 32 | 1084.70 | 33514.03 | ND | 30934.70 | 52235.40 | 30551.04 | ND | ND | ND |
| 33 | ND | 84849.87 | ND | 125377.26 | 262852.42 | 106751.63 | ND | 1499.45 | ND |
| 34 | ND | 30683.41 | ND | 11464.54 | 16052.21 | 11953.01 | ND | ND | ND |
| 35 | ND | 30780.04 | ND | 53826.53 | 102630.93 | 40428.71 | ND | 1697.95 | ND |
| 36 | ND | 4528.82 | ND | 19127.96 | 35912.21 | 4328.67 | ND | ND | ND |
| 37 | ND | 7278.28 | ND | 1689.37 | 4940.15 | 3152.29 | ND | ND | ND |
| 38 | ND | 13001.39 | ND | 32157.16 | 61366.06 | 21982.25 | ND | ND | ND |
| 39 | ND | 16659.90 | ND | 1064.04 | ND | ND | ND | ND | ND |
| 40 | ND | 9175.29 | ND | 12840.77 | 13054.64 | 7980.43 | ND | ND | ND |
| 41 | ND | 53399.17 | ND | 265818.56 | 184755.56 | 77494.68 | ND | ND | ND |
| 42 | ND | 8968.07 | ND | 31473.02 | 78504.05 | 27301.00 | ND | ND | ND |
| 43 | ND | ND | ND | ND | 19202.85 | ND | ND | ND | ND |
| 44 | ND | 12358.48 | ND | 2328.27 | ND | ND | ND | ND | ND |
| 45 | 16208.14 | 15082.45 | ND | ND | ND | ND | ND | ND | ND |
| 46 | 22672.55 | 248841.27 | ND | 361874.10 | 115949.04 | 109713.73 | 6350.37 | 2969.21 | ND |
| 47 | 1034.34 | 13423.75 | ND | 3265.64 | ND | ND | ND | ND | ND |
| 48 | 5665.86 | 46970.87 | ND | 31365.63 | 44628.25 | 18129.81 | ND | ND | ND |
| 49 | 1547.67 | 6704.43 | ND | 1733.79 | ND | ND | ND | ND | ND |
| 50 | ND | 43400.52 | ND | 25032.40 | 5406.55 | 1051.77 | ND | ND | ND |
| 51 | 30707.11 | 259404.70 | ND | 250879.69 | 1027511.76 | 342713.83 | 2612.51 | ND | 1370.26 |
| 52 | ND | 3846.58 | ND | 1186.27 | 4159.85 | 1630.87 | ND | ND | ND |
| 53 | 80419.98 | 633350.06 | ND | 506625.26 | 707367.44 | 273110.44 | 8629.73 | ND | 1209.28 |
| 54 | ND | 5658.15 | ND | 1336.08 | 1957.65 | 1068.36 | ND | ND | ND |
| 55 | 33815.49 | 137013.88 | ND | 354567.80 | 178583.98 | 267247.71 | 15013.78 | ND | ND |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 56 | ND | 19372.27 | ND | 14787.16 | 14535.46 | 9567.92 | ND | ND | ND |
| 57 | 8336.46 | 74712.31 | ND | 36873.82 | 5089.53 | ND | ND | ND | ND |
| 58 | 13715.91 | 69829.43 | ND | 42085.46 | 66113.87 | 31639.05 | 2666.10 | ND | ND |
| 59 | 14794.27 | 157672.40 | ND | 122414.62 | 138787.17 | 103658.89 | 2963.01 | ND | ND |
| 60 | ND | 54400.71 | ND | 8907.23 | 108740.88 | 32329.29 | ND | ND | ND |
| 61 | ND | 1799.95 | ND | 14450.29 | 29262.10 | 49641.96 | ND | ND | ND |
| 62 | 2189.43 | 20697.98 | ND | 6965.75 | 22803.53 | 13431.12 | ND | ND | ND |
