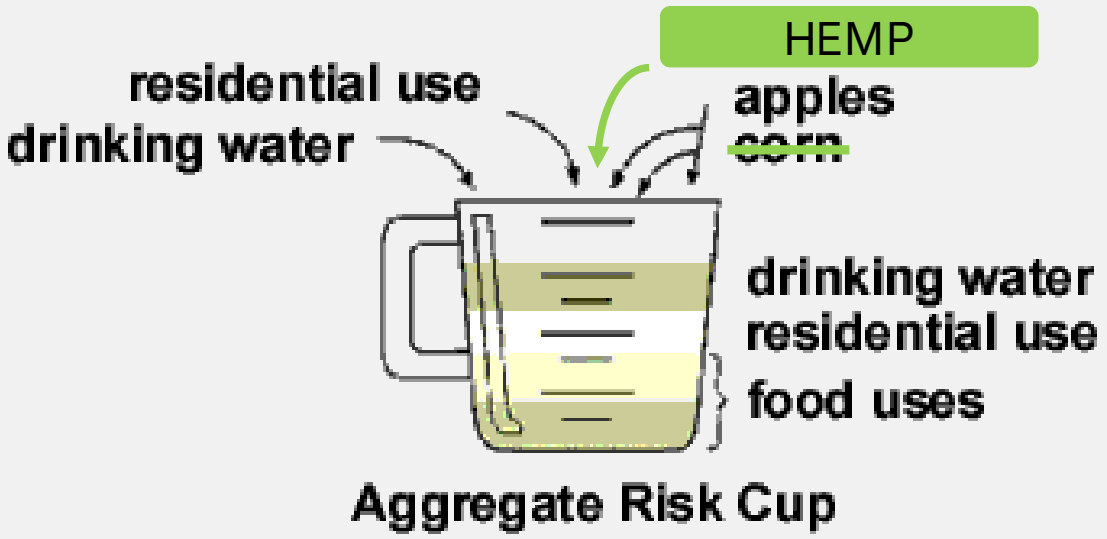
PESTICIDE RISKS & HEMP

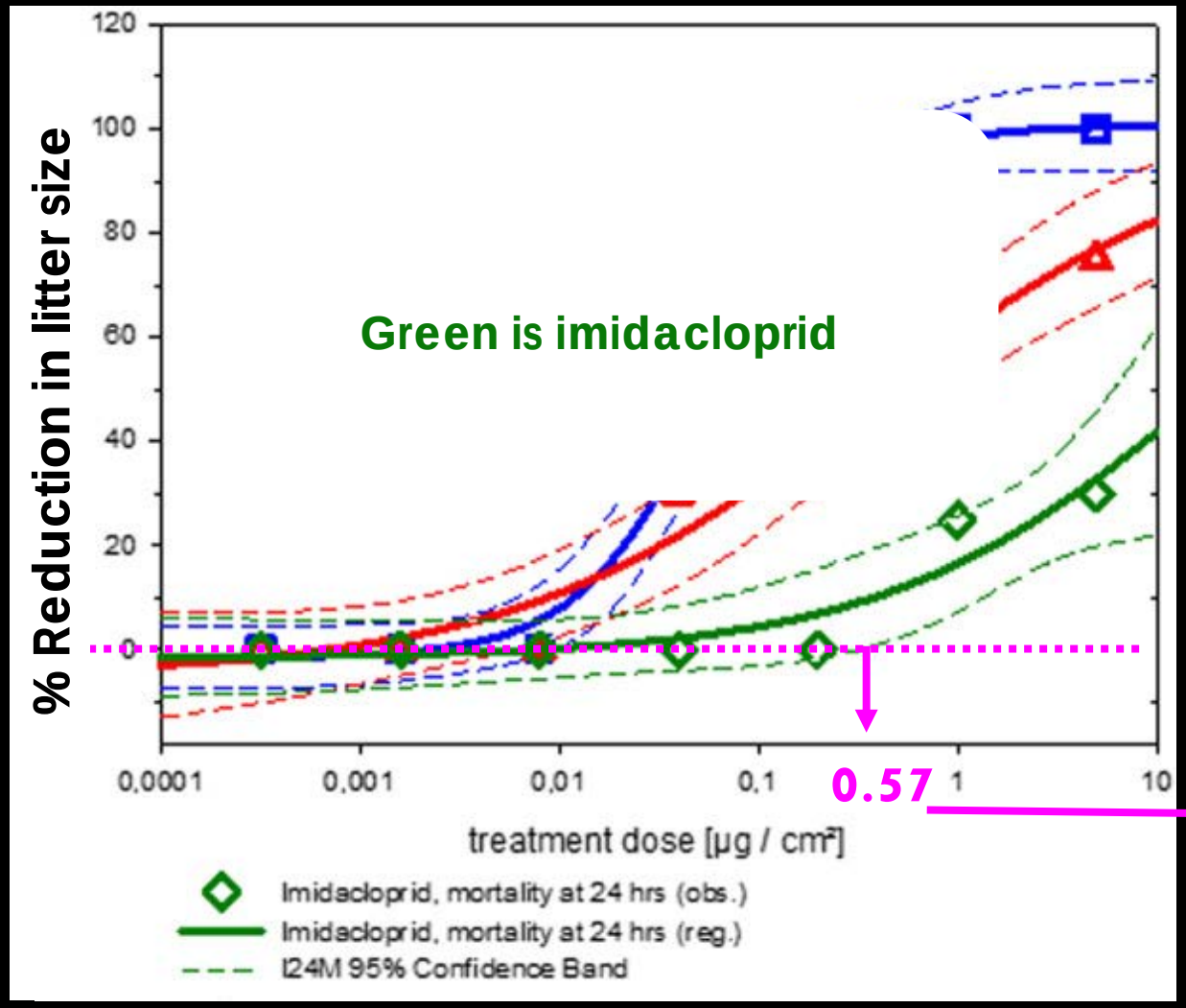
Pamela J. Bryer, PhD

Pesticides Toxicologist | Maine Board of Pesticides Control

RISK CUP


HEMP
residential use
drinking water
apples
~~corn~~
drinking water
residential use
food uses
Aggregate Risk Cup

REFERENCE DOSE



RfD is a daily exposure level that appears without appreciable risk

Imidacloprid RfD = 0.057 mg/kg/day

RfD =NOAEL/ UF x MF

UF uncertainty factor (1 to 100) **10**

MF modifying factor (1 to 100) **1**

$$\text{RfD} = \frac{0.57}{(10 \times 1)}$$

DIFFERENT COMMODITIES DIFFERENT TOLERANCES

All sources add to less than RfD

PESTICIDE - COMMODITY PAIRING

Switch away from imidacloprid?

-you would have to determine the tolerance for the new pesticide

-if there is no tolerance it can't be used

Codex Alimentarius

PESTICIDE - COMMODITY PAIRING

Label rates produce commodities that do not violate tolerances

FIELD CROPS
APPLICATION RATES
COTTON

Pests Controlled	Rate fluid ounces/ 1,000 row-feet	Rate fluid ounces/Acre
Cotton aphid Plant bugs Thrips Whitefli	1.3	17.0 to 21.1 (Depending on row-spacing)

Rest
Maximum amount allowed per crop season: **21.1 fluid ounces/Acre** (0.33 lb AI/Acre)

Regardless of formulation or method of application, apply no more than 0.5 lb active ingredient per acre per season, including seed treatment, soil, and foliar uses. **DO NOT** apply more than a total of 6 applications of the active ingredient per season. **DO NOT** graze treated fields after any application of this product. Please see Resistance Management section of this label.

The maximum amount of a pesticide that is allowed on a specific commodity

Peanut	0.45
Peanut, hay	35
Peanut, meal	0.75
Pecan	0.05
Persimmon	3.0
Pistachio	0.05
Pomegranate	0.90
Potato, chip	0.40
Potato, processed potato waste	0.90
Strawberry	0.50
Sugar apple	0.30
Sunflower, seed	0.05
Tomato, paste	6.0
Tomato, puree	3.0
Vegetable, brassica leafy, group 5	3.5
Vegetable, cucurbit, group 9	0.5
Vegetable, fruiting, group 8	1.0
Vegetable, leaves of root and tuber, group 2	4.0
Vegetable, legume, group 6, except soybean	4.0
Vegetable, root and tuber, group 1, except sugar beet	0.40
Watercress	3.5
Watercress, upland	3.5
Wax jambu	1.0

