

**Tabela S1.** Chl *a* fluorescence parameters for control maize leaves and treated with herbicide, surfactants and PNs. Mean values marked with the same letters did not differ significantly at  $p \leq 0.05$  according to Duncan's test,  $n = 15$ . The percentage values of changes compared to the control plants (taken as 100%) are given in parenthesis.

parametrs	maize								
	C	H	S1	S5	PN1	PN2	PN3	PN4	PN5
<b>Fv/Fm</b>	0.798 <sup>ab</sup>	0.785 <sup>abc</sup>	0.798 <sup>ab</sup>	0.805 <sup>a</sup>	0.796 <sup>abc</sup>	0.798 <sup>ab</sup>	0.789 <sup>abc</sup>	0.777 <sup>c</sup>	0.784 <sup>bc</sup>
		(-1.6)	(0)	(+0.9)	(-0.3)	(0)	(-1.2)	(-2.6)	(-1.7)
<b>Fv/Fo</b>	4.000 <sup>a</sup>	3.729 <sup>ab</sup>	3.999 <sup>a</sup>	4.150 <sup>a</sup>	3.941 <sup>ab</sup>	4.013 <sup>a</sup>	3.771 <sup>ab</sup>	3.515 <sup>b</sup>	3.684 <sup>ab</sup>
		(-6.8)	(0)	(+3.7)	(-1.5)	(+0.3)	(-5.7)	(-12.1)	(-7.9)
<b>ABS/RC</b>	1.939 <sup>bc</sup>	2.028 <sup>b</sup>	1.916 <sup>bc</sup>	1.962 <sup>bc</sup>	1.899 <sup>c</sup>	1.856 <sup>c</sup>	1.933 <sup>bc</sup>	2.029 <sup>b</sup>	2.147 <sup>a</sup>
		(+4.6)	(-1.2)	(+1.161)	(-2.1)	(-4.3)	(-0.3)	(+4.6)	(+10.7)
<b>DIo/RC</b>	0.393 <sup>cd</sup>	0.435 <sup>abc</sup>	0.387 <sup>cd</sup>	0.383 <sup>d</sup>	0.389 <sup>cd</sup>	0.375 <sup>d</sup>	0.409 <sup>bcd</sup>	0.453 <sup>ab</sup>	0.464 <sup>a</sup>
		(+10.9)	(-1.4)	(-2.6)	(-1.0)	(-4.5)	(+4.2)	(+15.4)	(+18.0)
<b>TRo/RC</b>	1.547 <sup>bc</sup>	1.592 <sup>b</sup>	1.528 <sup>bc</sup>	1.579 <sup>b</sup>	1.510 <sup>bc</sup>	1.481 <sup>c</sup>	1.524 <sup>bc</sup>	1.576 <sup>b</sup>	1.683 <sup>a</sup>
		(+3.0)	(-1.2)	(+2.1)	(-2.4)	(-4.2)	(-1.5)	(+1.9)	(+8.8)
<b>ETo/RC</b>	0.764 <sup>ab</sup>	0.736 <sup>b</sup>	0.745 <sup>ab</sup>	0.770 <sup>ab</sup>	0.754 <sup>ab</sup>	0.757 <sup>ab</sup>	0.774 <sup>ab</sup>	0.741 <sup>ab</sup>	0.798 <sup>a</sup>
		(-3.7)	(-2.5)	(+0.8)	(-1.4)	(-0.9)	(+1.2)	(-3.0)	(+4.4)
<b>ABS/CSm</b>	1112 <sup>ab</sup>	1122 <sup>ab</sup>	1160 <sup>ab</sup>	1131 <sup>ab</sup>	1160 <sup>ab</sup>	1187 <sup>ab</sup>	1202 <sup>a</sup>	1140 <sup>ab</sup>	1100 <sup>b</sup>
		(+0.9)	(+4.3)	(+1.6)	(+4.2)	(+6.7)	(+8.0)	(+2.5)	(-1.1)
<b>DIo/CSm</b>	225 <sup>ab</sup>	242 <sup>ab</sup>	234 <sup>ab</sup>	221 <sup>b</sup>	236 <sup>ab</sup>	237 <sup>ab</sup>	253 <sup>a</sup>	253 <sup>a</sup>	238 <sup>ab</sup>
		(+7.6)	(+4.2)	(-1.6)	(+5.1)	(+6.3)	(+12.8)	(+12.7)	(+5.9)
<b>TRo/CSm</b>	888 <sup>ab</sup>	881 <sup>ab</sup>	926 <sup>ab</sup>	909 <sup>ab</sup>	924 <sup>ab</sup>	948 <sup>a</sup>	948 <sup>a</sup>	887 <sup>ab</sup>	862 <sup>b</sup>
		(-0.8)	(+4.3)	(+2.4)	(+4.0)	(+6.8)	(+6.8)	(-0.1)	(-2.9)
<b>ETo/CSm</b>	441 <sup>abc</sup>	406 <sup>c</sup>	453 <sup>abc</sup>	444 <sup>abc</sup>	465 <sup>ab</sup>	487 <sup>a</sup>	483 <sup>a</sup>	421 <sup>bc</sup>	409 <sup>bc</sup>
		(-7.8)	(+2.9)	(+0.7)	(+5.4)	(+10.5)	(+9.6)	(-4.4)	(-7.2)
<b>PI</b>	2.053 <sup>a</sup>	1.586 <sup>b</sup>	2.033 <sup>a</sup>	2.042 <sup>a</sup>	2.153 <sup>a</sup>	2.319 <sup>a</sup>	2.052 <sup>a</sup>	1.604 <sup>b</sup>	1.567 <sup>b</sup>
		(-22.8)	(-1.0)	(-0.5)	(+4.8)	(+13.0)	(-0.1)	(-21.9)	(-23.7)

