

## **Appendix C2**

### **Metals Tested in the LLNA - Comparative Data (Sorted Alphabetically)**

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## Metals Tested in the LLNA - Comparative Data (Sorted Alphabetically)

Substance Name	CASRN	LLNA Conc. tested (%)	LLNA Sis	LLNA EC3 (%)	Vehicle	LLNA <sup>1</sup> Result	Overall LLNA Result <sup>1,2</sup>	Overall LLNA Result <sup>1,2,3</sup> (Aqueous Metals)	Overall LLNA Result <sup>1,2,3</sup> (Non-Aqueous Metals)	LLNA References	Guinea Pig Studies Outcome <sup>1</sup> (GPMT/BT)	Guinea Pig References	Human Outcome <sup>1</sup>	Human References
Aluminum chloride	7446-70-0	5, 10, 25	0.8, 0.8, 0.7	NC	Petrolatum	-	-	NA	-	Basketter et al. (1999a)	NA	NT	-	Basketter et al. (1999a)
<i>Ammonium tetrachloroplatinate</i> <sup>d</sup>	13820-41-2	2.5, 5, 10	16, 15.4, 18.1	IDR	DMSO	+	+	NA	+	Basketter and Scholes (1992); Basketter et al. (1999a,b)	+	Basketter and Scholes (1992); Basketter et al. (1999a)	+ <sup>7</sup>	Basketter et al. (1999a,b)
<i>Beryllium sulfate</i>	7787-56-6	NA	NA	0.03	NA	+	+	NA	+	Basketter et al. (1994); Mandervelt et al. (1997); Basketter et al. (1999a); Schneider and Akkan (2004)	+	Basketter et al. (1999a)	+ <sup>8,9</sup>	Basketter et al. (1994); Kligman (1966); Basketter et al. (1999b)
		2.5, 5, 10	8.4, 7.1, 9.4	IDR	DMF	+								
<i>Cobalt chloride</i>	7646-79-9	0.5, 1.0, 2.5	3.2, 2.7, 2.8	0.4	NA	+	+	NA	NA	Basketter and Scholes (1992); Basketter et al. (1994); Basketter et al. (1999b)	+	Basketter and Scholes (1992)	+ <sup>7,8</sup>	Basketter et al. (1999a, b)
Cobalt (II) salts	7440-48-4	NA	NA	NA	DMSO	+	+	NA	+	Ikarashi et al. (1992); Griem et al. (2003); Mandervelt et al. (1997); Schneider and Akkan (2004)	NA	NT	+ <sup>8</sup>	Kligman (1966); Griem et al. (2003); Schneider and Akkan (2004)
Cobalt sulfate	10124-43-3	NA	NA	NA	NA	+	+	NA	NA	NP	NA	NT	+ <sup>9</sup>	Kligman (1966)
<i>Copper chloride</i>	7758-89-6	1, 2.5, 5	8.1, 13.8, 13.6	0.4	DMSO	+	+	NA	+	Basketter and Scholes (1992); Basketter et al. (1999a); ICCVAM (1999)	-	Basketter and Scholes (1992); ICCVAM (1999)	-	Basketter et al. (1999a,b)
		NA	NA	NA	DMSO	+								