NOTHING NEW ABOUT TOLERANCES

HEMP

Fruit, pome, group 11	0.6
Fruit, stone, group 12	3.0
Goat, fat	0.30
Goat, meat	0.30
Goat, meat byproducts	0.30
Gooseberry	3.5
Grain, cereal, forage, fodder and straw, group 16, forage, except rice	7.0
Grain, cereal, forage, fodder and straw, group 16, hay, except rice	6.0
Grain, cereal, forage, fodder and straw, group 16, stover, except rice	0.30
Grain, cereal, forage, fodder and straw, group 16, straw, except rice	3.0
Grain, cereal, group 15, except rice	0.05
Grape	1.0
Grape, juice	1.5
Grape, raisin	1.5
Guava	1.0
Herbs subgroup 19A, dried herbs	48
Herbs subgroup 19-A, fresh herbs	8.0

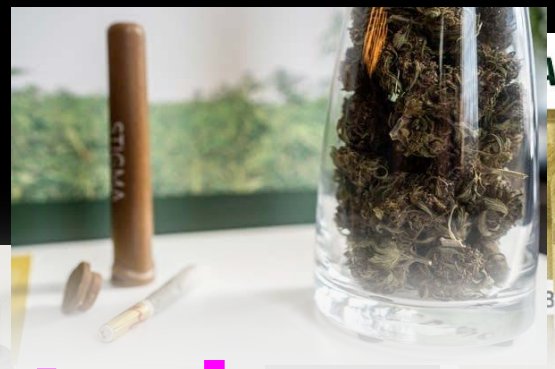
EPA USES USDA DATA TO DETERMINE TOLERANCES

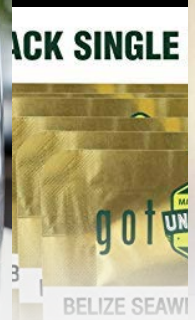
National level effort

Where does tha

Selecting pesticides exempt from food-use tolerances

UNIQUE CONCERNS





Toxicologist's dream and a regulator's nightmare!

CONCENTRATION

Restrictions:
Maximum amount allowed per crop season: **21.1 fluid ounces/Acre** (0.33 lb AI/Acre)

Remember our imidacloprid label from before?

POTENTIAL FOR EXCEEDING REFERENCE DOSE

Reference dose of 0.057 mg imidacloprid/kg/day

-for someone my size ~65kg = 3.7 milligrams available for daily consumption

3.7 mg equals 0.00013 ounces

That previous label allowed for 0.33 lbs/acre (5.3 ounces/acre)