**Tabele S2.** Chl a fluorescence parameters for control barnyard grass leaves and treated with herbicide, surfactants and PNs. Mean values marked with the same letters did not differ significantly at  $p \leq 0.05$  according to Duncan's test,  $n = 15$ . The percentage values of changes compared to the control plants (taken as 100%) are given in parenthesis.

parametrs	Barnyard grass								
	C	H	S1	S5	PN1	PN2	PN3	PN4	PN5
<b>Fv/Fm</b>	0.814 <sup>a</sup>	0.808 <sup>a</sup> (-0.7)	0.811 <sup>a</sup> (-0.3)	0.808 <sup>a</sup> (-0.7)	0.804 <sup>a</sup> (-1.1)	0.808 <sup>a</sup> (-0.7)	0.806 <sup>a</sup> (-0.9)	0.814 <sup>a</sup> (0)	0.763 <sup>b</sup> (-6.2)
<b>Fv/Fo</b>	4.379 <sup>a</sup>	4.231 <sup>a</sup> (-3.4)	4.315 <sup>a</sup> (-1.5)	4.231 <sup>a</sup> (-3.4)	4.153 <sup>a</sup> (-5.2)	4.265 <sup>a</sup> (-2.6)	4.180 <sup>a</sup> (-4.5)	4.467 <sup>a</sup> (+2.0)	3.385 <sup>b</sup> (-22.7)
<b>ABS/RC</b>	1.819 <sup>cd</sup>	1.991 <sup>ab</sup> (+9.4)	1.894 <sup>bcd</sup> (+4.1)	1.913 <sup>bcd</sup> (+5.2)	1.967 <sup>abc</sup> (+8.2)	1.954 <sup>abcd</sup> (+7.4)	1.956 <sup>abcd</sup> (+7.5)	2.072 <sup>a</sup> (+13.9)	1.807 <sup>d</sup> (-0.7)
<b>DIo/RC</b>	0.340 <sup>b</sup>	0.382 <sup>ab</sup> (+12.6)	0.357 <sup>b</sup> (+5.2)	0.368 <sup>b</sup> (+8.2)	0.386 <sup>ab</sup> (+13.5)	0.377 <sup>ab</sup> (+10.9)	0.380 <sup>ab</sup> (+11.8)	0.387 <sup>ab</sup> (+13.9)	0.428 <sup>a</sup> (+26.0)
<b>TRo/RC</b>	1.479 <sup>cd</sup>	1.608 <sup>ab</sup> (+8.7)	1.537 <sup>bc</sup> (+3.9)	1.545 <sup>bc</sup> (+4.5)	1.582 <sup>abc</sup> (+6.9)	1.578 <sup>abc</sup> (+6.6)	1.576 <sup>abc</sup> (+6.5)	1.686 <sup>a</sup> (+13.9)	1.379 <sup>d</sup> (-6.8)
<b>ETo/RC</b>	0.797 <sup>a</sup>	0.776 <sup>abc</sup> (-2.7)	0.765 <sup>abcd</sup> (-4.0)	0.729 <sup>d</sup> (-8.5)	0.767 <sup>abcd</sup> (-3.8)	0.750 <sup>bcd</sup> (-5.9)	0.790 <sup>ab</sup> (-0.8)	0.740 <sup>cd</sup> (-7.0)	0.631 <sup>e</sup> (-20.8)
<b>ABS/CSm</b>	1341 <sup>a</sup>	1183 <sup>ab</sup> (-11.8)	1209 <sup>ab</sup> (-9.9)	977 <sup>cd</sup> (-27.2)	1136 <sup>bc</sup> (-15.3)	1127 <sup>bc</sup> (-16.0)	1188 <sup>ab</sup> (-11.4)	839 <sup>de</sup> (-37.4)	697 <sup>e</sup> (-48.1)
<b>DIo/CSm</b>	251 <sup>a</sup>	227 <sup>a</sup> (-9.4)	228 <sup>a</sup> (-8.9)	187 <sup>bc</sup> (-25.3)	224 <sup>a</sup> (-10.6)	218 <sup>ab</sup> (-13.1)	232 <sup>a</sup> (-7.5)	155 <sup>cd</sup> (-38.3)	149 <sup>d</sup> (-40.6)
<b>TRo/CSm</b>	1091 <sup>a</sup>	956 <sup>ab</sup> (-12.3)	981 <sup>ab</sup> (-10.1)	790 <sup>cd</sup> (-27.6)	912 <sup>bc</sup> (-16.4)	909 <sup>bc</sup> (-16.6)	956 <sup>ab</sup> (-12.4)	685 <sup>d</sup> (-37.2)	548 <sup>c</sup> (-49.8)
<b>ETo/CSm</b>	589 <sup>a</sup>	467 <sup>b</sup> (-20.7)	491 <sup>b</sup> (-16.7)	377 <sup>cd</sup> (-36.0)	442 <sup>bc</sup> (-24.9)	434 <sup>bc</sup> (-26.3)	479 <sup>b</sup> (-18.7)	306 <sup>de</sup> (-48.1)	258 <sup>c</sup> (-56.2)
<b>PI</b>	2.857 <sup>a</sup>	2.104 <sup>bc</sup> (-26.4)	2.331 <sup>b</sup> (-18.4)	2.042 <sup>bc</sup> (-28.5)	1.994 <sup>bc</sup> (-30.2)	2.040 <sup>bc</sup> (-28.6)	2.175 <sup>bc</sup> (-23.9)	1.765 <sup>c</sup> (-38.2)	2.157 <sup>bc</sup> (-24.5)

