

Analytical Findings

Using the GC-MS method described above for the determination of benzene, Valisure analyzed 294 unique batches from 69 brands of sunscreen and after-sun care products with the results detailed below. In summary, 78 product batches had detectable levels of benzene, 26 contained benzene in concentrations between 0.1 ppm and 2.0 ppm and 14 contained over 2 ppm. In Tables 2 – 5, an asterisk “*” denotes data generated by the Chemical and Biophysical Instrumentation Center at Yale University from a sample from the same lot and specific product package. Two asterisks “**” denotes data generated by Boston Analytical from a sample of the same lot and specific product package. For samples where benzene was detected, at least three samples from each batch were tested individually and the amount of benzene detected is reported as an average followed by the percent standard deviation of the results from replicate measurements.

Table 2. Product description and results of benzene analysis on various batches of sunscreen and after-sun care products in which benzene was detected at 2 ppm or higher.

Brand Name	Type	Description	SPF	UPC	Lot	Exp.	Active Pharmaceutical Ingredient(s)	Benzene Avg ppm	% St Dev
Neutrogena	Spray	Ultra Sheer Weightless Sunscreen Spray, SPF 100+	100+	086800100416	04820E04	2022-01	Avobenzene 3%, Homosalate 15%, Octisalate 5%, Octocrylene 10%, Oxybenzone 6%	6.26 6.77*	7%
Neutrogena	Spray	Ultra Sheer Weightless Sunscreen Spray, SPF 70	70	086800100409	07020E01	2023-02	Avobenzene 3%, Homosalate 15%, Octisalate 5%, Octocrylene 4%, Oxybenzone 6%	5.96	7%
Neutrogena	Spray	Ultra Sheer Weightless Sunscreen Spray, SPF 70	70	086800100409	06920E01	2023-02	Avobenzene 3%, Homosalate 15%, Octisalate 5%, Octocrylene 4%, Oxybenzone 6%	5.76	5%
Sun Bum	Gel	Cool Down Gel	N/A	871760002005	50082C	–	N/A (Cosmetic Product)	5.33 5.49*	3%
Neutrogena	Spray	Ultra Sheer Weightless Sunscreen Spray, SPF 70	70	086800100409	02320E01	2022-12	Avobenzene 3%, Homosalate 15%, Octisalate 5%, Octocrylene 4%, Oxybenzone 6%	5.30	2%
Neutrogena	Spray	Beach Defense Oil-Free Body Sunscreen Spray - SPF 100	100	086800101444	04721E02	2023-01	Avobenzene 3%, Homosalate 15%, Octisalate 5%, Octocrylene 10%, Oxybenzone 6%	5.20 5.59*	5%
CVS Health	Spray	After-sun Aloe Vera Soothing Spray	N/A	050428390832	8140449A	–	N/A (Cosmetic Product)	4.71 4.55*	1%
Neutrogena	Spray	Invisible Daily Defense Body Sunscreen Broad Spectrum SPF 60+	60+	086800111542	04921E01	2024-01	Avobenzene 3%, Homosalate 10%, Octisalate 5%, Octocrylene 10%	4.65 5.27*	4%
Neutrogena	Spray	Ultra Sheer Weightless Sunscreen Spray, SPF 100+	100+	086800100416	03120E02	2021-12	Avobenzene 3%, Homosalate 15%, Octisalate 5%, Octocrylene 10%, Oxybenzone 6%	4.11 6.00**	15%
Neutrogena	Spray	Beach Defense Oil-Free Body Sunscreen Spray - SPF 100	100	086800101444	28020E01	2022-09	Avobenzene 3%, Homosalate 15%, Octisalate 5%, Octocrylene 10%, Oxybenzone 6%	4.01 4.00*	4%
CVS Health	Spray	After-sun Aloe Vera Soothing Spray	N/A	050428390832	4111849A	–	N/A (Cosmetic Product)	3.58 3.93*	4%
Neutrogena	Spray	Beach Defense Spray Body Sunscreen SPF 50	50	086800112549	25520E01	2023-08	Avobenzene 3%, Homosalate 10%, Octisalate 5%, Octocrylene 10%	3.52 3.71*	3%
Neutrogena	Spray	Beach Defense Oil-Free Body Sunscreen Spray - SPF 100	100	086800101444	31420E04	2022-10	Avobenzene 3%, Homosalate 15%, Octisalate 5%, Octocrylene 10%, Oxybenzone 6%	3.08 2.64*	2%
Fruit of the Earth	Gel	Aloe Vera Gel	N/A	071661001200	6612940A	–	N/A (Cosmetic Product)	2.78 2.94*	6%

