West University of Timișoara

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High risk chemicals used in cosmetics
- report on California cosmetics market -

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Abstract

This report is based on data provided by **California Health and Human Services Open Data Portal** (https://data.chhs.ca.gov/) and official reports of International Agency for Research on Cancer (IARC), Agency for Toxic Substances and Disease Registry (ATSDR) and Environmental Protection Agency (EPA)**.** It aims to **identify the most high risk chemicals** used in cosmetics from the California market, **what kind of products** contain such substances that pose a major risk to human use and **which are the companies** that use them. This report provides insights just into the State of California cosmetics market and cannot be generalized due to factors like legislation (example: EU has much stricter legislation on cosmetics that other countries) or market diversity in U.S. (example: some products are only found in California).

Keywords: high risk chemicals, California cosmetics market, cancer, birth defects

Introduction

This report is based on a dataset provided by California Health and Human Services Open Data Portal and the data was collected by the California Safe Cosmetics Program (CSCP) from the California Department of Public Health. The primary purpose of the CSCP is to collect information on hazardous and potentially hazardous ingredients in cosmetic products sold in California and to make this information available to the public. For all cosmetic products sold in California, the California Safe Cosmetics Act requires the manufacturer, packer, and/or distributor named on the product label to provide to the CSCP a list of all cosmetic products that contain any ingredients known or suspected to cause cancer, birth defects, or other developmental or reproductive harm.[1]

Even if I have have found 123 unique chemicals in cosmetics from California market, I decided to focus just on 9 high risk chemicals for human use, to find what kind of products contain such dangerous substances and to find which are the companies that use them.

[1] https://data.chhs.ca.gov/dataset/chemicals-in-cosmetics/resource/57da6c9a-41a7-44b0-ab8d-815ff2cd5913

Research:

Based on data provided by **California Health and Human Services Open Data Portal,** I have found 123 unique chemicals (declared by the manufacturers) on cosmetic products sold in California:

Titanium dioxide, Distillates (coal tar), Estragole, Cocamide diethanolamine, Toluene, Chromium (hexavalent compounds), Retinol, Retinol/retinyl esters, when in daily dosages in excess of 10,000 IU, or 3,000 retinol equivalents., Vitamin A, Vitamin A palmitate, Butylated hydroxyanisole, Coffea arabica extract, Lauramide diethanolamine, Coffee, Silica, crystalline (airborne particles of respirable size), Carbon black (airborne, unbound particles of respirable size), Carbon black, Genistein (purified), Progesterone, 2,4-Hexadienal (89% trans, trans isomer; 11% cis, trans isomer), Methyleugenol, Carbon-black extracts, Retinyl palmitate, o-Phenylphenol, Acrylamide, Formaldehyde (gas), Ginkgo biloba extract, Mica, Ethylene glycol, Acetic acid, retinyl ester, Ethyl acrylate, Trade Secret, Methanol, Mineral oils, untreated and mildly treated, Diethanolamine, TEA-Lauryl Sulfate, Retinyl acetate, Lead acetate, Talc, Triethanolamine, o-Phenylenediamine and its salts, Safrole, Styrene, Acetaldehyde, Cocamide DEA, 1,4-Dioxane, Arsenic (inorganic arsenic compounds), Dichloroacetic acid, Ethylene oxide, Lead, Dichloromethane (Methylene chloride), Benzene, Benzyl chloride, N-Nitrosodimethylamine, Propylene oxide, Methyl chloride, Cadmium and cadmium compounds, N-Methylpyrrolidone, Di-n-butyl phthalate (DBP), Coal tars, All-trans retinoic acid, Quinoline and its strong acid salts