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<i>Gold chloride</i>	16903-35-8	NA	NA	0.31	DMSO	+	+	NA	+	Basketter et al. (1999a); Schneider and Akkan (2004)	NA	NT	+ <sup>8,9</sup>	Kligman (1966); Basketter et al. (1999a,b); Schneider and Akkan (2004)
		5, 10, 25	21.8, 10.9, 17.9	IDR	DMSO	+								
<i>Lead acetate</i>	15347-57-6	2.5, 5, 10	0.7, 0.8, 1	NC	DMSO	-	-	NA	-	Basketter et al. (1999b); ICCVAM (1999)	NA	NT	-	Basketter et al. (1999a,b)
		NA	NA	NA	NA	-								
Manganese chloride	7773-01-5	5, 10, 25	1.10, 0.60, 1.00	NC	Petrolatum	-	-	NA	-	Basketter et al. (1999a)	NA	NT	-	Basketter et al. (1999a,b)
<i>Mercuric (II) chloride</i>	7484-94-7	5, 10	19.9, 11.8	0.39	AOO	+	+	NA	+	Basketter et al. (1994); Basketter et al. (1999a); Schneider and Akkan (2004)	+	Magnusson and Kligman (1969); Basketter et al. (1999a)	+ <sup>7,8,9</sup>	Kligman (1966); Marzulli and Maibach (1974); Magnusson and Kligman (1969); Basketter et al. (1994); Basketter et al. (1999a,b)
<i>Nickel chloride</i>	7718-54-9	2.5, 5, 10	1.3, 2.6, 6.6	5.5	30% ETOH	+	+	+	-	Basketter and Scholes (1992); Gerberick et al. (1992); Basketter et al. (1999a,b); ICCVAM (1999); Griem et al. (2003)	+	Hicks et al. (1979); Goodwin et al. (1981); Möller (1984); Wahlberg and Boman (1985); Basketter and Scholes (1992); Basketter et al. (1999b); ICCVAM (1999)	+	Vandenberg and Epstein (1963); Goodwin et al. (1981); Menne (1994); Basketter et al. (1999a,b); Griem et al. (2003)
		0.5, 1.0, 2.5	1, 1.7, 2.2	NC	DMSO	-								
		1, 2.5, 5	1.5, 2.2, 2.4	NC	DMSO	-								
Nickel (II) salts	NA	NA	NA	1.40	NA	+	+	NA	NA	Schneider and Akkan (2004)	NA	NT	+ <sup>8</sup>	Kligman (1966); (Schneider and Akkan (2004)

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<i>Nickel sulfate</i>	7786-81-4	0.25, 0.5, 1, 2.5	2, 2.4, 2.8, 3	2.5	1% Pluronic L92	+	+	+	-	Basketter and Scholes (1992); Basketter et al. (1994); Basketter et al. (1999a); Ryan et al. (2000, 2002); Griem et al. (2003)	+	Magnusson and Kligman (1969); Bourrinet et al. (1979); Maurer et al. (1979); Wahlberg and Boman (1985); Gad et al. (1986); Basketter and Scholes (1992)	+ <sup>7,8</sup>	Magnusson and Kligman (1969); Marzulli and Maibach (1976); Bourrinet et al. (1979); Gad et al. (1986); Basketter et al. (1994); Uter et al. (1995); Basketter et al. (1999a,b); Griem et al. (2003)
		0.25, 0.5, 1, 2.5	0.9, 1.1, 1.6, 1.6	NC	DMF	-								
		0.25, 0.5, 1, 2.5	1.3, 1.4, 1.4, 1.8	4.8	DMSO	+								
		0.5, 1.0, 2.5	1.1, 1.5, 1.5	NC	DMSO	-								
<i>Potassium dichromate</i>	7778-50-9	0.025, 0.05, 0.1, 0.25, 0.5	1.6,1.4, 3.8, 5.3, 16.1	0.08	DMSO	+	+	+	+	ECPA LLNA Project Report <sup>5</sup> ; NTP Study <sup>6</sup> ; Kimber et al. (1991); Basketter and Scholes (1992); Basketter et al. (1994); Kimber et al. (1995); Basketter et al. (1999a,b); Ryan et al. (2002); Schneider and Akkan (2004); Basketter and Kimber (2006)	+	Magnusson and Kligman (1969); Goodwin et al. (1981); Gad et al. (1986); Kimber et al. (1991); Basketter and Scholes 1992); Kimber et al. (2003)	+ <sup>7,8,9</sup>	Kligman (1966); Magnusson and Kligman (1969); Marzulli and Maibach (1976); Goodwin et al. (1981); Basketter et al. (1994); Basketter et al. (1999a,b); Schneider and Akkan (2004); Basketter and Kimber (2006)
		0.025, 0.05, 0.1, 0.25, 0.5	1.4, 2.5, 9.5, 25.9, 10.1	0.05	DMSO	+								
		0.025, 0.05, 0.1, 0.25	1.21, 1.84, 2.22, 3.39	0.20	DMSO	+								
		0.025, 0.05, 0.1, 0.25, 0.5	1.1, 1.1, 1.4, 4.9, 5.4	0.17	1% Pluronic L92	+								
		0.025, 0.05, 0.1, 0.25, 0.5	2.9, 4.3, 9.1, 15.1, 22.6	0.33	DMF	+								
		0.02, 0.1, 0.5	1.5, 4.5, 15.2	0.06	1% Pluronic L92	+								
		0.02, 0.1, 0.5	1.06, 1.04, 5.55	0.3	1% Pluronic L92	+								
		0.02, 0.1, 0.5	2.4, 2.9, 7.9	0.11	1% Pluronic L92	+								
		0.02, 0.1, 0.5	1.4, 1.8, 7.8	0.18	1% Pluronic L92	+								
		0.02, 0.1, 0.5	1.7, 1.5, 4.1	0.33	1% Pluronic L92	+								
		0.025, 0.05, 0.1, 0.25, 0.5	1.1, 1.3, 2.3, 5.1, 13.1	0.15	DMSO	+								
		0.1, 0.25, 0.5	3.5, 10.2, 10.4	0.03	DMSO	+								
		NA	NA	0.46	NA	+								
		0.1, 0.25, 0.5	7.9, 22.6, 33.6	0.07	DMSO	+								
		0.1, 0.25, 0.5	1.8, 5.1, 6.9	0.15	DMSO	+								
		0.1, 0.25, 0.5	NA, 8.8, 10.1	0.01	DMSO	+								
		0.1, 0.25, 0.5	2.0, 4.4, 5.4	0.17	DMSO	+								
		0.025, 0.05, 0.1, 0.25, 0.5	1.7, 2.9, 4.5, 10.4, 19.1	0.058	DMSO	+								
		0.025, 0.05, 0.1, 0.25, 0.5	1.2, 2.1, 3.4, 4.5, 11.2	0.132	DMSO	+								
0.025, 0.05, 0.1, 0.25, 0.5	1.9, 1.7, 2.2, 5.9, 13.0	0.122	DMSO	+										
0.025, 0.05, 0.1, 0.25, 0.5	1.6, 1.4, 3.8, 5.3, 16.1	0.126	DMSO	+										
0.025, 0.05, 0.1, 0.25, 0.5	NA	0.08	NA	+										
Tin chloride	NA	5, 10, 25	4.1, 6.5, 6.3	3.6	AOO	+	+	NA	+	Basketter et al. (1999b)	NA	NT	+	Basketter et al. (1999a,b)