Table 3. Product description and results of benzene analysis on various batches of sunscreen and after-sun care products in which benzene was detected at 0.1 ppm to 2 ppm.

Brand Name	Type	Description	SPF	UPC	Lot	Exp.	Active Pharmaceutical Ingredient(s)	Benzene Avg ppm	% St Dev
Neutrogena	Spray	Invisible Daily Defense Body Sunscreen Broad Spectrum SPF 60+	60+	086800111542	17820E01	2023-05	Avobenzone 3%, Homosalate 10%, Octisalate 5%, Octocrylene 10%	1.99 1.66*	8%
Neutrogena	Spray	Ultra Sheer Weightless Sunscreen Spray, SPF 100+	100+	086800100416	06420E05	2022-02	Avobenzone 3%, Homosalate 15%, Octisalate 5%, Octocrylene 10%, Oxybenzone 6%	1.44 1.06*	6%
Raw Elements	Lotion	Eco Formula Sunscreen Lotion SPF 30	30	858855002003	58J19	2021-07	Zinc Oxide 23%	1.35 1.31*	9%
CVS Health	Spray	After-sun Aloe Vera Soothing Spray	N/A	050428390832	1101990A	--	N/A (Cosmetic Product)	0.90 1.04*	3%
Neutrogena	Spray	Ultra Sheer Weightless Sunscreen Spray, SPF 70	70	086800100409	26119E01	2022-08	Avobenzone 3%, Homosalate 15%, Octisalate 5%, Octocrylene 4%, Oxybenzone 6%	0.87	9%
CVS Health	Gel	After-sun Aloe Vera Moisturizing Gel	N/A	050428324837	4500231A	--	N/A (Cosmetic Product)	0.81 0.98*	2%
Neutrogena	Spray	Ultra Sheer Weightless Sunscreen Spray, SPF 100+	100+	086800100416	08119F36	2022-02	Avobenzone 3%, Homosalate 15%, Octisalate 5%, Octocrylene 10%, Oxybenzone 6%	0.77	4%
SunBurnt	Gel	Advanced After-Sun Gel	N/A	324330210060	62R20	2022-12	N/A (Cosmetic Product)	0.75 0.87*	2%
Neutrogena	Spray	Ultra Sheer Weightless Sunscreen Spray, SPF 100+	100+	086800100416	32619E06	2021-10	Avobenzone 3%, Homosalate 15%, Octisalate 5%, Octocrylene 10%, Oxybenzone 6%	0.73	9%
Goodsense	Lotion	Sunscreen Lotion SPF 30	30	846036001143	070606920	2022-07	Avobenzone 3%, Homosalate 10%, Octisalate 5%, Octocrylene 10%	0.71	4%
Neutrogena	Spray	CoolDry Sport Water-Resistant Sunscreen Spray SPF 70	70	086800100379	33719E01	2022-10	Avobenzone 3%, Homosalate 15%, Octisalate 5%, Octocrylene 4%, Oxybenzone 6%	0.66	5%
Neutrogena	Spray	Ultra Sheer Body Mist Sunscreen Broad Spectrum SPF 30 Spray	30	086800100386	28219E02	2021-09	Avobenzone 3%, Homosalate 8%, Octisalate 5%, Octocrylene 8%	0.49	18%
Banana Boat	Spray	Kids Max Protect & Play Sunscreen C-Spray SPF 100	100	079656050820	200910346	2023-02	Avobenzone 3%, Homosalate 10%, Octisalate 5%, Octocrylene 10%, Oxybenzone 6%	0.41 0.43*	7%