Sodium Bromate, Phenacetin, Arsenic (inorganic oxides), Mercury and mercury compounds, p-Aminodiphenylamine, Permethrin, Acetylsalicylic acid, Coal tar extract, Selenium sulfide, Oil Orange SS, Spironolactone, Nickel (Metallic), Caffeic acid, Cocamide MEA, Cosmetic talc, C.I. Acid Red 114, Caffeine, Benzophenone-4, Ethanol in alcoholic beverages, Formaldehyde, Cocamide diethanolamine (DEA), Coffee extract, Retinol palmitate, Coffee bean extract, Propylene glycol mono-t-butyl ether, Avobenzone, Coal tar solution, Pulegone, Titanium dioxide (airborne, unbound particles of respirable size), beta-Myrcene, Talc (powder), 2,2-Bis(bromomethyl)-1 ,3-propanediol, Benzo[a]pyrene, Benz[a]anthracene, Extract of coffee bean, Goldenseal root powder, Isopropyl alcohol manufacture using strong acids, 2-Propyleneacrolein, N,N-Dimethyl-p-toluidine, Formaldehyde solution, N-Nitrosodiethanolamine, Benzophenone-2, Vinyl acetate, Trichloroacetic acid, Phenacemide, Aloe vera, non-decolorized whole leaf extract, Polygeenan, Diethanolamides of the fatty acids of coconut oil, Bisphenol A (BPA), Hydrous magnesium silicate, Benzophenone, Cocamide, Lauramide DEA, Aloe vera, whole leaf extract, Musk xylene, Aspirin, Coal Tar, Benzophenone-3, Quartz, Talc containing asbestiform fibers, Methylene glycol

Still, a large part of the chemicals present in the products on the market do not represent real risks for humans. Although many tests on laboratory rats have shown that these substances can cause cancer or birth defects, other studies have shown that just excessive exposure to large amounts can be considered a real danger for humans.

However, several studies and experiments have been conducted over time that have revealed a huge risk of human exposure to certain chemicals which may cause different types of cancer, birth defects or reproductive problems.

These scientific observations could not go unnoticed and forced some government agencies to inform the public about the increased risk of such substances in products intended for human use.

Based on official reports from government and international agencies, I have identified 9 extremely dangerous chemicals used in cosmetics on the California market.

This classification of the high risk chemicals is primarily based on **Agency for Toxic**

Substances and Disease Registry (ATSDR), on **The National Priorities List (NPL)** of **Environmental Protection Agency (EPA)** and on **International Agency for Research on Cancer (IARC),** but also take into account other NGOs that draw attention to the major risk posed by these chemicals.

The **Environmental Protection Agency (EPA)** protects people and the environment from significant health risks, sponsors and conducts research, and develops and enforces environmental regulations.
The National Priorities List (NPL) is the list of sites of national priority among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The NPL is intended primarily to guide the EPA in determining which sites warrant further investigation.
The **Agency for Toxic Substances and Disease Registry (ATSDR)**, based in Atlanta, Georgia, is a federal public health agency of the US Department of Health and Human Services. ATSDR partners with communities across the nation to increase knowledge about toxic substances, reduce the health effects of toxic exposures, and protect the public health.
International Agency for Research on Cancer (IARC) is the specialized cancer agency of the World Health Organization.

I have identified the following 9 chemicals present in California cosmetics that pose a major risk to human use:

Lead	Mercury	Arsenic
Formaldehyde	Benzen	Benzophenon
Isopropyl	Dibutyl	Polygeenan

But all these 9 chemicals can be present on the cosmetics leaflets under other names. The manufacturer may use other scientific names of the chemical to be printed on the product.

Examples in this regard could be represented by **Formaldehyde** or **Isobutyl** which can be listed on a product label by other names, such as:

Formaldehyde
Formic aldehyde
Formalin
Methyl aldehyde
Methyl chloride
Methylene glycol
Methanediol
Methylene oxide
Methanal

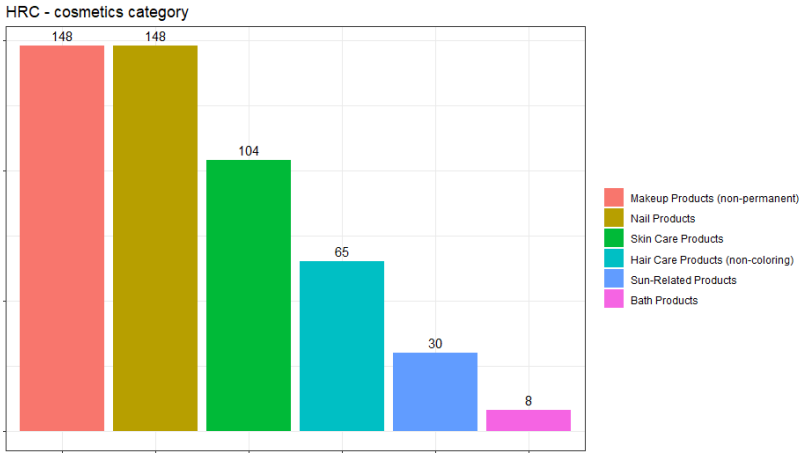
Isobutyl
N-butyl
Tert-butyl
Sec-butyl
Butyl
Butan-2-yl
2-methylpropyl
1-methylpropyl
2-methylpropyl