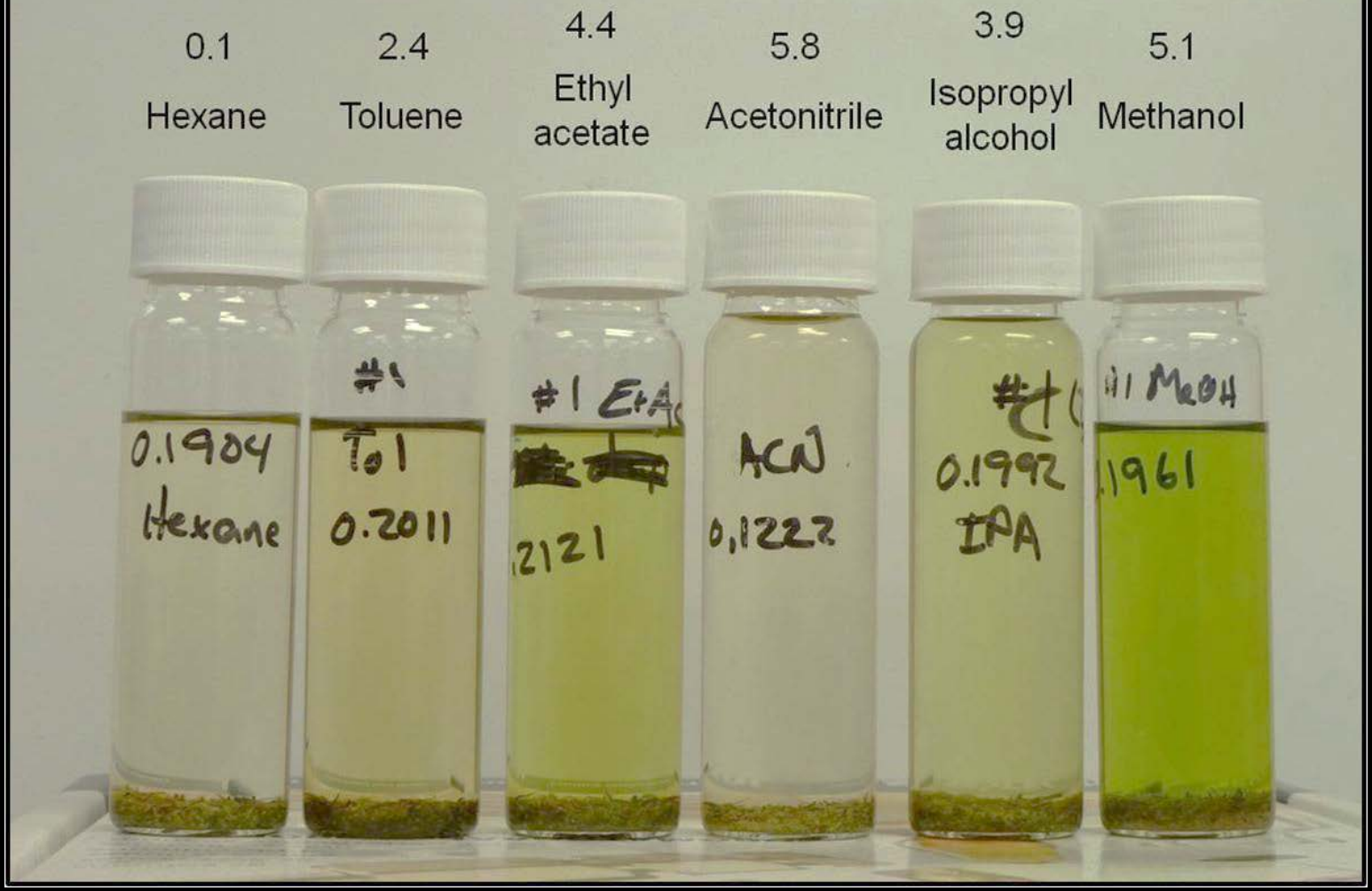
That acre holds the potential for over 40,000 days of maximum daily tolerance and it gets concentrated into how many servings?

DIFFERENT EXTRACTIONS DIFFERENT PESTICIDES

Solvent	Polarity index	Solubility in water (%, w/w)	Density ($g\,mL^{-1}$)	Viscosity ($mN\,s\,m^{-2}$)	Expansion volume[a]	Boiling point (°C)
Water	10.2	—	0.998	1.00	1416	100.0
Acetonitrile	5.8	100	0.786	0.37	488	81.6
Acetone	5.1	100	0.791	0.32	348	56.2
Methanol	5.1	100	0.792	0.60	632	64.6
Ethanol	5.2	100	0.789	1.20	438	78.4
Ethyl acetate	4.4	8.7	0.902	0.45	261	77.2
2-Propanol	3.9	100	0.785	1.76	334	82.4
Dichloromethane	3.1	1.6	1.33	0.44	399	40.7
Diethyl ether	2.8	6.9	0.713	0.24	246	34.6
Toluene	2.4	0.052	0.866	0.52	240	110.8
Cyclohexane	0.2	0.006	0.789	0.98	268	80.7
Isooctane	0.1	0.002	0.692	0.50	155	99.0
n-Hexane	0.0	0.014	0.660	0.32	196	69.0

[a]At 250 °C and 10 psi (gauge) pressure, 1 unit liquid volume will become the given value in the same units in the gas phase.

Marijuana extracted with different solvents.
Polarity index is listed above the solvent name.