**Table S3.** Matrix of the experimental design and experimental data obtained for the dependent variables.

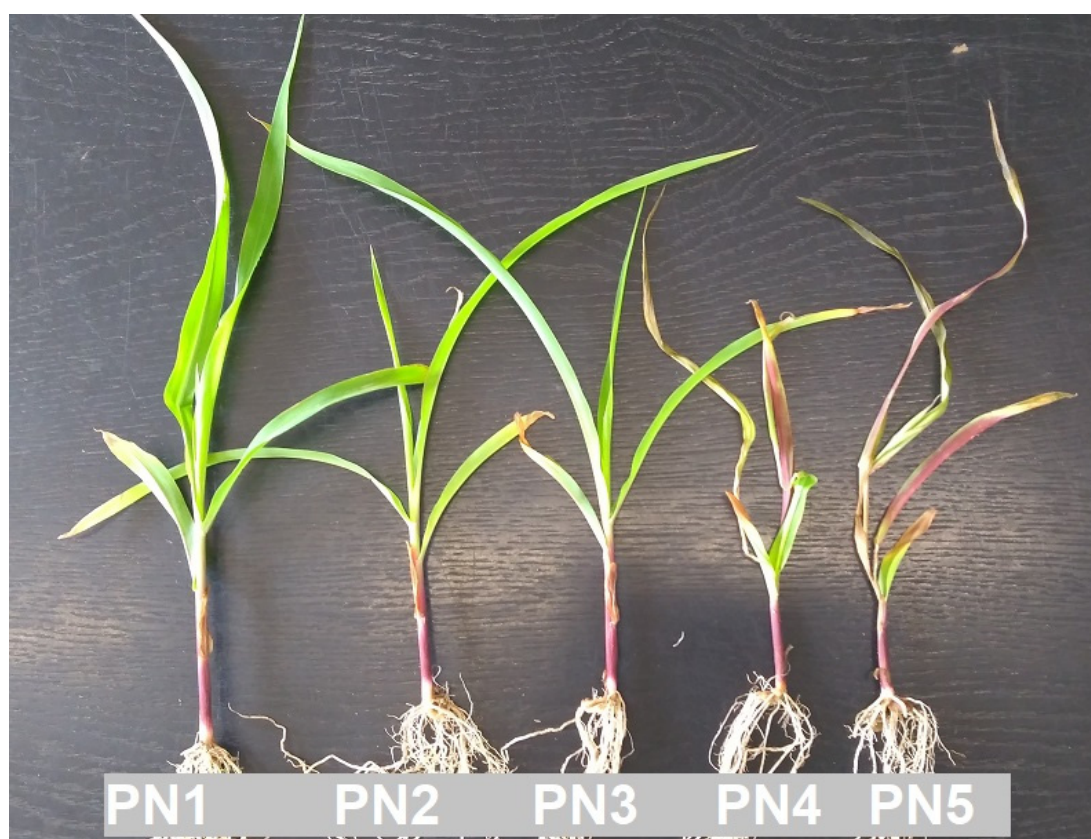
Sample	Input parameters				Output parameters			
	C <sub>Oil</sub> [%]	C <sub>Emulsifier</sub> [%]	Amplitude [%]	Time	Z- Ave [d.nm]	PDI	Viscosity [mPa·s]	Stability
N17	3%	5%	79	3 min	210±10	0.277±0.50	300	+
N13	3%	3%	69	2 min	301±17	0.476±0.040	250	-
N18	3%	5%	89	2 min	360±20	0.375±0.120	500	-
N23	5%	3%	79	3 min	162±3	0.081±0.035	466	+
N6	1%	3%	89	1 min	45±0.2	0.062±0.006	278.5	+
N16	3%	5%	69	1 min	117±3	0.173±0.011	376	+
N20	5%	1%	79	1 min	-	-	-	-
N21	5%	1%	89	3 min	-	-	-	-
N4	1%	3%	69	3 min	100±12	0.273±0.023	300	+
N14	3%	3%	79	1 min	70 ±2	0.186±0.011	395	+
N26	5%	5%	79	2 min	480±43	0.660±0.170	600	-
N22	5%	3%	69	1 min	134 ±4	0.164±0.0008	480	+
N8	1%	5%	79	1 min	176±32	0.399±0.232	213	-
N9	1%	5%	89	3 min	250.1±50	1.000	238	-
N25	5%	5%	69	3 min	560±60	0.89±0.13	780	-
N10	3%	1%	69	3 min	155±5	0.117±0.02	497.5	+
N11	3%	1%	79	2 min	163 ±4	0.127±0.009	569.5	+
N5	1%	3%	79	2 min	48±0.2	0.164±0.032	365.5	+
N12	3%	1%	89	1 min	161±5	0.166±0.016	313	+
N7	1%	5%	69	2 min	43.41±4	0.134±0.019	422	+
N2	1%	1%	79	3 min	157 ±3	0.150±0.006	239.7	+
N15	3%	3%	89	3 min	203 ±5	0.046±0.005	353.5	+