Thereby, in list of chemicals used in cosmetics I have identified different names and derivatives of the name of the main 9 high risk chemicals:

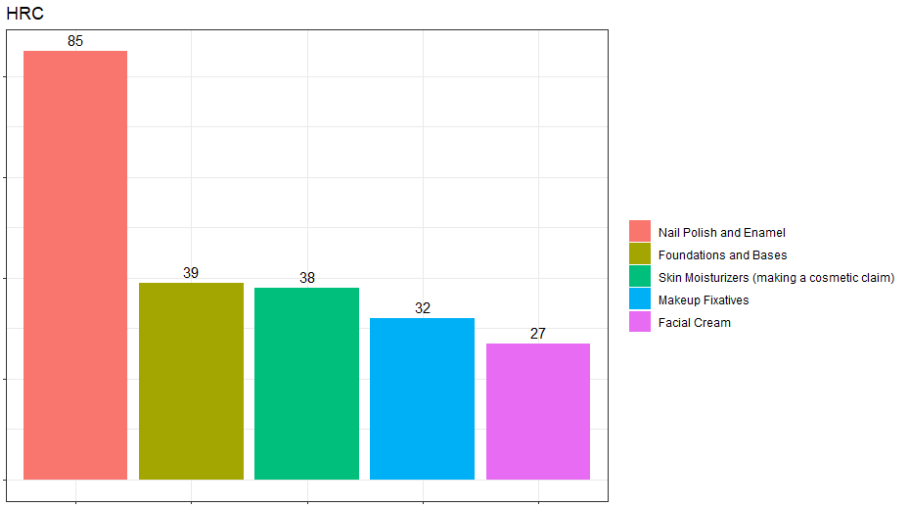
Titanium dioxide, Distillates (coal tar), Estragole, Cocamide diethanolamine, Toluene, Chromium (hexavalent compounds), Retinol, Retinol/retinyl esters, when in daily dosages in excess of 10,000 IU, or 3,000 retinol equivalents., Vitamin A, Vitamin A palmitate, Butylated hydroxyanisole, Coffea arabica extract, Lauramide diethanolamine, Coffee, Silica, crystalline (airborne particles of respirable size), Carbon black (airborne, unbound particles of respirable size), Carbon black, Genistein (purified), Progesterone, 2,4-Hexadienal (89% trans, trans isomer; 11% cis, trans isomer), Methyleugenol, Carbon-black extracts, Retinyl palmitate, o-Phenylphenol, Acrylamide, **Formaldehyde (gas)**, Ginkgo biloba extract, Mica, Ethylene glycol, Acetic acid, retinyl ester, Ethyl acrylate, Trade Secret, Methanol, Mineral oils, untreated and mildly treated, Diethanolamine, TEA-Lauryl Sulfate, Retinyl acetate, **Lead acetate**, Talc, Triethanolamine, o-Phenylenediamine and its salts, Safrole, Styrene, Acetaldehyde, Cocamide DEA, 1,4-Dioxane, **Arsenic (inorganic arsenic compounds)**, Dichloroacetic acid, Ethylene oxide, **Lead**, Dichloromethane (Methylene chloride), **Benzene**, Benzyl chloride, N-Nitrosodimethylamine, Propylene oxide, **Methyl chloride**, Cadmium and cadmium compounds, N-Methylpyrrolidone, **Di-n-butyl phthalate (DBP)**, Coal tars, All-trans retinoic acid, Quinoline and its strong acid salts, **Methylene glycol**