Neutrogena	Spray	Beach Defense Oil-Free Body Sunscreen Spray - SPF 100	100	086800101444	35219E05	2021-11	Avobenzone 3%, Homosalate 15%, Octisalate 5%, Octocrylene 10%, Oxybenzone 6%	0.41	8%
Neutrogena	Spray	Ultra Sheer Weightless Sunscreen Spray, SPF 100+	100+	086800100416	29519E02	2021-09	Avobenzone 3%, Homosalate 15%, Octisalate 5%, Octocrylene 10%, Oxybenzone 6%	0.37 0.38*	2%
Banana Boat	Spray	UltraMist Deep Tanning Dry Oil Continuous Clear Spray SPF 4	4	79656046632	200944022	2023-03	Homosalate 3.0%, Octocrylene 1.0%	0.36	18%
Banana Boat	Spray	Kids Max Protect & Play Sunscreen C-Spray SPF 100	100	079656050820	200273634	2022-12	Avobenzone 3%, Homosalate 10%, Octisalate 5%, Octocrylene 10%, Oxybenzone 6%	0.19	11%
Neutrogena	Spray	Ultra Sheer Weightless Sunscreen Spray, SPF 70	70	086800100409	13019F84	2022-04	Avobenzone 3%, Homosalate 15%, Octisalate 5%, Octocrylene 4%, Oxybenzone 6%	0.18	10%
Neutrogena	Spray	Ultra Sheer Body Mist Sunscreen Broad Spectrum SPF 45	45	086800100393	15719F83	2022-05	Avobenzone 3%, Homosalate 15%, Octisalate 5%, Octocrylene 2.35%, Oxybenzone 6%	0.15	12%
Banana Boat	Spray	Ultra Sport Clear Sunscreen Spray SPF 100	100	79656050806	201060792	2023-03	Avobenzone 3.0%, Homosalate 10.0%, Octisalate 5.0%, Octocrylene 10.0%, Oxybenzone 6.0%	0.15	4%
Neutrogena	Lotion	Ultra Sheer Dry-Touch Water Resistant Sunscreen SPF 70	70	86800687702	0090L0069	2022-06	Avobenzone 3.0%, Homosalate 15.0%, Octisalate 5.0%, Octocrylene 2.8%, Oxybenzone 6.0%	0.13	73%
Neutrogena	Spray	CoolDry Sport Water-Resistant Sunscreen Spray SPF 50	50	086800100362	15619F25	2022-05	Avobenzone 2.7%, Homosalate 9%, Octisalate 4.5%, Octocrylene 6%, Oxybenzone 4.5%	0.13	4%
TopCare Everyday	Lotion	Ultimate Sheer Sunscreen Lotion SPF 70	70	036800459007	9533119A	2021-11	Avobenzone 3%, Homosalate 10%, Octisalate 3%, Octocrylene 7%, Oxybenzone 6%	0.12 0.16*	6%
EltaMD	Spray	UV Aero Broad-Spectrum Full-Body Sunscreen Spray, SPF 45	45	390205025879	67155I	2022-11	Zinc Oxide 9.3%, Octinoxate 7.5%	0.11 0.17*	18%
EltaMD	Spray	UV Aero Broad-Spectrum Full-Body Sunscreen Spray, SPF 45	45	390205025879	67155H	2022-11	Zinc Oxide 9.3%, Octinoxate 7.5%	0.11	9%
Banana Boat	Spray	Kids Max Protect & Play Sunscreen C-Spray SPF 100	100	079656050820	200243635	2022-12	Avobenzone 3%, Homosalate 10%, Octisalate 5%, Octocrylene 10%, Oxybenzone 6%	0.11	19%