

## Supplementary Materials

**Ecotoxicological evaluation of products obtained from cashew nut technical liquid (tCNSL) proposed as a larvicide to control *Aedes aegypti* (Diptera: Culicidae)**

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**Table S1.** Ecotoxicological assessment of Diflubenzuron in aquatic organisms

Biological group	Scientific name	Exposure medium	Test endpoint in hours (h)	Estimate	%	Commercial name	Toxic concentrations (mg/L)	References
Algae	<i>Raphidocelis subcapitata</i>	Static	72	EC50	79.4	Dimilin®	>80	43
	<i>Raphidocelis subcapitata</i>	Static	120	EC50	95.6	-	>80	43
Crustacean	<i>Ceriodaphnia dubia</i>	-	48	EC50	-	-	0.0017	52
	<i>Daphnia magna</i>	-	48	EC50	-	-	0.00184	53
	<i>Daphnia magna</i>	Static	48	EC50	97.6	-	0.000026-0.000071	43
	<i>Daphnia magna</i>	Static	48	EC50	79.4	-	0.000032	43
	<i>Daphnia magna</i>	Static	48	EC50	-	Dimilin®	0.071	54
	<i>Daphnia magna</i>	Static	48	EC50	25	Champion	0.00006	55
	<i>Daphnia similis</i>	Static	48	EC50	25	Dimilin®	0.00097	56
	<i>Gammarus pseudolimnaeus</i>	-	96	LC50	-	-	0.045	57
	<i>Hyalella azteca</i>	-	96	LC50	-	-	0.00184	53
	<i>Mysidopsis bahia</i>	-	96	LC50	-	-	0.002	58
Fish	<i>Brachydanio rerio</i>	Static	96	LC50	95.6	-	>0.2	43
	<i>Brachydanio rerio</i>	Static	96	LC50	79.4	Dimilin®	>106	43
	<i>Cyprinodon variegatus</i>	Static	96	LC50	100	-	>0.00013	43
	<i>Hyphessobrycon eques</i>	Static	48	LC50	25	Champion	10.91	59
	<i>Ictalurus punctatus</i>	-	96	LC50	-	-	>100	60
	<i>Lepomis macrochirus</i>	-	96	LC50	-	-	129	57
	<i>Onchorynchus mykiss</i>	-	96	LC50	-	-	136	57
	<i>Oncorhynchus mykiss</i>	Static	96	LC50	95.6	-	>65	43
	<i>Oncorhynchus mykiss</i>	Static	96	LC50	79.4	Dimilin®	>106	43
	<i>Oncorhynchus clarki</i>	-	96	LC50	-	-	>60	61
	<i>Oreochromis niloticus</i>	Static	48	LC50	25	Champion	10.04	59
	<i>Oreochromis niloticus</i>	Static	96	LC50	25	Dimilin®	>100	56
	<i>Perca flavescens</i>	-	96	LC50	-	-	25	60
	<i>Salvelinus fontinalis</i>	-	96	LC50	-	-	>50	61

EC50 - Effective Concentration 50 %; LC50 - Lethal Concentration 50 %; - Data not informed

**Table S2.** Ecotoxicological assessment of Novaluron in aquatic organisms

Biological group	Scientific name	Exposure medium	Test endpoint in hours (h)	Estimate	%	Commercial name	Toxic concentrations (mg/L)	References
Algae	<i>P. subcapitata</i>	Static	72	EC50	-	-	9.68	62
	<i>Selenastrum</i> *	Static	96	EC50	Novaluron	-	>0.00000968	63
Crustacean	<i>Daphnia</i> *	Static	48	EC50	Novaluron	-	0.000058	63
	<i>Daphnia</i> *	Static	48	EC50	Novaluron	-	0.000000279	63
	<i>Daphnia magna</i>	-	48	EC50	-	-	0.058	62
	<i>Ctenopharyngodon idella</i>	-	96	LC50	-	-	12.96	64
Fish	<i>Ctenopharyngodon idella</i>	-	96	LC50	-	-	12.96	64
	<i>Labeo rohita</i>	-	96	LC50	-	-	3.33	65
	<i>Lepomis macrochirus</i>	Flow test conditions	96	LC50	Novaluron	-	≥1.0	63
	<i>Oncorhynchus mykiss</i>	-	96	LC50	-	-	> 1.0	62
	<i>Oncorhynchus mykiss</i>	Flow test conditions	96	LC50	Novaluron	-	≥1.0	63

EC50 - Effective Concentration 50 %; LC50 - Lethal Concentration 50 %; \* Species not defined; - Data not informed