Sodium Bromate, Phenacetin, **Arsenic (inorganic oxides), Mercury and mercury compounds**, p-Aminodiphenylamine, Permethrin, Acetylsalicylic acid, Coal tar extract, Selenium sulfide, Oil Orange SS, Spironolactone, Nickel (Metallic), Caffeic acid, Cocamide MEA, Cosmetic talc, C.I. Acid Red 114, Caffeine, Benzophenone-4, Ethanol in alcoholic beverages, **Formaldehyde**, Cocamide diethanolamine (DEA), Coffee extract, Retinol palmitate, Coffee bean extract, Propylene glycol mono-t-butyl ether, Avobenzone, Coal tar solution, Pulegone, Titanium dioxide (airborne, unbound particles of respirable size), beta-Myrcene, Talc (powder), 2,2-Bis(bromomethyl)-1,3-propanediol, Benzo[a]pyrene, Benz[a]anthracene, Extract of coffee bean, Goldenseal root powder, **Isopropyl alcohol manufacture using strong acids**, 2-Propyleneacrolein, N,N-Dimethyl-p-toluidine, **Formaldehyde solution**, N-Nitrosodiethanolamine, Benzophenone-2, Vinyl acetate, Trichloroacetic acid, Phenacemide, Aloe vera, non-decolorized whole leaf extract, **Polygeenan**, Diethanolamides of the fatty acids of coconut oil, Bisphenol A (BPA), Hydrous magnesium silicate, **Benzophenone**, Cocamide, Lauramide DEA, Aloe vera, whole leaf extract, Musk xylene, Aspirin, Coal Tar, Benzophenone-3, Quartz, Talc containing asbestiform fibers

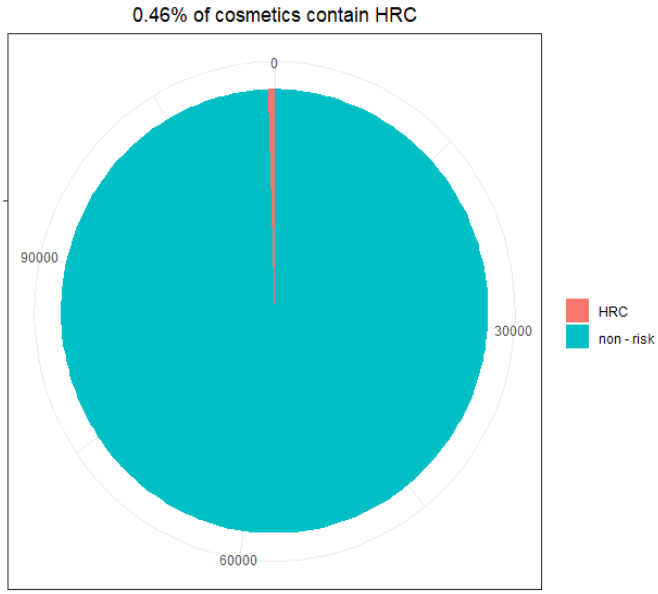
After some data transformation, I have explored the data to find information about high risk chemicals.



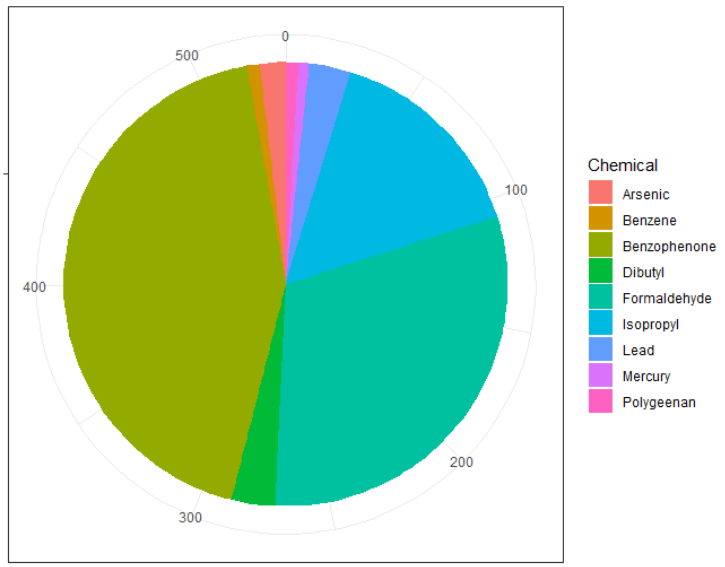
High risk chemicals are most often present in makeup products and nail products, followed by skin care and hair care products.