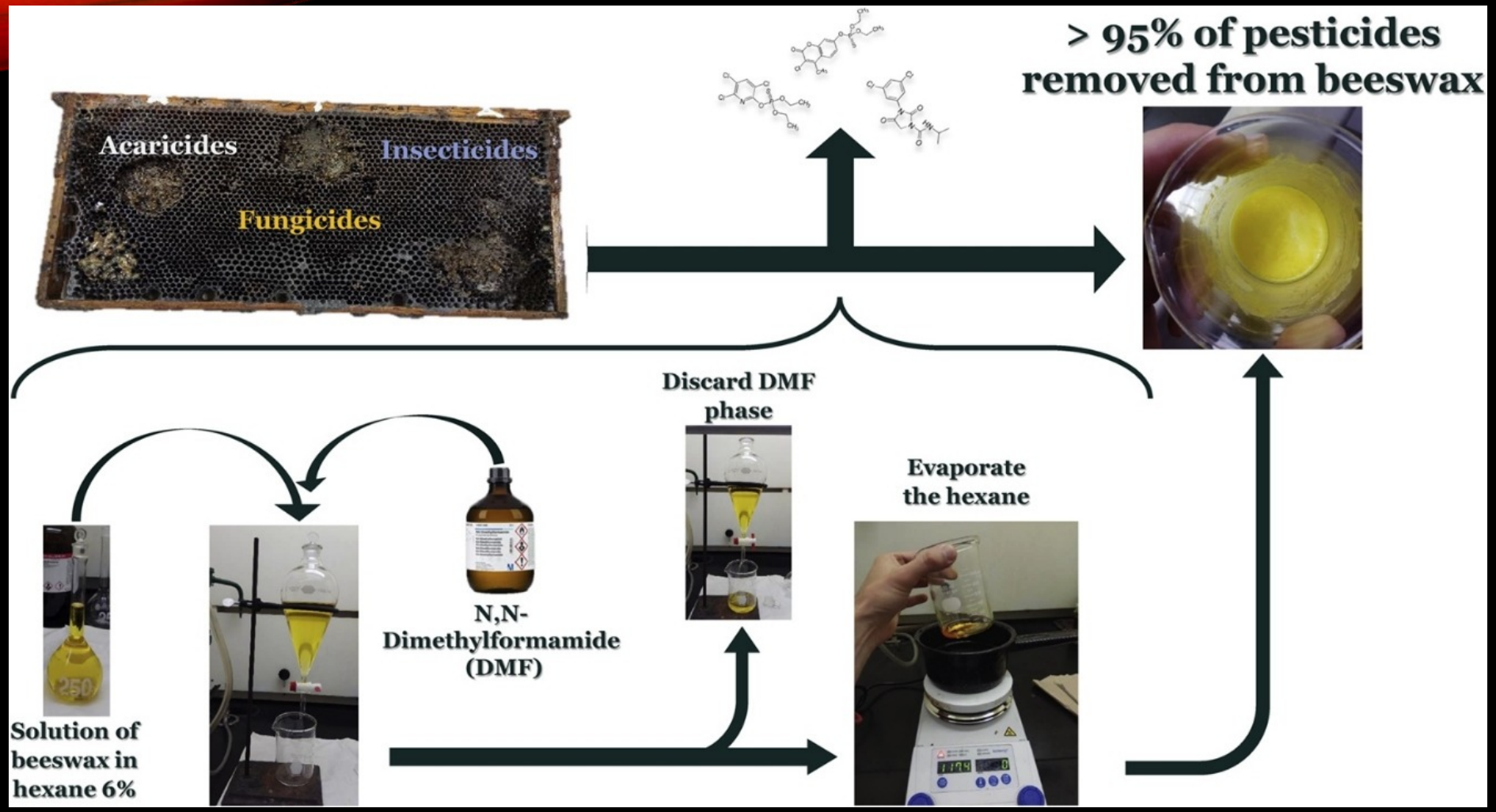
PESTICIDES	LIST[1]	SPIKE LEVEL µg/L	40/15 DCM/ETHER RECOVERY % DCM/ETHER MIX	40/15 DCM/ETHER RECOVERY % DCM/ETHER SEPARATE	50/20 DCM/ETHER RECOVERY (%) DCM/ETHER SALT	50/20 DCM/ETHER RECOVERY (%) DCM/ETHER NO SALT	QC LIMITS (%)[2]
4,4'-DDD	5,6,8	0.63	70	85	[illegible]		
4,4'-DDE	5,6,8	0.63	59	83	[illegible]		
4,4'DDT	5,6,8	0.63	65	93	[illegible]		
Aldrin	5,6,8	0.63	64	77	[illegible]		
alpha-BHC	5,6,8	0.63	73	74	[illegible]		
beta-BHC	5,6,8	0.63	71	72	[illegible]		
delta-BHC	5,6,8	0.63	77	81	[illegible]		
Dieldrin	6,8	0.63	78	84	[illegible]		
Endosulfan I	5,6,8	0.63	79	83	[illegible]		
Endosulfan II	5,6,8	0.63	81	88	95	83	70 -130
Endosulfan Sulfate	5,6,8	0.63	79	87	98	102	70 -130
Endrin	5,6,8	0.63	80	83	100	100	70 -130
Endrin Aldehyde	5,6,8	0.63	84	85	100	101	70 -130
gamma-BHC (Lindane)	5,6,8	0.63	75	76	83	90	70 -130
Hepatchlor Epoxide	5,6,8	0.63	77	82	88	89	70 -130
Heptatchlor	5,6,8	0.63	69	77	77	74	70 -130
Methoxychlor	5,8	0.63	73	90	108	103	70 -130
alpha-Chlordane	5,8	0.63	69	82	80	79	70 -130
gamma-Chlordane	5,8	0.63	68	81	78	77	70 -130
Endrin Ketone	8	0.63	81	90	103	105	70 -130
AVERAGE RECOVERY			74	83	89	89	