| 63 | ND | 9778.59 | ND | 2530.61 | 7839.58 | 3700.88 | ND | ND | ND |
| 64 | ND | 6188.82 | ND | ND | 1794.60 | ND | ND | ND | ND |
| 65 | ND | 87215.19 | ND | 29298.44 | 40173.29 | 6247.25 | ND | ND | ND |
| 66 | 4219.77 | 30505.13 | ND | 5771.66 | 12109.67 | 8649.01 | ND | ND | ND |
| 67 | ND | 2103.06 | ND | 19950.34 | ND | ND | ND | ND | ND |
| 68 | 2752.59 | 72049.91 | ND | 142068.56 | 156439.91 | 54841.88 | ND | ND | ND |
| 69 | 1143.17 | 404193.73 | ND | 236769.93 | 13467.65 | 15106.64 | ND | ND | ND |
| 70 | ND | ND | ND | ND | 14644.65 | ND | ND | ND | ND |
| 71 | ND | 6478.85 | ND | 1714.33 | 3865.00 | ND | ND | ND | ND |
| 72 | ND | 35942.25 | ND | 19764.80 | 30247.87 | 6376.75 | ND | ND | ND |
| 73 | 5966.76 | 113855.43 | ND | 28638.11 | 29648.77 | 75826.53 | ND | ND | ND |
| 74 | 6467.43 | 11942.60 | ND | ND | ND | ND | ND | ND | ND |
| 75 | 27165.36 | 152437.45 | ND | 78037.15 | 12586.65 | 1392.05 | 5759.60 | ND | ND |
| 76 | 7084.15 | 6187.25 | ND | ND | ND | ND | ND | ND | ND |
| 77 | 36021.36 | 76080.04 | ND | 32011.54 | 25074.93 | 41520.12 | 7499.54 | ND | ND |
| 78 | 15915.66 | 129718.56 | ND | 43788.92 | 112737.24 | 56303.96 | 3801.53 | ND | ND |
| 79 | 118853.81 | 818869.43 | ND | 333807.22 | 871883.28 | 397631.65 | 29712.99 | ND | ND |
| 80 | 2646.50 | 4176.48 | ND | ND | ND | ND | ND | ND | ND |
| 81 | 5100.72 | 11591.55 | ND | 11005.97 | 12926.32 | 1983.76 | ND | ND | ND |
| 82 | ND | 32800.47 | ND | 3773.28 | ND | 1770.73 | ND | ND | ND |
| 83 | 8113.54 | 40949.78 | ND | 13766.61 | ND | ND | ND | ND | ND |
| 84 | 45716.11 | 314291.23 | ND | 369919.70 | 246187.18 | 116090.27 | 11758.60 | ND | ND |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 85 | 8609.28 | 41277.39 | ND | 25803.11 | 27724.85 | 19272.67 | ND | ND | ND |
| 86 | 8700.39 | 391608.25 | ND | 72172.26 | 36095.88 | ND | ND | ND | ND |
| 87 | 15935.92 | 28102.85 | ND | 7673.46 | 95873.44 | 98623.98 | ND | ND | ND |
| 88 | 3084.20 | 56921.88 | ND | ND | 20574.53 | 10055.08 | ND | ND | ND |
| 89 | ND | ND | ND | 108506.29 | 366215.51 | 34192.44 | ND | ND | ND |
| 90 | 16044.25 | 268972.05 | ND | 33458.69 | 27742.27 | 20464.92 | ND | ND | ND |
| 91 | ND | 8281.56 | ND | ND | ND | 4985.21 | ND | ND | ND |
| 92 | 6560.94 | 44341.02 | ND | 16563.90 | ND | ND | ND | ND | ND |
| 93 | 15671.57 | 48432.33 | ND | 4096.28 | 17796.50 | 15682.36 | 2749.40 | ND | ND |