More specific, high risk chemicals are present in nail polish, foundation and bases and skin moisturizers.

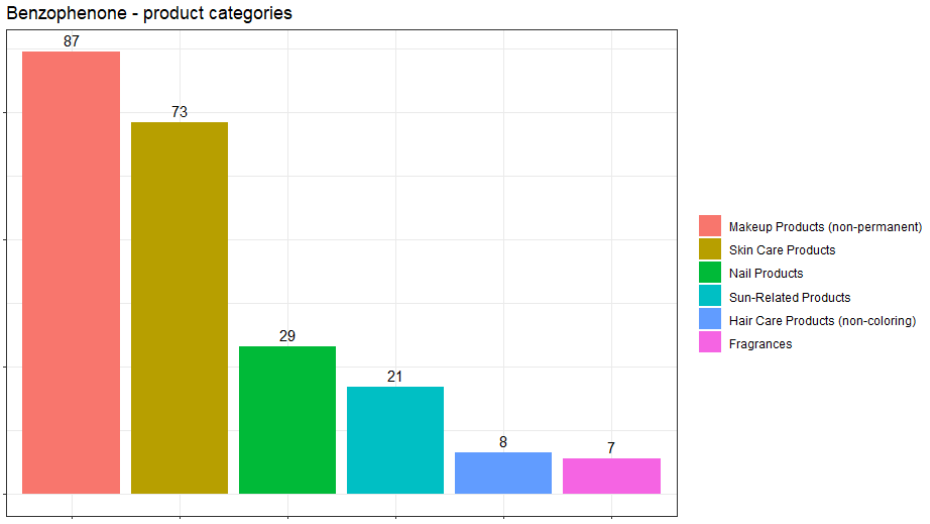


534 products out of 114.635 cosmetic products -> containing high risk chemicals for humans.
That represents 0.46% of all unique cosmetic products of California market.
There are 40 companies out of 606 from California market that uses high risk chemicals

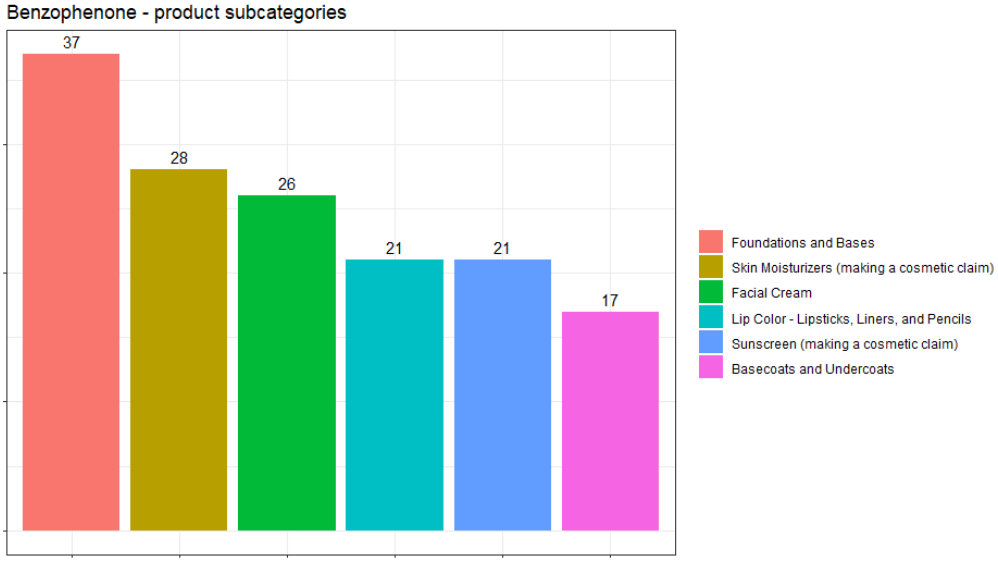


Benzophenon, Formaldehyde and **Isopropyl** are the most used high risk chemicals used in cosmetic products.

