Supplementary Materials

Use of New BTH Derivative as Supplement or Substitute of Standard Fungicidal Program in Strawberry Cultivation

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Field experiment 2019

A field experiment was accomplished at the private experimental field in Ziąbki near Bolimów in Poland (Latitude: 52°11′ 08.36 N, Longitude: 20°16′ 89.35 E, Altitude 88 m above sea level). The meteorological data during the experimental period were obtained from the weather station of Patoki (6 km) and are shown in Table S1 and S2.

Table S1. Characteristics of atmospheric conditions during the test in 2019.

Date	Rainfall [mm]	Air temperature[◦C]			Relative humidity [%]
		Mean	Min	Max	
05.04	0.2	12.3	4.5	20	45
06.04	0	11.4	5.6	17.8	48
07.04	0	10.1	0.7	17.7	66
08.04	0	10.7	1.1	19.1	64
09.04	0	5.9	1.4	9	68
10.04	0	3.6	-1.7	8.3	53
11.04	0	3.4	-1.1	7.6	64
12.04	0	3.9	1.6	6.5	53
13.04	2	3.2	0.8	6.2	79
14.04	0	7.9	4.1	12.7	39
15.04	0	6.3	0.1	12.2	41
16.04	0.4	5.9	-2.5	12.8	58
17.04	0	10.9	0.8	19.1	54
18.04	0	11.8	0.4	20.6	48
19.04	0	12.3	1.1	20.7	48
20.04	0	11.3	1.2	18.6	48
21.04	0	10.5	3.2	18.4	58
22.04	0	10.5	3.5	17.2	69
23.04	0.2	13.3	6.6	19	36
24.04	0	15.1	9.2	20.3	43
25.04	0	18.6	12.3	25.7	53
26.04	0	18.9	8.7	28.1	62
27.04	0	13	10.6	14.8	91
28.04	1.8	10.7	7.8	13.3	88
29.04	7.4	13.4	9.7	22.5	91
30.04	0	13.8	7.3	19.7	66
01.05	0	12.3	4.7	18.7	52
02.05	0	11.1	7.9	14	69
03.05	0.2	9	2	13.5	65
04.05	0	8.8	2.1	14.2	62
05.05	0	7.2	3	11.9	67
06.05	0	8	1.6	14.1	45
07.05	0	8.1	0.2	14.2	55
08.05	0	8.1	-2.3	15.9	59
09.05	0.4	10.7	7.8	15	60
10.05	1	12.5	8	18.6	80
11.05	0	14.1	9.3	19.1	71
12.05	15.6	12.3	7	20	83
13.05	2.2	8.4	6.2	11.2	86
14.05	6.2	6.7	3.9	8.7	100

15.05	11.8	9.2	7.1	11.8	100
16.05	3.8	13.3	11.8	15.4	99
17.05	7.2	15.1	12.5	20	97
18.05	1.2	17.4	12.2	23.7	85
19.05	0.8	18.8	15	23.7	84
20.05	0	19.7	14.3	25	79
21.05	6	17	13.9	22.2	91
22.05	3.2	14.9	10.7	18.9	92
23.05	0	14.8	13.1	17.4	98
24.05	0	16	12.1	21.7	75
25.05	0	15.9	7.5	23.4	68
26.05	0	14.6	7.6	21.2	70
27.05	0	19.4	11.8	26	66
28.05	18.6	17.4	15.1	22.1	94
29.05	3.2	12.4	8.9	16.5	84
30.05	0	12.1	3.5	19	59
31.05	0	15.9	4.4	23.8	67
01.06	0	18.6	12.7	24.6	78
02.06	3	19.5	11.5	27.5	80
03.06	0.2	21.1	12.3	28.4	69
04.06	0	22.1	11.7	30.1	65
05.06	0	23.2	16.1	28.9	63
06.06	0	22.6	16.1	28.5	65
07.06	1	20.8	15.5	27.3	84
08.06	7	20.8	14.3	29.1	78
09.06	0	19.4	10.2	25.6	58
10.06	0	22.8	14.6	29.9	59
11.06	0	26.3	19.1	33	63
12.06	0	26.4	17.9	33	56
13.06	11.2	24.2	19	33	74
14.06	5.4	22.4	17.3	27.6	83
15.06	0	24.9	18.9	30.8	78
16.06	0	22.6	16.2	25.9	74
17.06	0	18.8	13.1	24	71
18.06	0	20.0	11.4	26.3	65

Table S2. Environmental conditions during the treatments in 2019.