**Table S3.** Ecotoxicological assessment of Pirimiphos-Methyl in aquatic organisms

Biological group	Scientific name	Exposure medium	Test endpoint in hours (h)	Estimate	%	Comercial name	Toxic concentrations (mg/L)	References
<b>Algae</b>	<i>Raphidocelis subcapitata</i>	Static	96	EC50	91	-	>0.001	66
<b>Crustacean</b>	<i>Daphnia magna</i>	-	48	EC50	-	-	0.00021	67
	<i>Daphnia magna</i>	Static	48	EC50	-	-	0.00000021	66
	<i>Daphnia magna</i>	Static	48	LC50	-	-	0.1035 ± 0.0568	68
	<i>Cyprinus carpio</i>	-	96	LC50	-	-	1.4	67
<b>Fish</b>	<i>Oncorhynchus mykiss</i>	-	96	LC50	-	-	0.404	67
	<i>Oncorhynchus mykiss</i>	-	96	LC50	-	-	0.20	67
	<i>Oncorhynchus mykiss</i>	Static	96	LC50	-	-	0.2	66
	<i>Oncorhynchus mykiss.</i>	Static	96	LC50	-	-	0.404	69
	<i>Oncorhynchus mykiss.</i>	Static	96	LC50	-	-	0.20	69
	<i>Poecilia reticulata</i>	-	96	-	-	-	0.019	70
	<i>Poecilia reticulata</i>	Static	96	LC50	25	Actellic® 25EC	0.019	71
	<i>Psetta maxima</i>	-	96	-	99.5	Sigma Chemical	0.452	72
	<i>Pseudomugil signifer</i>	Static	96	LC50	-	-	0.091	73

EC50 - Effective Concentration 50 %; LC50 - Lethal Concentration 50 %; - Data not informed

**Table S4.** Ecotoxicological assessment of Pyriproxyfen in aquatic organisms

Biological group	Scientific name	Exposure medium	Test endpoint in hours (h)	Estimate	%	Comercial name	Toxic concentrations (mg/L)	References
Algae	<i>Lemna gibba</i>	Static	72	EC50	98.4	-	> 0.18	74
	<i>Raphidocelis subcapitata</i>	-	72	EC50	-	-	0.15	75
	<i>Daphnia carinata</i>	-	48	LC50	96.6	-	0.08	76
Crustacean	<i>Daphnia magna</i>	Flow test conditions	48	EC50	95.3	-	0.4	75
	<i>Daphnia magna</i>	Static	48	LC50	98.5	Sumilarv®	0,0025	77
	<i>Daphnia magna</i>	Renewal every two days	168	LC50	98.5	Sumilarv®	0.00125	77
	<i>Daphnia magna</i>	Renewal every two days	504	EC50	98.5	Sumilarv®	0.00125	77
	<i>Daphnia magna</i>	Static	48	LC50	-	-	0.000096	78
	<i>Danio rerio</i>	Renewal every two days	96	LC50	-	-	0.660	79
Fish	<i>Danio rerio</i>	Renewal every two days	192	LC50	-	-	0.220	79
	<i>Pseudomugil signifer</i>	Static	96	LC50	-	-	0.845	73
	<i>Xiphophorus maculatus</i>	Renewal every two days	96	LC50	-	Sumilarv®	0.020	80

EC50 - Effective Concentration 50 %; LC50 - Lethal Concentration 50 %; - Data not informed

**Table S5.** Ecotoxicological assessment of Temephos in aquatic organisms

Biological group	Scientific name	Exposure medium	Test endpoint in hours (h)	Estimate	%	Comercial name	Toxic concentrations (mg/L)	References
Crustacean	<i>Daphnia magna</i>	Static	48	EC50	1	Fersol	0.00015	55
	<i>Daphnia magna</i>	Static	48	LC50	43 EC	Abate	0.000011	81
	<i>Daphnia magna</i>	Static	48	LC50	5 GR	-	0.00054	61
	<i>Daphnia pulex</i>	Static	12	LC50	-	Abate	<0.0013	82
	<i>Farfantepenaeus duorarum</i>	Static	48	EC50	43	-	0.0053	83
	<i>Gammarus lacustris</i>	Static	48	LC50	86.2	-	0.082	61
	<i>Mesocyclops sp</i>	Static	48	EC50	>98%	Sigma	0.00145	84
	<i>Mesocyclops sp</i>	Static	48	EC50	>98%	Sigma	0.045	84
Fish	<i>Cyprinodon variegatus</i>	Flow test conditions	96	EC50	43 EC	Abate	4.7	81
	<i>Cyprinodon variegatus</i>	Flow test conditions	96	EC50	5 GR	Abate	> 5.4	81
	<i>Fundulus similis</i>	-	48	LC50	-	-	1	85
	<i>Hyphessobrycon eques</i>	Static	48	LC50	1	Fersol	7.30	59
	<i>Lepomis macrochirus</i>	Static	96	LC50	86.2	-	21.8	61
	<i>Lepomis macrochirus</i>	Static	96	LC50	43 EC	-	1.14	61
	<i>Menidia beryllina</i>	Static	48	LC50	-	-	3,9	85
	<i>Oncorhynchus mykiss</i>	Static	96	LC50	90	-	9.58	81
	<i>Oreochromis niloticus</i>	Static	48	LC50	1	Fersol	7.11	59
	<i>Poecilia reticulata</i>	Static	36	LC50	1	-	0.00375	86
	<i>Poecilia reticulata</i>	Static	96	LC50	90.3	Abate	<50l	87
	<i>Tilapia melanopleum</i>	Static	96	LC50	-	Abate	30,2	88
	<i>Tilapia melanopleum</i>	Static	96	LC50	-	Abate	30,2	88

