

Pastels and Toxicity

Introduction

Toxicity of pastels is a very common concern raised on HTP, and on other pastel sites. It seems to rear up again and again. Thus this post. So before asking **me** questions about toxicity, read this in its entirety (yes its long), and if you do decide to post on the subject, please stay kind.

If you have facts to share that I don't have, I'd love them (I'm a science geek!)? Please cite your source so we keep this to facts. I will update this periodically when the **facts** warrant it, though I am not actively researching any more. I have my answers to my satisfaction.. Opinions are welcome to--just label them as such.

First, definitions.

Fact: Something you can support. Not an opinion.

Opinion: How you feel about something. These can be strong, and they are fine to have. But they aren't to be confused with facts.

Toxic: Poisonous

Irritant: A substance that annoys (the lungs for the most part in our discussion). Can produce inflammation. But not poison.

Chemical bond: This is a molecular level "glued" substance. Its different from a mixture. Sodium mixed with water makes a fire and thus would be very bad for you to eat. Sodium bonded with chlorine makes salt. This you must eat at least a little of.

Pastels are generally not considered TOXIC (fact, in regards to ASTM scientifically researched standards).¹ Paints (oil, acrylic, etc.) can use toxic chemicals unbound (like lead or cobalt), but pastels cannot because of the risk of inhalation. That being said, like me you are probably seeing toxicity warnings on some pastels coming from various vendors. So I researched this--extensively. Why? Because it conflicted with what I had read, to allay my health fears, and to assure I was not adding toxicity into the environment, as I live in an environmentally fragile area with a shallow water table.

My results:

The toxicity and carcinogen warnings we are seeing are coming from Prop 65, which is a California mandate. It requires that if a toxic substance is present it must be listed, regardless of if it is chemically bound. The large majority of the warnings are for Titanium Dioxide because Prop 65 has titanium on its toxicity list.

Titanium in the form of Titanium Dioxide is a fine powder that has found its way into the toxicity list in California only. Titanium is **NOT** considered by scientists or the FDA to be toxic (its in food products sometimes, and its used in artificial hip joints!). There is **ZERO** data linking it to toxicity. It is

¹ See 2019 update at end of document: Appendix C

not toxic, but because it is a powdered pigment of relatively large particle size and commonly used, it can be considered an irritant. Irritants can produce inflammation and inflammation can be a problem (i.e., asthma). Different people will find themselves with differing levels of tolerance.

The 6 **TOXIC** chemicals that are present in pastels and also trigger those warnings: Cadmium, chromium, cobalt, copper, mercury, and nickel.

- **Cadmium:** These occur as cadmium zinc sulphide (yellows) and cadmium sulphoselenide (reds). Soluble cadmium compounds are toxic but the method by which modern cadmium pigments are manufactured makes them virtually insoluble and therefore not a danger in normal use as an artists' color.²
- **Chromium pigments:** These are in reference to Oxide of Chromium, Viridian and Lead Chrome Yellows. Lead, barium and zinc chromates are dangerous to health, but pastel manufacturers have stopped using them. The chemical nature of the chromium in the two greens is such as to render the chromium different to that in the lead chromate pigments, and is not a hazard.
- **Cobalt:** Referring to Cobalt Blue, Cerulean Blue, Cobalt Green, Cobalt Violet and Cobalt Yellow (Aureolin). In the dry powder form as pigment, these can cause respiratory allergies if inhaled. Ingestion hazards depend on solubility. Cobalt Violet and Cobalt Yellow will be the most harmful as they have greater solubility. There is no danger from normal use.
- **Copper:** Many historical pigments contained copper in a soluble form which would be harmful if ingested, such pigments have long since ceased to be used. Copper is present in phthalocyanines, but is chemically bonded in such a way as to be virtually unavailable for absorption into the body.
- **Nickel:** Also chemically bonded in a way as to prevent absorption into the body. Considered non-toxic in its use in pastels.
- **Mercury:** Mercury is found in the pigment vermilion, but mercuric sulfide is virtually insoluble and only if soluble impurities are present does it constitute a danger.