Environmental conditions during the treatments / Date of treatment	Temperature [◦C]	Relative humidity [%] of air	Wind speed [m/s]	Wind direction	Date of the first rainfall after treatment	Size of the first rainfall after treatment [mm]
05.04	14.0	52.4	2.4	E	05.04	0.2
19.04	19.1	55.3	1.8	SW	19.04	0.2
26.04	24.4	54.2	1.4	W	26.04	1.8
02.05	14.7	55.0	3.7	W	10.05	0.2
09.05	17.1	53.2	1.6	SE	14.05	0.4
17.05	20.5	77.3	0.6	SW	17.05	7.2
21.05	21.0	73.9	0.8	SE	21.05	6.0
28.05	21.3	68.4	1.9	SW	28.06	18.6
05.06	28.9	64.3	0.8	S	07.06	1.0

Field experiment 2019

A field experiment was accomplished at the private experimental field in Dłutowo Górne near Czerwińsk nad Wisłą (Latitude: 52◦29′ 5.93 N, Longitude: 20◦27′ 0.93 E, Altitude 120 m above sea level). The meteorological data during the experimental period were obtained from the weather station of Michalowo (30 km) and are shown in Table S3 and S4 in ESI.

Table S3. Characteristics of atmospheric conditions during the test in 2020.

Date	**Rainfall [mm]**	**Air temperature[◦C]**			**Relative humidity [%]**
		Mean	**Min**	**Max**	
09.04	0.00	12.5	4.5	22.1	56
10.04	0.00	7.7	-0.3	15.2	62
11.04	0.00	7.0	-1.3	14.9	51
12.04	0.00	11.4	2.7	20.1	43
13.04	1.27	8.8	0.8	14.2	60
14.04	0.00	3.5	-1.9	8.2	55
15.04	0.00	5.2	-0.3	9.5	67
16.04	0.00	9.6	4.4	15.5	59
17.04	0.00	7.4	0.0	15.0	54
18.04	0.00	5.1	-4.8	13.7	54
19.04	0.00	5.4	-2.1	13.3	58
20.04	0.00	6.2	-2.2	14.7	63
21.04	0.00	9.0	1.7	16.3	56
22.04	0.00	9.8	0.3	18.6	60
23.04	0.00	10.4	0.2	19.4	56
24.04	0.00	13.7	4.7	21.1	49
25.04	0.00	8.9	2.3	13.5	61
26.04	0.00	7.9	-0.4	14.3	59
27.04	0.00	11.2	-0.2	20.0	52
28.04	0.00	16.5	7.6	25.3	45
29.04	3.30	10.3	6.9	13.7	71
30.04	1.02	11.4	5.6	17.9	72
01.05	4.83	10.9	7.6	17.6	82
02.05	0.51	10.1	4.1	16.8	83

03.05	3.05	10.5	6.5	15.6	80
04.05	0.00	10.3	2.6	17.6	73
05.05	5.59	8.0	5.0	11.7	82
06.05	3.81	9.2	6.2	14.5	78
07.05	0.00	10.6	3.4	17.8	65
08.05	0.00	12.7	5.3	19.5	64
09.05	0.00	13.4	3.5	21.7	63
10.05	3.05	16.4	6.2	24.8	62
11.05	22.61	14.0	2.3	23.1	81
12.05	4.57	5.9	0.8	10.9	70
13.05	0.00	8.2	3.3	13.0	70
14.05	0.76	9.4	5.3	15.7	74
15.05	0.00	9.4	2.0	16.2	64
16.05	0.00	10.2	6.1	14.0	64
17.05	0.00	11.5	6.0	16.8	63
18.05	2.54	12.6	8.9	16.3	70
19.05	1.78	12.3	7.5	15.6	84
20.05	0.00	10.9	5.1	17.0	68
21.05	0.00	8.8	1.9	14.8	59
22.05	0.00	10.1	0.8	18.0	54
23.05	3.05	11.8	3.5	17.8	64
24.05	2.79	12.4	8.9	18.7	77
25.05	1.52	11.2	7.0	17.7	83
26.05	0.00	12.8	7.6	19.1	78
27.05	0.00	13.6	6.6	22.1	70
28.05	0.00	13.3	8.2	18.9	75
29.05	0.00	13.3	9.3	18.2	60
30.05	11.18	12.4	8.0	18.4	68
31.05	1.78	16.1	10.4	21.9	66
01.06	0.00	14.5	7.5	20.0	57
02.06	0.00	14.4	7.6	20.9	59
03.06	0.00	12.4	6.6	18.3	71
04.06	0.00	14.5	4.9	22.5	64
05.06	4.83	15.4	11.5	21.6	79
06.06	0.25	16.6	11.4	22.7	72
07.06	5.59	19.2	12.4	25.5	76
08.06	0.51	15.1	12.5	18.6	89
09.06	0.00	14.5	11.1	17.9	83
10.06	4.06	17.3	12.9	22.1	86
11.06	16.00	20.7	17.5	26.2	80
12.06	0.00	23.5	16.4	30.8	68
13.06	0.00	22.3	17.4	26.7	74
14.06	0.00	17.6	13.0	22.3	70
15.06	0.00	16.1	8.7	22.5	72
16.06	0.00	18.1	9.3	25.5	69
17.06	16.00	20.2	14.5	29.1	75
18.06	1.27	19.7	15.5	25.8	86
19.06	1.02	21.1	16.0	28.1	80
20.06	0.51	20.1	17.0	26.3	85
21.06	18.54	19.3	16.0	26.4	88

