

# Optimizing the Extraction of the Polyphenolic Fraction from Defatted Strawberry Seeds for Tiliroside Isolation Using Accelerated Solvent Extraction Combined with a Box–Behnken Design

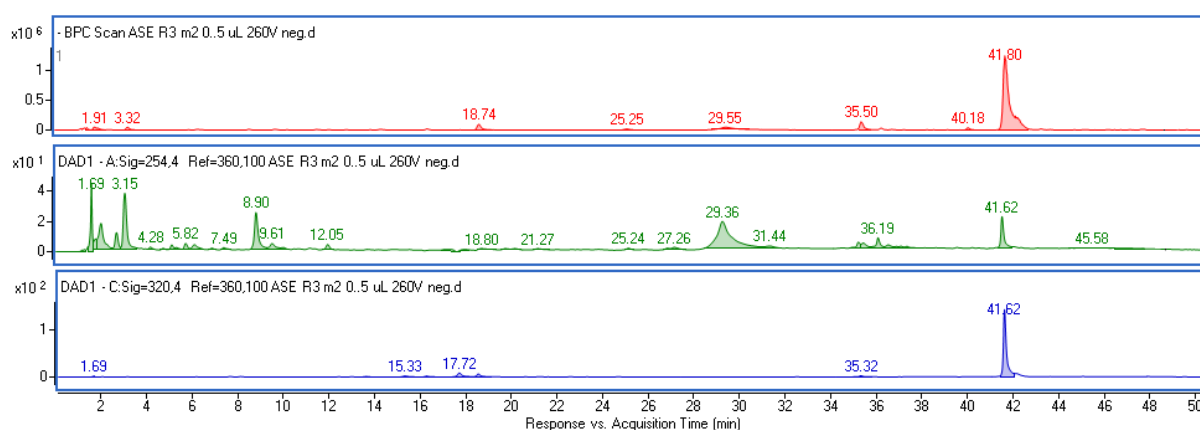
Magdalena Wójciak <sup>1,\*</sup>, Barbara Mazurek <sup>2</sup>, Weronika Wójciak <sup>1</sup>, Dorota Kostrzewa <sup>2</sup>, Magdalena Żuk <sup>1</sup>, Mariusz Chmiel <sup>2</sup>, Tomasz Kubrak <sup>3</sup> and Ireneusz Sowa <sup>1</sup>

<sup>1</sup> Department of Analytical Chemistry, Medical University of Lublin, Chodźki 4a, 20-093 Lublin, Poland; weronikawojciak01@gmail.com (W.W.); magdalena.zu25@gmail.com (M.Ż.); ireneusz.sowa@umlub.pl (I.S.)

<sup>2</sup> Analytical Department, Łukasiewicz Research Network – New Chemical Syntheses Institute, Aleja Tyśiąclecia Państwa Polskiego 13a, 24-110 Puławy, Poland; barbara.mazurek@ins.lukasiewicz.gov.pl (B.M.); dorota.kostrzewa@ins.lukasiewicz.gov.pl (D.K.); mariusz.chmiel@ins.lukasiewicz.gov.pl (M.C.)

<sup>3</sup> Department of Biochemistry and General Chemistry, Medical College of The University of Rzeszów, Rzeszów, 2A Kopisto St., 35-959 Rzeszów, Poland; tkubrak@ur.edu.pl