Recommendations

1. Don't eat your pastels (opinion). It probably wouldn't hurt, but then again, there are so many better things to eat.
2. Control your dust to your comfort level (opinion). I work very tightly and clean often (baby wipes) so I don't have a huge amount of dust anyway. I work in a small (10 x 13') space, and I have enough surfaces so I can easily tell what the dust loading is that I am putting into the room. Sometimes its higher (like using broad big strokes of the super soft pastels). I use a HEPA filter when I feel its appropriate. I work flat most of the time.
3. Blowing: A topic of hot debate. It increases your dust level if you don't manage it. But again, this is a comfort thing. If I have a lot to blow, I do it outside. My HEPA filter manages the rest.
4. If you are particularly sensitive, use a mask. A dust rated mask (sold in hardware stores) is fine, as you are dealing with relatively large particle sizes (as opposed to bacteria rated, or chemical rated which screen particles that are much smaller than pastel or pollen).
5. Gloves or no gloves? Your choice. No research supports any form of absorption by the skin of any particularly nasty form from pastels.
6. Don't panic when someone says some pastellist they knew died of lung cancer. One in three of us will have a bout of cancer and many of us will ultimately die from it. That means one of three pastellists too. There is no evidence of any kind that pastellists, or even artists in general die at a greater rate of cancer.

² See 2019 update at end of document: Appendix C

Appendices

Appendix A: Information about the research

Appendix B: Tables Used in the research

Appendix C: Update with 2019 information

Appendix A

- Research completed in 2017 by Amy Sanders
- Brands included in this study were the brands in the author's collection at the time: Rembrandt, BlockX, Sennelier, Schminke, Unison, Mt. Vision, Girault, Daler Rowney, Art Spectrum, Great American, Holbein, NuPastel, Faber Castell, Cretacolor, Caran d'Ache, Conte pencils, Caran d'Ache pencils, Faber Castell pencils, Gioconda pencils, Derwent pencils, Brynzeel pencils, CarbOthello pencils and CretaColor pencils
- Brands not included: Diane Townsend, Terry Ludwig, Blue Earth, Richeson, Dick Blick, Mungyo, PanPastels.
- References:
 - The Artists Handbook of Materials and Techniques, Fifth Edition, by Ralph Mayer. Note this is through YALE University.
 - Communications with technical specialists at Holbein, Schminke, Conte and BlockX
 - Proposition 65 text (22 pages)
 - 2 University chemistry/chemical websites (unfortunately I failed to write down the specific names but they were US prominent universities)

Appendix B (3 charts)

Pigments used in pastels, non toxic (2017)

P#	Chemical Class	Common name(s)
PBk 11	Iron oxide	Mars black, black iron oxide, synthetic black iron oxide
PB 22, 60	Organic synthetic anthraquinone	Indanthrene blue, indanthrone,
PB 27, 29	Inorganic synthetic ferriferrocyanide, silicate	Prussian blue, Paris blue, iron blue, Milori blue, Chinese blue, bronze blue, Ultramarine blue, French ultramarine
PBr 6, 7	Inorganic iron oxide	Raw sienna, burnt sienna, Italian Earth, Mars brown, natural/synthetic brown iron oxide,
PG 8, 23	Organic synthetic nitroso	Hooker's green, Green earth, terra verte, burnt green earth
PO 5, 36, 43, 48, 49, 60, 62	Organic synthetic monoazo/anthraquinone/quinacridone/acetoacetyl	Dinitraniline orange, permanent orange, Benzimidazolone orange, Perinone orange, Quinacridone gold (or deep gold), Quinacridone,
PR 5, 7, 9, 14, 17, 83, 88, 112, 119, 194	Organic synthetic monoazo	Naphthol red, naphthol carmine, alizarin crimson, permanent red, permanent carmine, thioindigoid red, Perinone red
PR 9	Organic root extract	Madder lake, natural rose madder, natural madder
PR 109, 102	Inorganic synthetic iron oxide	English red, Indian red, Venetian red, Mars red, Mars violet, Light red, Natural red iron oxide
PR 109, 102, 192, 207	Organic synthetic quinacridone	Quinacridone magenta, quinacridone red, quinacridone scarlet,
PR 123, 146, 149, 168, 170, 175, 177, 178, 179, 188, 194	Organic synthetic anthraquinone	Perylene vermillion, perylene red, Naphthol red, naphthol carmine, permanent carmine, anthraquinoid red, bromelated anthranthrone, benzimidazonlone red, benzimidazonlone maroon,
PV 15,	Inorganic synthetic silicate	Ultramarine violet, ultramarine red,
PV 19, 23, 31	Organic synthetic quinacridone/oxazine	Quinacridone violet, quinacridone red, dioxazine violet, carbazole violet, isoviolanthrone violet
PW 4, 6	Inorganic synthetic	Zinc white, Chinese white, permanent white, titanium white, titanium dioxide, anatase, rutile
PY 1, 3, 65, 73, 74, 83, 97, 98, 108, 109, 110, 112, 138, 139, 151, 154, 156, 175	Organic synthetic monoazo/anthraquinone /Disazo/quinolone	Arylide yellow, azo yellow, Hansa yello, Diarylide yellow, diazo yellow, monoazo, brilliant yellow, permanent yellow, anthrapyrimidine yellow, isoindolinone yellow, tetrachloroisoindolinone yellow, flavathrone yellow, quinaphthalone yellow, isoindaline yellow, benzimidazolone yellow
PY 42,	Inorganic iron oxide	Mars yellow, Mars orange, yellow oxide, iron yellow, ochre