| 94 | 2205.60 | 11538.85 | ND | 3173.73 | ND | ND | ND | ND | ND |
| 95 | ND | 1579.88 | ND | 10219.14 | 4571.93 | ND | ND | ND | ND |
| 96 | ND | 4728.01 | ND | 1352.28 | 4218.35 | ND | ND | ND | ND |
| 97 | 51892.39 | 1493282.89 | ND | 522061.40 | 473458.85 | 258619.65 | 8482.52 | ND | ND |
| 98 | 9152.30 | 89461.85 | ND | 29034.75 | 1854.74 | ND | ND | ND | ND |
| 99 | 12444.07 | 13344.52 | ND | ND | ND | 3475.05 | ND | ND | ND |
| 100 | 16466.56 | 37016.38 | ND | 17856.75 | 7535.48 | 25119.70 | ND | ND | ND |
| 101 | 13701.74 | 14236.06 | ND | 3579.61 | 3696.42 | 8601.61 | ND | ND | ND |
| 102 | ND | 14344.14 | ND | 5339.73 | 8188.67 | 4347.30 | ND | ND | ND |
| 103 | 37469.90 | 755457.92 | ND | 285159.28 | 192968.24 | 188886.92 | 7425.81 | ND | ND |
| 104 | 14973.69 | 39588.58 | ND | 9461.59 | 20138.06 | 16744.81 | 1240.38 | ND | ND |
| 105 | 11368.42 | 534998.11 | ND | 92829.61 | 79504.37 | 82015.40 | 3608.48 | ND | ND |
| 106 | ND | 28418.00 | ND | ND | 9495.36 | 2078.96 | ND | ND | ND |
| 107 | ND | 1617.21 | ND | 1192.53 | 2827.25 | ND | ND | ND | ND |
| 108 | 22918.51 | 328417.17 | ND | 176919.14 | 200188.37 | 63777.81 | ND | ND | ND |
| 109 | 64662.43 | 270222.91 | ND | 183482.92 | 158255.47 | 122494.31 | 20510.14 | ND | ND |
| 110 | 17556.97 | 627993.91 | ND | 84204.01 | 82089.09 | 75511.34 | 2216.18 | ND | ND |
| 111 | ND | 4882.04 | ND | ND | 13047.30 | 7265.10 | ND | ND | ND |
| 112 | ND | 32098.89 | ND | ND | 7102.96 | 3878.93 | ND | ND | ND |
| 113 | ND | 8507.01 | ND | 46403.07 | 21450.29 | ND | ND | ND | ND |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 114 | 4239.76 | 146512.72 | ND | 115350.99 | 35145.26 | 25814.04 | ND | ND | ND |
| 115 | 1458.88 | 22632.77 | ND | 12669.56 | 29772.98 | 9460.95 | ND | ND | ND |
| 116 | 1766.48 | 33807.06 | ND | 16511.20 | ND | 14116.06 | ND | ND | ND |
| 117 | ND | ND | ND | 12143.46 | ND | ND | ND | ND | ND |
| 118 | ND | 6194.09 | 2769.14 | ND | ND | ND | ND | ND | ND |
| 119 | 4069.42 | ND | 8488.11 | ND | ND | ND | ND | ND | ND |
| 120 | 53788.12 | 6452.42 | 9039.54 | ND | ND | ND | ND | ND | ND |
| 121 | 1961.09 | 1459.22 | 3745.80 | ND | ND | ND | ND | ND | ND |
| 122 | 25225.84 | 8716.90 | 34509.81 | 1285.17 | ND | ND | ND | ND | ND |
| 123 | 6166.83 | 3871.31 | 1475.96 | 3372.77 | ND | ND | ND | ND | ND |
| 124 | 97783.28 | 3427.90 | 136125.99 | ND | ND | ND | ND | ND | ND |
| 125 | ND | 9682.04 | 23636.71 | 15622.94 | ND | ND | ND | ND | ND |