Substance Name	CASRN	LLNA Conc. tested (%)	LLNA Sis	LLNA EC3 (%)	Vehicle	LLNA <sup>1</sup> Result	Overall LLNA Result <sup>1,2</sup>	Overall LLNA Result <sup>1,2,3</sup> (Aqueous Metals)	Overall LLNA Result <sup>1,2,3</sup> (Non-Aqueous Metals)	LLNA References	Guinea Pig Studies Outcome <sup>1</sup> (GPMT/BT)	Guinea Pig References	Human Outcome <sup>1</sup>	Human References
<i>Zinc sulfate</i>	7730-02-0	5, 10, 25	1.3, 2, 2.3	NC	DMSO	-	+	NA	-	Basketter et al. (1999a); ICCVAM (1999)	NA	NT	-	Basketter et al. (1999a,b)
		NA	NA	NA	NA	+								

Abbreviations: AOO = Acetone olive-oil (4:1); BT = Beuhler Test; CASRN = Chemical Abstracts Service Registry Number; Conc. = Concentration; DMF = Dimethylformamide; DMSO = Dimethyl sulfoxide; ETOH = Ethanol; GPMT = Guinea Pig Maximization Test; IDR = Insufficient Data Results; LLNA = Local Lymph Node Assay; NA = Not Available; NC = Not Calculated; SI = Stimulation Index.

<sup>1</sup>(+) = Sensitizer; (-) = Non-sensitizer

<sup>2</sup>Overall LLNA result based on "weight-of-evidence" with the majority and/or most severe result applicable to all chemicals except for nickel chloride.

<sup>3</sup>An aqueous vehicle is any vehicle containing at least 20% water. Conversely, a non-aqueous vehicle is any vehicle containing less than 20% water.

<sup>4</sup>Bold and italicized text represent the 11 metals that were recorded in the ICCVAM LLNA Evaluation Report (ICCVAM 1999).

<sup>5</sup>LLNA Project Report was provided by the European Crop Protection Association (ECPA).

<sup>6</sup>National Toxicology Program (NTP) data were provided by D. Germolec.

<sup>7</sup>Data obtained from the Human Patch Test Allergen.

<sup>8</sup>Data obtained from the Human Maximization Test.

<sup>9</sup>Data obtained from the Human Repeat Insult Patch Test.