Not used in pastels so not an issue (2017)

P#	Chemical Class	Common name(s)	Carcinogen	Other toxicity
PB 28	Mixed metal oxide (cobalt)	Cobalt blue	No	YES
PO 20, 23	Inorganic synthetic cadmium	Cadmium orange, lithopone orange, mercadium orange,	No	YES
PR 106	Inorganic synthetic (mercury)	Vermillion, Cinnabar	No	YES
PR 108, 113	Inorganic synthetic cadmium (mercury in 113)	Cadmium red, Cadmium-barium red, mercadium red, lithopone red	No	YES
PV 14	Mixed metal oxide (cobalt)	Cobalt Violet	No	YES
PW 1	Lead	Lead white, flake white, Cremitz white, silver white, lead carbonate	No	YES
PY 35, 37,	Inorganic synthetic cadmium	Cadmium yellow light, cadmium zinc yellow, primrose yellow, lemon yellow, cadmium-barium yellow, cadmium yellow medium and deep,	No	YES
PY 40	Inorganic synthetic (cobalt)	Aureollin, cobalt yellow		
PY 41	Inorganic synthetic (lead antimoniate)	Naples yellow, antimony		

Used in pastels w/health issues: These are the pigments I identified in my pastels from the toxicity list that prompted my research. All were found to be safe in normal use through either chemical bonding or other means (i.e., irritant, vs. toxins, or use in such small quantity as to not be of concern)³

P#	Chemical Class	Common Name(s)	Carcinogen	Other toxicity
PBk 6, 7, 9	Carbon black	Lampblack, carbon black, vegetable black, Carbon black, furnace black, Ivory black, bone black	No	Possibly
PB 15, 16	Organic synthetic phthalocyanine	Phthalocyanine blue, thalo blue, Monastral blue	Trace	No
PG 7, 36	Organic synthetic phthalocyanine	Phthalocyanine green, thalo green, Monastral green,	Trace	No
PW 43	Inorganic Colored iron oxide	Yellow ochre, brown ochre		Possible trace of Manganese
PB 33	Mixed metal oxide (manganese)	Manganese blue	No	YES
PB 35, 36	Mixed metal oxide (cobalt)	Cerulean blue, Corruleum blue	No	YES
PB 72	Cobalt zinc aluminate Blue	Some cobalt blues (Sennelier)	No	YES
PBr 7 (77491, 77499)	Inorganic iron oxide (manganese)	Raw umber, Burnt umber, natural brown iron oxide	No	YES
PG 10	Organic synthetic monoazo (nickel)	Nickel azo gold, green gold	No	YES
PG 17	Mixed metal oxide (chromium)	Chromium green oxide, oxide of chromium	Trace	YES
PG 18	Inorganic synthetic chromium	Veridian green, Guignet's green	Trace	YES
PG 19, 50	Mixed metal oxide (cobalt)	Cobalt green, light green oxide	No	YES
PV 16	Inorganic metal salt (manganese)	Manganese violet, mineral violet	No	YES
PY 53, 150, 152	Inorganic Mixed metal oxide (nickel)	Nickel yellow, nickel titanium or titanate yellow, nickel azo yellow, nickel dioxazine yellow	No	YES

³ Note that many toxic chemicals are toxic only in quantity. Your body actually requires some cobalt, but too much causes poisoning similar to lead. There is trace arsenic in most rice. There are trace quantities of many toxins in the air we breathe every day. If used under the EPA and FDA limits, I don't pay attention because I know my exposure is less than what I'm probably breathing in or encountering in daily cleaning, driving my car, etc.

Appendix C

2019 updates/cautions:

- It came to my attention in a recent HTP conversation that Diane Townsend filed paperwork for toxicity in her pastel—specifically the use of cadmium. As I don't have any, I have not attempted to research this. I do not know if the cadmium pigment use in her pigments is in line with those I researched.
- There are new lines I have also not researched (some are mentioned in Appendix A), nor have I made any attempt to research some of the private lines. For example, from time to time I see a reference about someone who makes pastels and sells them on EBay. I would avoid these for two reasons. First, they may or may not comply with ASTM standards and thus be toxic, and secondly, they may or may not be lightfast.