\* Correspondence: magdalena.wojciak@umlub.pl

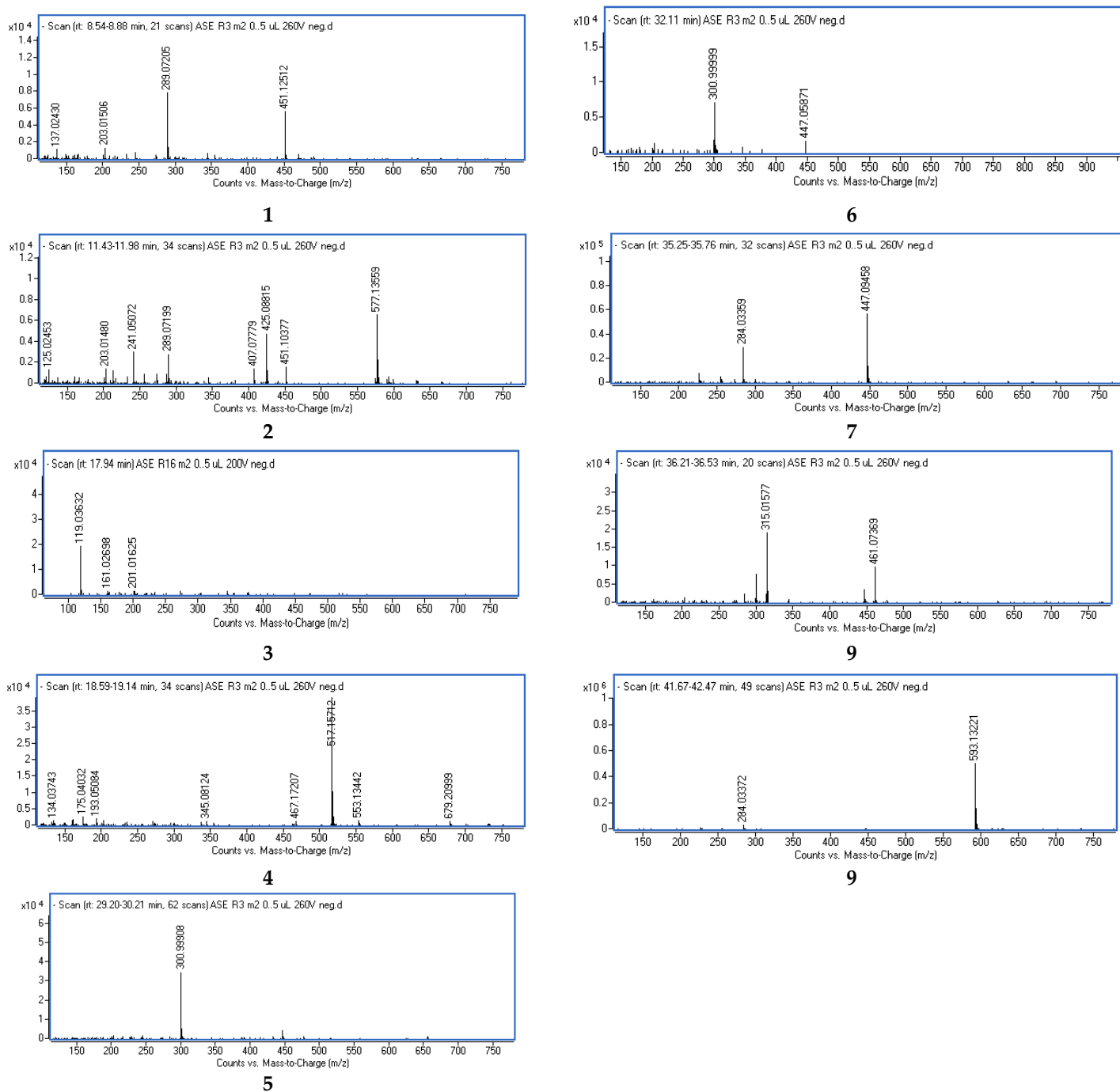


**Figure S1.** Example of base peak chromatogram (BPC) in negative ionization mode (red line) and DAD chromatogram shown at a wavelength of 254 nm (green line) and 320 nm (blue line) for the extract from defatted strawberry seeds obtained using accelerated solvent extraction.

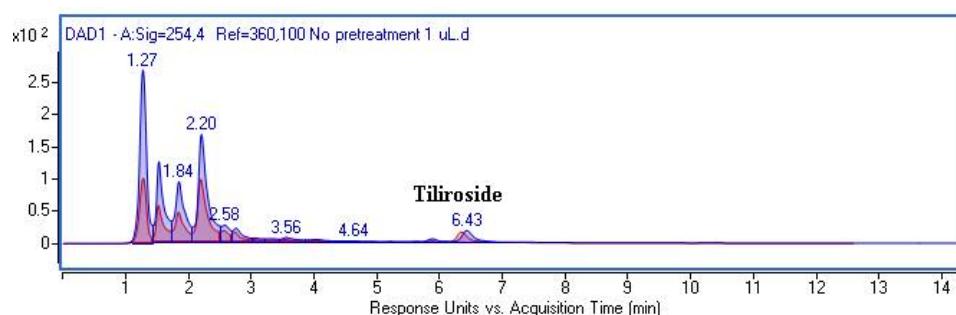
**Table S1.** Data used for identification of main polyphenolic constituents extracted from defatted strawberry seeds.

	R <sub>T</sub> (min)	[M-H] <sup>-</sup>	ppm	Formula	Name
1	9.01	451.12512 (289)	1.18	C <sub>21</sub> H <sub>24</sub> O <sub>11</sub>	catechin hexoside
2	11.61	577.13559 (289)	0.76	C <sub>30</sub> H <sub>26</sub> O <sub>12</sub>	procyanidin
3	18.01	-(119,161)	-	C <sub>9</sub> H <sub>8</sub> O <sub>3</sub>	p-coumaric acid <sup>1</sup>
4	18.86	679.20999 (517.193)	1.30	C <sub>28</sub> H <sub>39</sub> O <sub>19</sub>	3-O-feruloylsucrose derivative
5	29.55	300.99908	0.30	C <sub>14</sub> H <sub>6</sub> O <sub>8</sub>	ellagic acid <sup>1</sup>
6	32.11	447.05871 (301)	4.04	C <sub>20</sub> H <sub>16</sub> O <sub>12</sub>	ellagic acid rhamnoside
7	34.16	447.09458 (284)	2.89	C <sub>21</sub> H <sub>20</sub> O <sub>11</sub>	kaempferol glucoside <sup>1</sup>
8	36.46	461.07369 (315,301)	2.47	C <sub>21</sub> H <sub>18</sub> O <sub>12</sub>	methyl ellagic acid hexoside
9	41.80	593.13221 (284)	3.61	C <sub>30</sub> H <sub>26</sub> O <sub>13</sub>	tiliroside <sup>1</sup>