| 126 | 122238.57 | 26750.06 | 136580.79 | 4378.40 | 6781.62 | ND | ND | ND | ND |
| 127 | 21625.99 | 30707.05 | 83150.73 | 4212.01 | ND | ND | ND | ND | ND |
| 128 | 194635.18 | 27162.05 | 93989.75 | ND | ND | ND | ND | ND | ND |
| 129 | 90252.28 | 37537.68 | 15947.25 | 26779.59 | 14927.91 | ND | ND | 7959.44 | ND |
| 130 | 17263.68 | 149506.16 | 4095.66 | 15227.45 | 1816.83 | ND | ND | ND | ND |
| 131 | ND | 1295.72 | 1260.85 | ND | ND | ND | ND | ND | ND |
| 132 | 779958.30 | 242902.29 | 409680.44 | 114158.98 | 9198.53 | 10325.82 | ND | ND | ND |
| 133 | 3416.20 | 2793.43 | ND | 3194.68 | ND | ND | ND | ND | ND |
| 134 | 6031.34 | 279655.89 | 646352.24 | 25009.52 | 1556.71 | ND | ND | ND | ND |
| 135 | 88370.14 | 139945.06 | 198971.53 | 11084.94 | ND | ND | ND | ND | ND |
| 136 | 256344.58 | 29099.00 | 61100.06 | 4059.43 | ND | 4392.64 | ND | ND | ND |
| 137 | 231204.73 | 25035.77 | 85198.62 | ND | 3628.17 | 10599.62 | 8726.90 | ND | 13643.13 |
| 138 | 1606236.39 | 809201.91 | 997252.29 | 243316.46 | 16767.71 | 17813.99 | ND | ND | 2813.88 |
| 139 | 1386.67 | ND | ND | ND | ND | ND | ND | ND | ND |
| 140 | 62034.03 | 72101.36 | 67311.22 | 15225.84 | ND | ND | ND | ND | ND |
| 141 | ND | ND | 2067.78 | ND | ND | ND | ND | ND | ND |
| 142 | 29547.71 | ND | ND | ND | 1312.57 | 1673.54 | ND | ND | ND |
| 143 | ND | 68825.70 | 5705.54 | 2324.25 | ND | ND | ND | ND | ND |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 144 | 7441.97 | 279347.67 | 470625.64 | 51871.42 | 2227.49 | 1366.67 | ND | ND | ND |
| 145 | 2796.68 | ND | ND | ND | ND | ND | ND | ND | ND |
| 146 | 63212.10 | ND | ND | 16207.43 | 19130.50 | 11747.47 | 8587.15 | 15350.41 | 19887.52 |
| 147 | 11125.89 | 8650.51 | 6534.18 | 10880.60 | 1160.23 | ND | ND | ND | ND |
| 148 | ND | 10445.88 | ND | ND | 9401.83 | ND | ND | ND | ND |

ND: non detected.

Table S4. Antioxidant properties of the tested extracts.

| **Solvents** | **DPPH (mg TE/g)** | **ABTS (mg TE/g)** | **CUPRAC (mg TE/g)** | **FRAP (mg TE/g)** | **MCA (mg EDTAE/g)** | **PBD (mmol TE/g)** |
|---|---|---|---|---|---|---|
| Hexane | 70.19±2.42$^{e}$ | 172.56±6.15$^{f}$ | 97.41±1.42$^{e}$ | 84.11±1.66$^{f}$ | 9.55±0.53$^{e}$ | 1.27±0.04$^{e}$ |
| Ethyl acetate | 938.84±0.55$^{a}$ | 4009.94±18.45$^{a}$ | 1377.38±49.12$^{b}$ | 1196.05±29.33$^{c}$ | 11.88±0.24$^{d}$ | 3.94±0.12$^{a}$ |
