



Report of Ozone production by products of FreshlightAGRI BV

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Commisioned by:

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Rabobank 12.17.37.527 | KvK 030231605 | BTW nr 818626859B01

Date and place of measurements:

30 June 2015, Apeldoorn.

Date and place of report:

2 July 2015, Soesterberg

Perfomace experiments and report:

L.M'Rabet, PhD



Protocol of measurements:

Materials:

The following ionizers of FreshlightAGRI BV are tested:

ibulb 80 HD

Grosso

SuperNova

Ionbooster

As a positive control: the ActivTek Induct 5000 ionizer with UV is used. Ionizers using UV are known to produce ozone.

Measuring Instruments:

GrayWolfe Sense Toxic ozone detector EC-202, calibrated by the factory on 15-12-2014 on a scale from 0,00 ppb till 36,00 ppm is used. In addition temperature is measured.

Test procedure:

The measurements are performed in a room of lxbxh 360x320x274 cm. The room consisted of one glass wall. The door was left open during the measurements. The experiments are performed on an office desk of 70cm height.

Products, ibulb 80 HD, Grosso, and Supernova are fixed into a horizontally placed lamp fitting above the desk at a height of 30 cm above the table and the ozone detector is placed 5 cm from the core of the product.. The core of the product is the centre of the product corresponding with the centre of the lamp fitting. This is as close as possible to enlarge the detection of ozone particles.

The ionbooster is placed directly on the table and the detector is placed horizontally in such a way that the detector is situated 5 cm from one of the two outlets of the ionbooster. Again this is as close as possible. The Activ Tek Induct 5000 is placed upside down on the table. Directly next to the ActivTek Induct 5000 the ozone detector is placed. Due to its configuration the detector product distance is 15 cm. Each product was tested for at least 12 minutes and average of 2 minutes were logged by the software of GrayWolfe. Data logged are exported to excel for further analysis.

The ibulb 80 HD is tested twice, once at a distance of 5 cm and once at a distance at 10 cm for of 18 minutes.



Results:

The ibulb 80 HD is the first product tested (see appendix II). The first distance between product and detector is 10 cm. No ozone is detected (see appendix 1&II). Afterwards the distance between product and detectors are placed as close as possible, which is 5 cm. Results obtained are depicted in table 1 and in figure 1. As can be seen, none of the products of FreshlightAGRI BV produce detectable levels of Ozone.

The Activ Tek Induct 5000 does produce ozone. The concentration of ozone in the air increases linear with the time the product is switched on.

Table 1: Ozone production of products tested

2 min Average ozone ppb time	Product				
	80 HD	ActivTek 5000	booster	Grosso	SuperNova
2	0	9	0	0	0
4	0	19	0	0	0
6	0	36	0	0	0
8	0	52	0	0	0
10	0	47	0	0	0
12	0	54	0	0	0
14	0	61	0	0	0
16	0	69	0	0	0

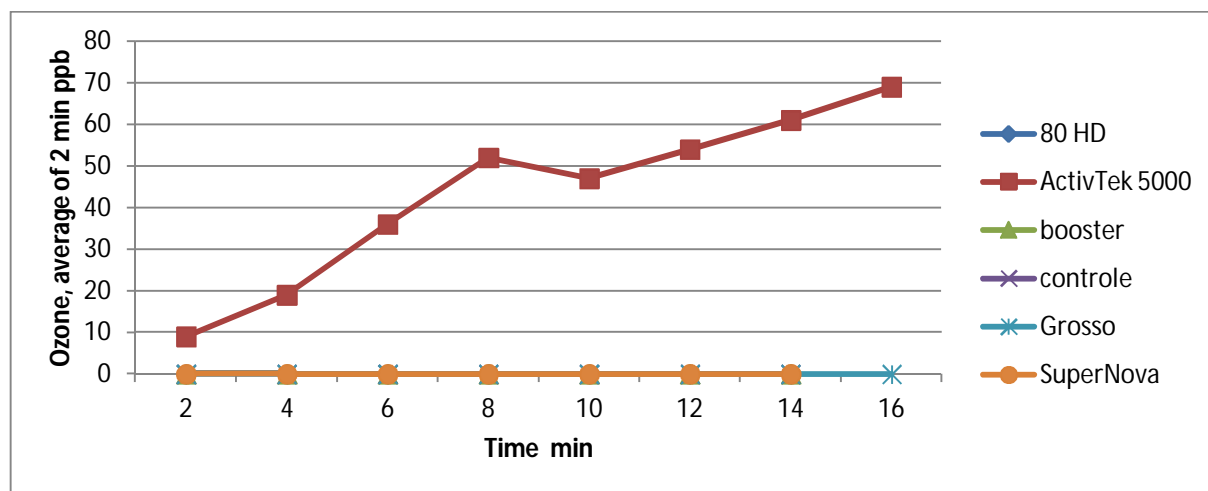


Figure 1: Ozone production of products tested.