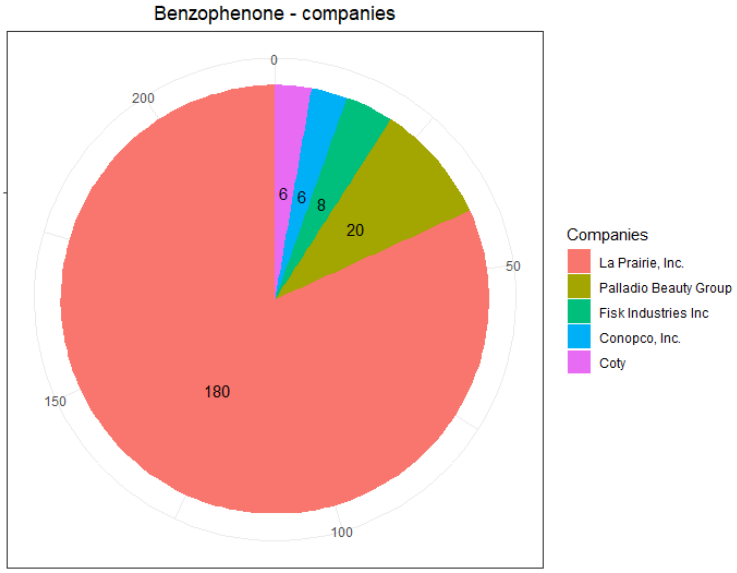
Benzophenon



Benzophenone is a mutagen, carcinogen, and endocrine disruptor. However, it is present in 87 makeup products, 73 skin care products and 29 nail products.

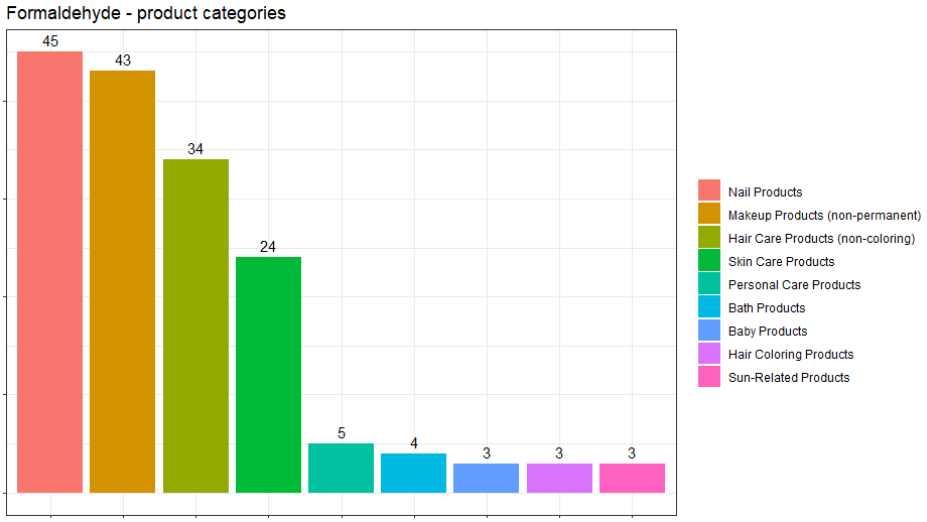


More specific, benzophenone is more common in foundations and bases, skin moisturizers and facial creams.