EC50 - Effective Concentration 50 %; LC50 - Lethal Concentration 50 %; - Data not informed

**Table S6.** Mutagenic activity expressed by the mean of reversals / plate and standard deviation for the strains TA97a, TA98, TA100, TA102 and TA1535 of *Salmonella enterica* serovar Typhimurium after treatment with the LCCt emulsion in the absence (-S9) and presence (+ S9) of metabolic activation system.

Products	Concentrations (mg/plate)	TA97a		TA98		TA100		TA102		TA1535	
		-S9	+S9	-S9	+S9	-S9	+S9	-S9	+S9	-S9	+S9
tCNSL	NC	101.67±4	108.33±4	23.33±4	25.67±3	122.67±6	138.33±9	142.67±7	158.33±3	6.33±1	7.67±1
	0.5	-	-	19.33±3	16.67±2	-	-	-	-	-	-
	1	-	-	18.67±1	17.00±1	-	-	-	-	-	-
	2	79.67±5	109.00±5	11.00±2	12.67±1	92.00±8	97.33±3	100.00±2	95.67±5	8.33±3	9.00±3
	20	72.33±4	101.67±3	11.67±1	12.67±2	66.33±8	112.00±16	93.67±8	95.67±5	5.33±2	6.33±1
	200	69.00±6	110.33±6	9.67±2	8.00±2	88.00±14	116.00±7	81.33±4	97.97±10	2.33±1	4.67±1
	2000	55.33±5	86.00±3	8.33±1	7.00±2	95.33±7	137.67±9	65.00±4	78.67±7	2.33±1	3.67±1
NatCNSLS mixture	NC	101.67±4	108.33±4	24.33±4	25.67±3	122.67±6	138.33±9	142.67±7	158.33±3	6.33±1	7.67±1
	0.5	108.67±3	127.00±3*	16.67±1	16.33±1	-	-	86.00±3	129.67±3	-	-
	1	90.67±11	126.33±3*	14.67±1	16.00±1	-	-	90.33±1	115.67±5	-	-
	2	84.00±1	81.00±7	14.67±1	12.00±2	98.33±3	83.00±4	54.33±6	89.00±8	3.33±1	6.00±1
	20	77.33±3	73.00±4	14.33±2	11.67±1	99.00±3	65.00±4	58.00±8	93.00±2	4.00±1	5.33±1
	200	72.00±3	64.00±6	11.33±1	9.00±2	104.67±2	106.67±3	103.67±9	79.33±3	5.33±3	5.00±1
	2000	66.00±3	62.00±4	8.67±1	8.67±1	108.00±5	127.00±2	132.00±6	49.33±8	8.33±3	4.67±2
tCNSL+NatCNSLS mixture	NC	126.00±4	136.33±1	32.33±2	34.00±2	136.00±5	155.67±4	312.66±13	394.67±5	12.67±2	14.33±1
	1	144.67±3*	143.33±5	27.67±1	40.00±2	147.67±2	168.00±6	385.67±4**	405.33±5	17.67±1	19.00±1*
	2	136.00±5	141.33±6	31.33±3	41.00±1*	140.33±2	157.33±2	395.33±4**	395.00±4	18.00±2	17.33±2
	20	118.67±6	121.00±3	30.33±4	34.00±1	125.67±5	147.00±4	332.67±6	400.67±9	16.67±2	16.00±1
	200	84.67±5	90.67±2	30.67±1	34.00±3	140.33±1	131.00±4	354.00±8*	408.33±10	13.33±1	12.00±1
	2000	80.67±4	82.67±3	29.67±1	38.00±2	100.33±2	134.00±6	343.33±5	393.67±11	17.67±2	10.33±1
PC		896.33±11 <sup>a</sup>	926.66±6 <sup>b</sup>	260.67±9 <sup>a</sup>	293.33±7 <sup>b</sup>	677.67±9 <sup>c</sup>	708.67±7 <sup>b</sup>	995.00±11 <sup>d</sup>	946.67±7 <sup>b</sup>	226.33±9 <sup>c</sup>	266.33±4 <sup>b</sup>

NC – Negative Control: MiliQ water used as a product diluent; PC – Positive Control: <sup>a</sup>4-nitro-o-phenylenediamine (10 µg/plate); <sup>b</sup>2AA- aminoanthracene (2,5 µg/plate); <sup>c</sup>Sodium Azide (2.5 µg/plate); <sup>d</sup>Mitomycin C (0,5 µg/plate); - Concentrations not tested. Statistical analyzes (ANOVA) were performed separately for each strain, in the absence or presence of S9 comparing the concentrations with the negative control within each product. \* p<0.05, \*\*p<0.01.