During the experiments the temperature increased from 23,1°C till 26,1°C (appendix II).



Conclusion and Discussion:

The Graywolfe Sense Toxic Gas probe EC-202 is calibrated according to the manufacturer of the probes and is functioning normally. Indeed production of ozone by Activ Tek Induct 5000 is detected, showing that the detector operates according to the manufacturer's specs.

The lack of ozone detection by the FreshlightAGRI BV products is not due to a failure in the detector. These products do not produce ozone or at an undetectable level.

The maximum level of ozone given by the Dutch authorities is 0,06 ppm, 60 ppb or 0,12 mg/m³ for 8 hr work for 5 days (see RIVM.nl). Maximum levels of ozone for 15 min is 0,3 ppm or 300ppb.

It is to be expected that the FreshlightAGRI BV products will stay below 60ppb and are safe in use.



Appendix I raw data:

date time	ozone ppb	temp °C	product	cm	time min
30-6-2015 11:55	9	26,9	ActivTek 5000	15	2
30-6-2015 11:57	19	26,7	ActivTek 5000	15	4
30-6-2015 11:59	36	26,4	ActivTek 5000	15	6
30-6-2015 12:01	52	26,1	ActivTek 5000	15	8
30-6-2015 12:03	47	26	ActivTek 5000	15	10
30-6-2015 12:05	54	25,9	ActivTek 5000	15	12
30-6-2015 12:07	61	25,8	ActivTek 5000	15	14
30-6-2015 12:09	69	25,7	ActivTek 5000	15	16
30-6-2015 11:16	0	25,7	SuperNova	5	2
30-6-2015 11:18	0	26,4	SuperNova	5	4
30-6-2015 11:20	0	26,9	SuperNova	5	6
30-6-2015 11:22	0	27,6	SuperNova	5	8
30-6-2015 11:24	0	28,1	SuperNova	5	10
30-6-2015 11:26	0	28,2	SuperNova	5	12
30-6-2015 11:28	0	28,5	SuperNova	5	14
30-6-2015 10:57	0	24,5	Grosso	5	2
30-6-2015 10:59	0	24,5	Grosso	5	4
30-6-2015 11:01	0	24,5	Grosso	5	6
30-6-2015 11:03	0	24,5	Grosso	5	8
30-6-2015 11:05	0	24,5	Grosso	5	10
30-6-2015 11:07	0	24,5	Grosso	5	12
30-6-2015 11:09	0	24,5	Grosso	5	14
30-6-2015 11:11	0	24,6	Grosso	5	16
30-6-2015 10:41	0	24,3	80 HD	5	2
30-6-2015 10:43	0	24,4	80 HD	5	4
30-6-2015 10:45	0	24,4	80 HD	5	6
30-6-2015 10:47	0	24,5	80 HD	5	8
30-6-2015 10:49	0	24,5	80 HD	5	10
30-6-2015 10:51	0	24,5	80 HD	5	12
30-6-2015 10:53	0	24,5	80 HD	5	14
30-6-2015 10:16	0	23,9	80 HD	10	2
30-6-2015 10:18	0	23,9	80 HD	10	4
30-6-2015 10:20	0	24	80 HD	10	6
30-6-2015 10:22	0	24	80 HD	10	8
30-6-2015 10:24	0	24	80 HD	10	10
30-6-2015 10:26	0	24	80 HD	10	12
30-6-2015 10:28	0	24	80 HD	10	14
30-6-2015 10:30	0	24	80 HD	10	16
30-6-2015 10:32	0	24,1	80 HD	10	18
30-6-2015 11:35	0	27,1	booster	5	2
30-6-2015 11:37	0	26,9	booster	5	4
30-6-2015 11:39	0	27,2	booster	5	6
30-6-2015 11:41	0	27,5	booster	5	8
30-6-2015 11:43	0	27,8	booster	5	10
30-6-2015 11:45	0	28,1	booster	5	12
30-6-2015 11:47	0	28,3	booster	5	14
30-6-2015 9:42	0	22,4	no product		2
30-6-2015 9:47	0	22,8	no product		4
30-6-2015 9:52	0	23	no product		6
30-6-2015 9:57	0	23,2	no product		8
30-6-2015 10:02	0	23,4	no product		10
30-6-2015 10:07	0	23,5	no product		12
30-6-2015 10:12	0	23,8	no product		14



Appendix II: sequence of measurements both ozone concentrations and temperature