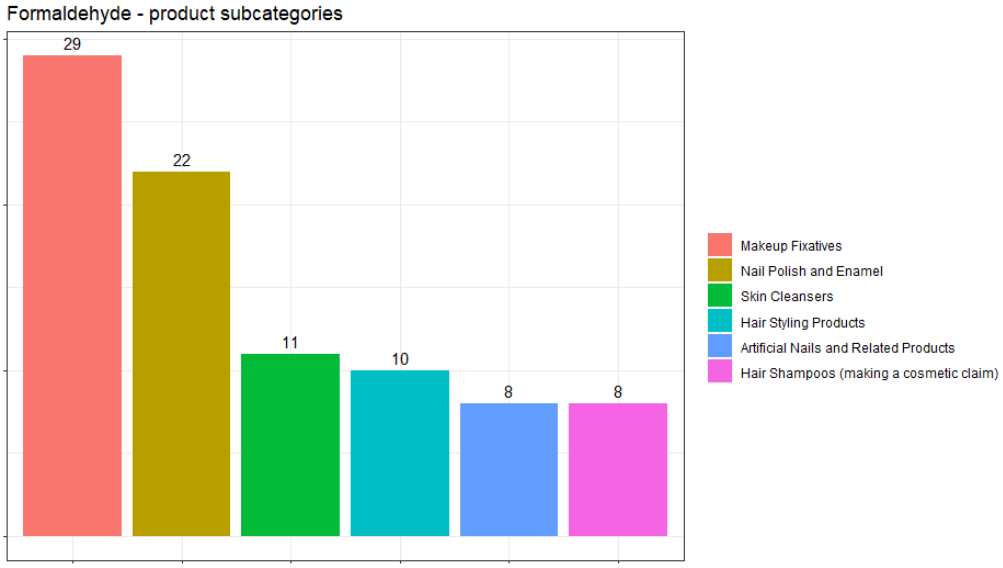


La Prairie, Inc. is number one company which has 180 cosmetic products on market, all of them using Benzophenone in their composition.

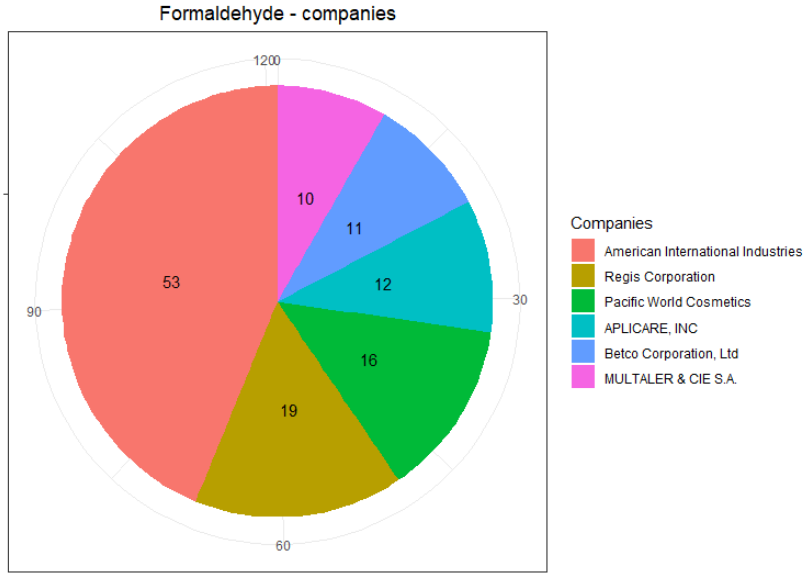
Formaldehyde



Formaldehyde is on the Proposition 65 list because it can cause cancer. Exposure to formaldehyde can cause leukemia and cancers of the nose, throat, and sinuses. Formaldehyde is present on a high range of cosmetic products like nail products, makeup products, hair and skin care products.

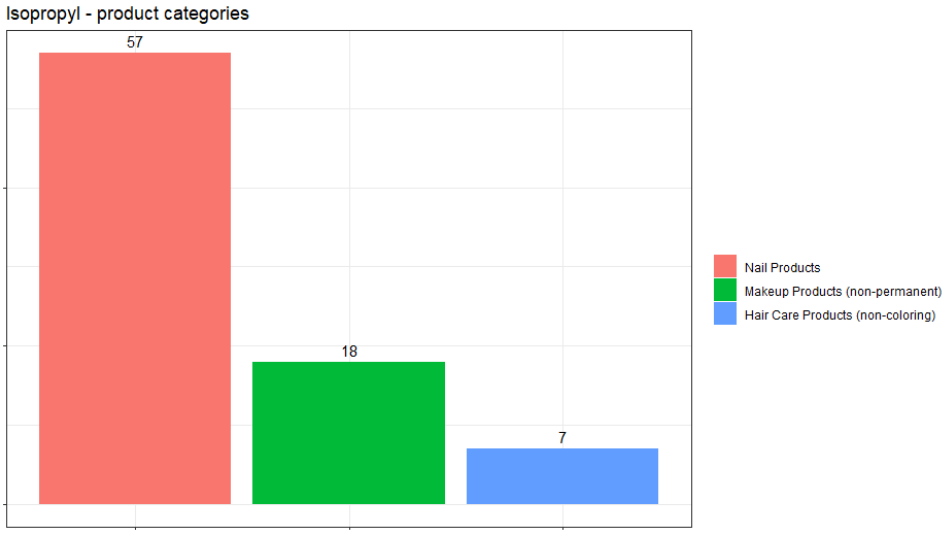


More specific, products like makeup fixatives, nail polish and skin cleansers are much more likely to contain Formaldehyde.