22.06	0.00	20.4	16.7	24.9	83
23.06	0.00	18.2	13.6	24.0	75
24.06	5.84	18.6	14.9	22.7	87
25.06	0.00	22.5	17.8	27.3	72
26.06	1.27	21.6	16.3	28.8	71
27.06	1.02	20.6	15.7	26.5	78
28.06	0.00	23.5	16.5	30.2	74
29.06	11.94	19.6	15.7	24.4	85
30.06	0.76	18.6	14.1	23.9	73

Table S4. Environmental conditions during the treatments in 2020.

Environmental conditions during the treatments / Date of treatment	Temperature [◦C]	Relative humidity [%] of air	Wind speed [m/s]	Wind direction	Date of the first rainfall after treatment	Size of the first rainfall after treatment [mm]
09.04	20.1	38.2	4.7	SW	13.04	1.27
23.04	18.6	38.0	3.9	NE	29.04	3.33
30.04	15.9	47.4	0.7	SE	1.05	4.83
07.05	15.9	64.2	2.9	NW	10.05	3.05
13.05	10.8	60.4	3.4	SW	14.05	0.76
21.05	15.5	51.8	3.6	N	23.05	3.05
29.05	17.1	51.2	3.7	N	30.05	11.18
04.06	18.4	60.7	0.8	SW	5.06	4.83
10.06	17.3	77.2	2.2	NW	11.06	16.00

Table S5. Correlation analysis between selected parameters.

	1st parameter (x)	2nd parameter (y)	2020	2019/20
			r	r
1.	BTHWA [total dose in [mg/L]]	Diameter [cm]	0.385	n.s.
2.	BTHWA [total dose in [mg/L]]	Plant area [cm^2]	0.379	n.s.
3.	BTHWA [total dose in [mg/L]]	Dry weight [%]	-0.462	n/a
4.	BTHWA [total dose in [mg/L]]	Polyphenols [mg/100g of fruits]	0.455	0.266
5.	BTHWA [total dose in [mg/L]]	*Colletotrichum* sp. in field [pc./m^2]	-0.457	-0.261
6.	BTHWA [total dose in [mg/L]]	*Colletotrichum* sp. in field [%]	-0.421	n.s.
7.	Fungicide [number of treatments]	Height [cm]	-0.395	-0.252
8.	Fungicide [number of treatments]	Diameter [cm]	-0.352	n.s.
9.	Fungicide [number of treatments]	Plant area [cm^2]	-0.412	n.s.
10.	Fungicide [number of treatments]	Mean weight of marketable fruits [g]	-0.453	-0.325

11.	Fungicide [number of treatments]	*Botrytis cinerea* in field (%)	-0.688	-0.298
12.	Fungicide [number of treatments]	*Phytophtora* sp. in field [%]	-0.756	-0.303
13.	Fungicide [number of treatments]	Fruits infected in field [%]	-0.809	-0.315
14.	Fungicide [number of treatments]	*Botrytis cinerea* during storage [%]	-0.397	-0.334
15.	Fungicide [number of treatments]	Dry weight of fruits [%]	-0.426	n/a
16.	Fungicide [number of treatments]	Brix [◦]	-0.562	n/a
17.	Polyphenols [mg/100g of fruits]	Fruits infected in field [%]	n.s.	-0.738
18.	Polyphenols [mg/100g of fruits]	*Phytophtora* sp. in field [%]	n.s.	-0.717
19.	Polyphenols [mg/100g of fruits]	*Colletotrichum* sp. in field [%]	n.s.	-0.359
20.	Polyphenols [mg/100g of fruits]	*Botrytis cinerea* in field [%]	n.s.	-0.665
21.	Polyphenols [mg/100g of fruits]	Fruits infected during storage [%]	n.s.	-0.779
22.	Polyphenols [mg/100g of fruits]	*Phytophtora* sp. during storage [%]	n.s.	-0.812
23.	Polyphenols [mg/100g of fruits]	*Botrytis cinerea* during storage [%]	n.s.	-0.347
24.	Polyphenols [mg/100g of fruits]	Anthocyans [mg/100g of fruits]	0.751	0.906
25.	Polyphenols [mg/100g of fruits]	Ascorbic acid [mg/100g of fruits]	0.531	0.91
26.	*Colletotrichum* sp. during storage [%]	Respiration rate [$mg/kg \cdot h^{-1}$]	0.81	n/a
27.	Firmness [N]	Respiration rate [$mg/kg \cdot h^{-1}$]	0.93	n/a
28.	Brix [◦]	Respiration rate [$mg/kg \cdot h^{-1}$]	0.85	n/a

r- correlation coefficient; n.s.- correlation not significant, n/a – data not available