N24	5%	3%	89	2 min	136 ±2	0.099±0.019	265	+
N3	1%	1%	89	2 min	110.0±3	0.055±0.017	505	+
N27	5%	5%	89	1 min	78± 2	0.111±0.013	330	+
N1	1%	1%	69	1 min	62±3	0.577±0.015	436	-
N19	5%	1%	69	2 min	181±8	0.183±0.043	375	+
N28	3%	3%	79	2 min	85±2	0.107±0.009	305	+

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Legend: (+) –sample passed the stability tests, and its size did not change with time; (-) - sample did not pass the stability tests and destabilized.

A.



B.

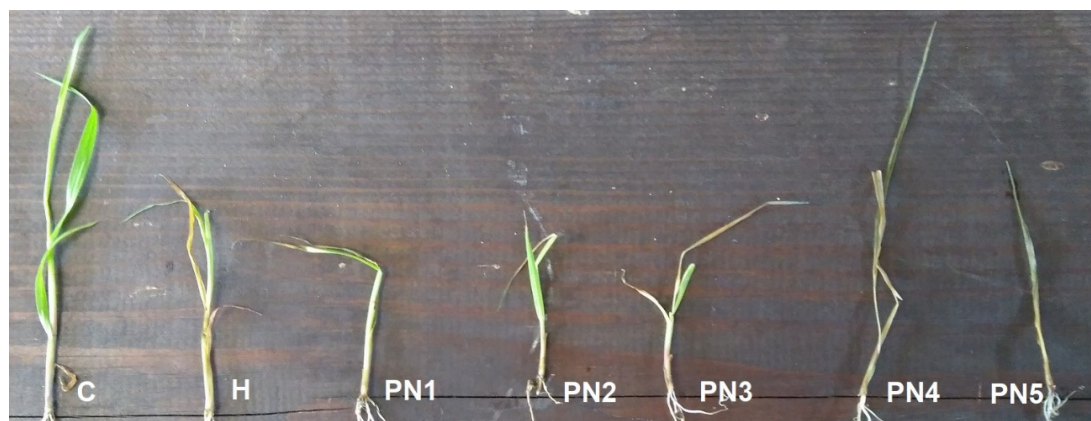


Figure S1. The representative photos of damages caused to maize (A) and barnyard grass (B) seven days after leaf-spraying with the peppermint nanoemulsions. C – water control; H – herbicide; PN1- PN5 – peppermint nanoemulsions.