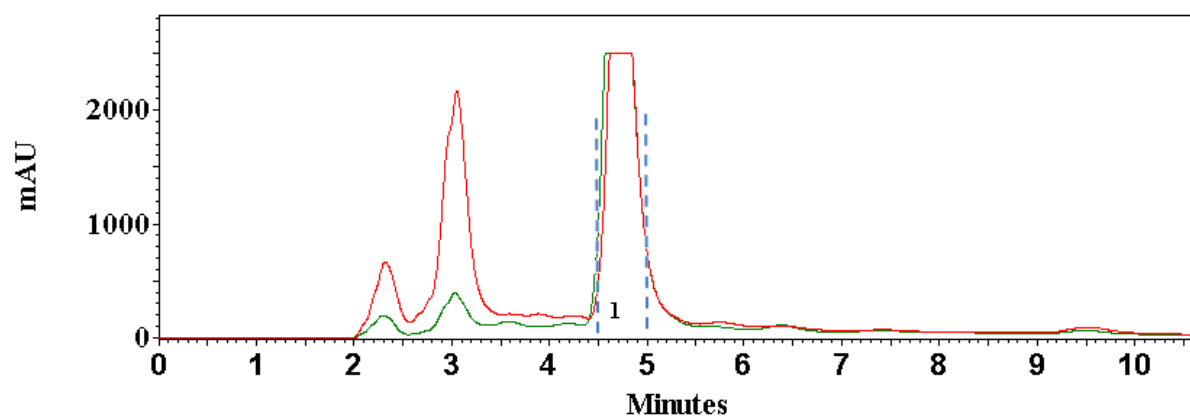
<sup>1</sup> components were confirmed by comparison with standard



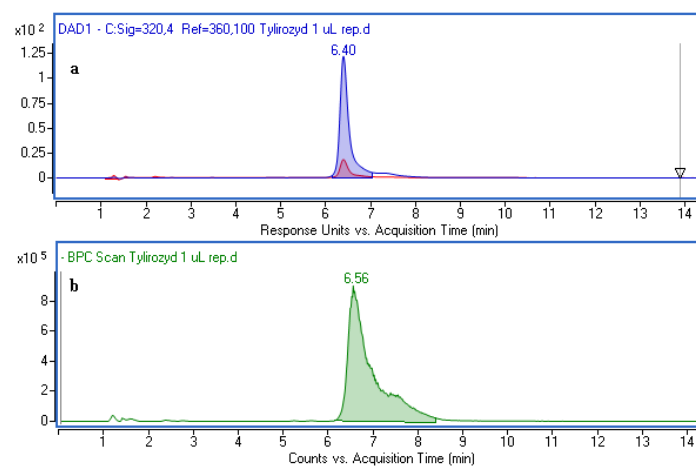
**Figure S2.** MS spectra of compounds identified in the extracts from defatted strawberry seeds obtained using accelerated solvent extraction. Names of the compounds are given in Table S1.



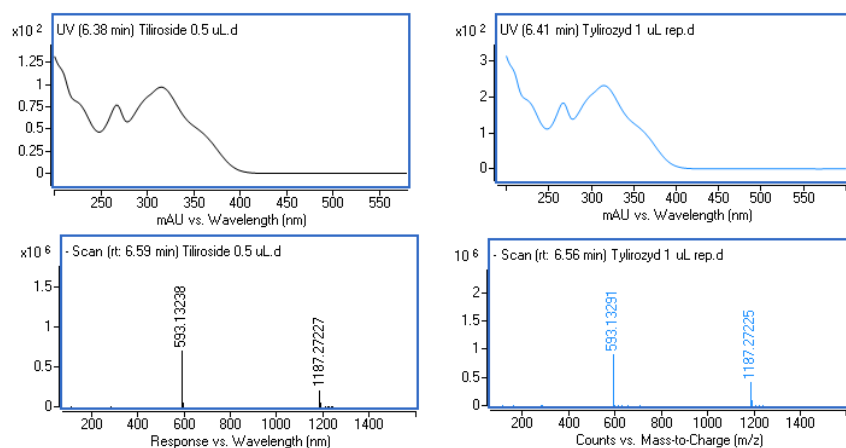
**Figure S3.** Overlapped chromatograms of the extracts obtained using pretreatment of plant material with water (red line) and without pretreatment (blue line).



**Figure S4.** Chromatogram obtained using preparative monolithic column with marked region of isolation. 1 – tiliroside.



**Figure S5.** Chromatogram registered at 320 nm (blue line) and at 245 nm (red line) (a) and base peak chromatogram (c) of tiliroside isolated from plant material.



**Figure S6.** UV-Vis and MS spectrum of the tiliroside standard (grey line) and the isolated compound (blue line).