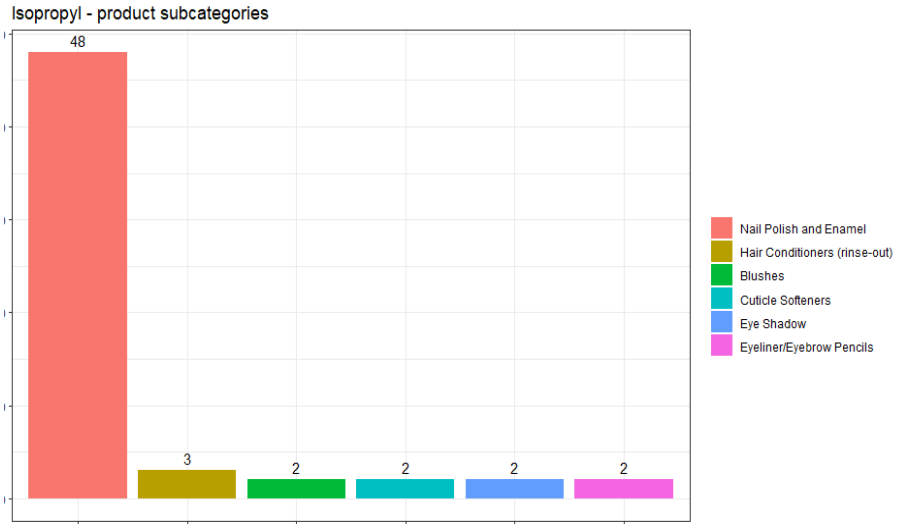


Almost half of cosmetic products from the market which contains Formaldehyde are sold by American International Industries, a company that sells products in 180 countries.

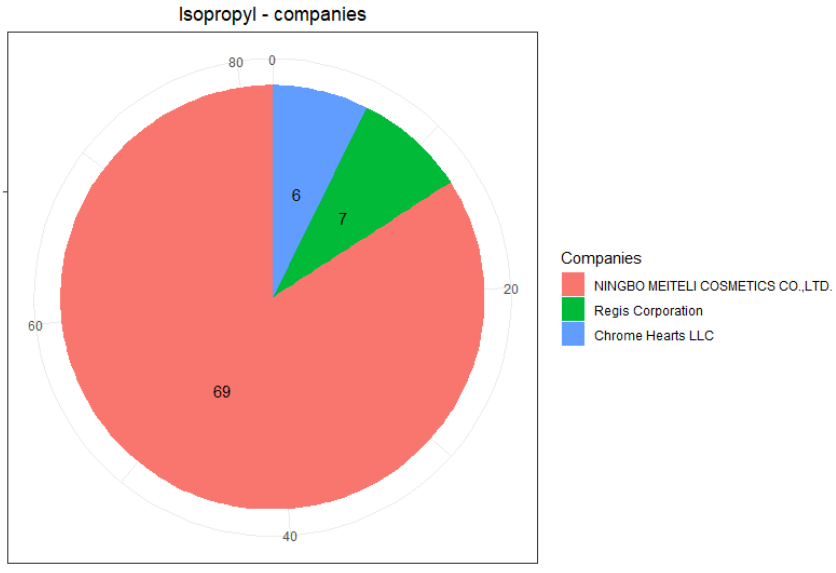
Isopropyl



Isopropyl for human use represents an excessive risk of developing paranasal sinus cancer. Is found only in nail products, makeup products and hair care products.



81% from all cosmetics that use Isopropyl are nail polish products.



There are just three companies that use this high risk chemical in their cosmetic products. The number one company that sells the most products with isopropyl is a company from China which does not even have a presentation website.

Conclusion

This study looked at the 9 most dangerous chemicals used in products from the California cosmetics market with a focus on the top 3 this kind of chemicals present in cosmetics, and top 3 companies that uses them in their products. This chemicals may cause different types of cancer, birth defects or reproductive problems and use of them in cosmetic industry must be very severely clarified from a legal point of view.

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