| Dichloromethane | 93.25±0.44$^{e}$ | 398.03±3.66$^{e}$ | 154.43±0.91$^{e}$ | 136.68±2.67$^{f}$ | 14.82±0.51$^{c}$ | 1.51±0.05d |
| Ethanol | 935.68±1.08$^{a}$ | 4012.39±15.59$^{a}$ | 1332.52±21.37$^{b}$ | 1214.23±47.64$^{c}$ | 10.26±0.13$^{e}$ | 3.27±0.06$^{bc}$ |
| Ethanol/water | 939.35±1.78$^{a}$ | 4026.50±14.06$^{a}$ | 1730.38±89.51$^{a}$ | 1534.85±42.81$^{a}$ | 14.14±0.19$^{c}$ | 3.48±0.07$^{b}$ |
| Water | 933.74±3.22$^{a}$ | 3973.50±56.53$^{a}$ | 1278.06±62.55$^{b}$ | 1432.77±2.73$^{b}$ | 17.49±0.69$^{b}$ | 3.81±0.08$^{a}$ |
| NADES-A | 829.11±43.29$^{b}$ | 2830.66±67.42$^{b}$ | 833.38±6.17$^{c}$ | 968.98±19.43$^{d}$ | 21.76±0.72$^{a}$ | 3.48±0.04$^{b}$ |
| NADES-B | 767.55±17.15$^{c}$ | 2285.15±13.73$^{c}$ | 774.94±20.01$^{cd}$ | 860.90±6.08$^{e}$ | na | 3.32±0.12$^{b}$ |
| NADES-C | 712.48±28.19$^{d}$ | 2134.94±31.58$^{c}$ | 699.44±8.78$^{d}$ | 799.20±16.74$^{e}$ | 6.87±0.70$^{f}$ | 3.09±0.08$^{c}$ |

Values are reported as mean ±SD of three parallel measurements. TE: Trolox equivalent; EDTAE: EDTA equivalent; na: not active. Different letters in same column indicate significant differences in the tested extracts ($p<0.05$)

Table S5. Enzyme inhibitory of the tested extracts.

| Solvents | AChE (mg GALAE/g) | BChE (mg GALAE/g) | Tyrosinase (mg KAE/g) | Amylase (mmol ACAE/g) | Glucosidase (mmol ACAE/g) |
|---|---|---|---|---|---|
| Hexane | 7.32±0.14$^{e}$ | 1.39±0.04$^{d}$ | 49.14±0.34$^{f}$ | 0.50±0.01$^{c}$ | 1.00±0.12$^{bc}$ |
| Ethyl acetate | 9.00±0.01$^{b}$ | 1.73±0.06$^{bc}$ | 81.29±0.12$^{d}$ | 0.54±0.01$^{c}$ | 0.93±0.02$^{c}$ |
| Dichloromethane | 8.03±0.27$^{d}$ | 1.52±0.06$^{cd}$ | 60.27±0.78$^{e}$ | 0.54±0.01$^{c}$ | 1.01±0.05$^{bc}$ |
| Ethanol | 9.00±0.02$^{b}$ | 2.13±0.18$^{a}$ | 78.41±0.64$^{d}$ | 0.35±0.01$^{d}$ | 1.01±0.01$^{bc}$ |
| Ethanol/water | 8.88±0.09$^{bc}$ | 1.87±0.09$^{b}$ | 79.94±0.40$^{d}$ | 0.40±0.02$^{d}$ | 1.02±0.01$^{bc}$ |
| Water | 8.63±0.02$^{c}$ | na | 80.55±0.19$^{d}$ | 1.01±0.03$^{b}$ | 1.06±0.01$^{b}$ |
| NADES-A | 15.16±0.20$^{a}$ | na | 153.97±0.96$^{b}$ | 0.38±0.01$^{d}$ | 2.15±0.01$^{a}$ |
| NADES-B | na | na | 94.25±2.59$^{c}$ | 2.49±0.07$^{a}$ | 2.17±0.01$^{a}$ |
| NADES-C | na | na | 164.12±0.61$^{a}$ | 2.54±0.04$^{a}$ | 2.20±0.01$^{a}$ |

Values are reported as mean ±SD of three parallel measurements. GALAE: Galantamine; KAE: Kojic acid; ACAE: Acarbose equivalent; na: not active. Different letters in same column indicate significant differences in the tested extracts ($p<0.05$)