[1] LIST 5 = Method 508 analyte 6 = Method 608 analyte 8 = Method 8081 analyte

[2] Recovery control ranges are taken from Method 508.

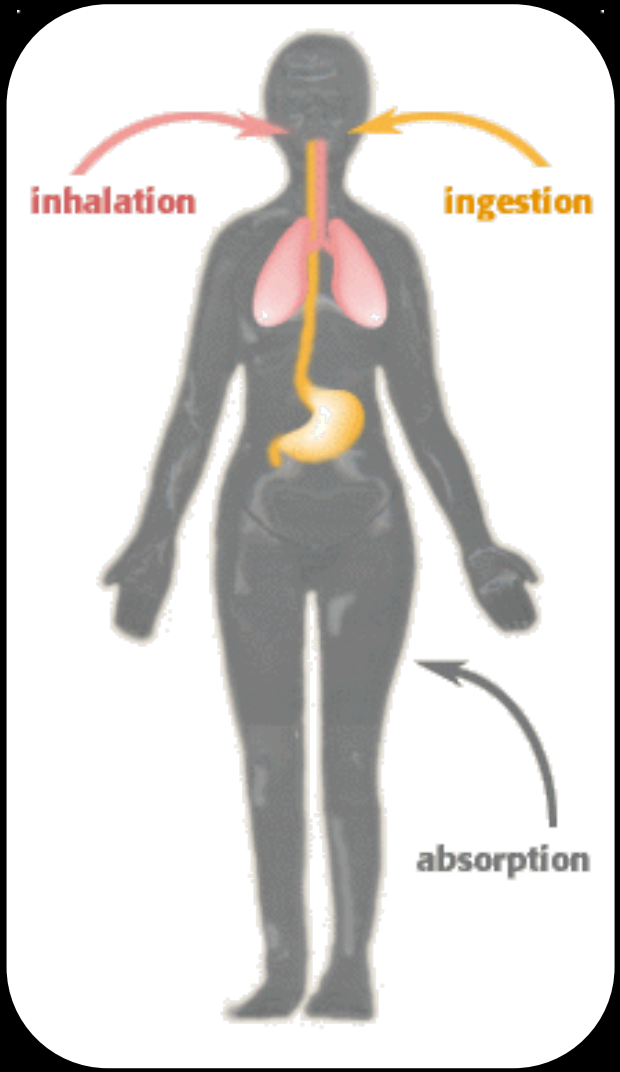
Pesticides extract differently when extracted as 2 solvents combined vs 2 solvents in series

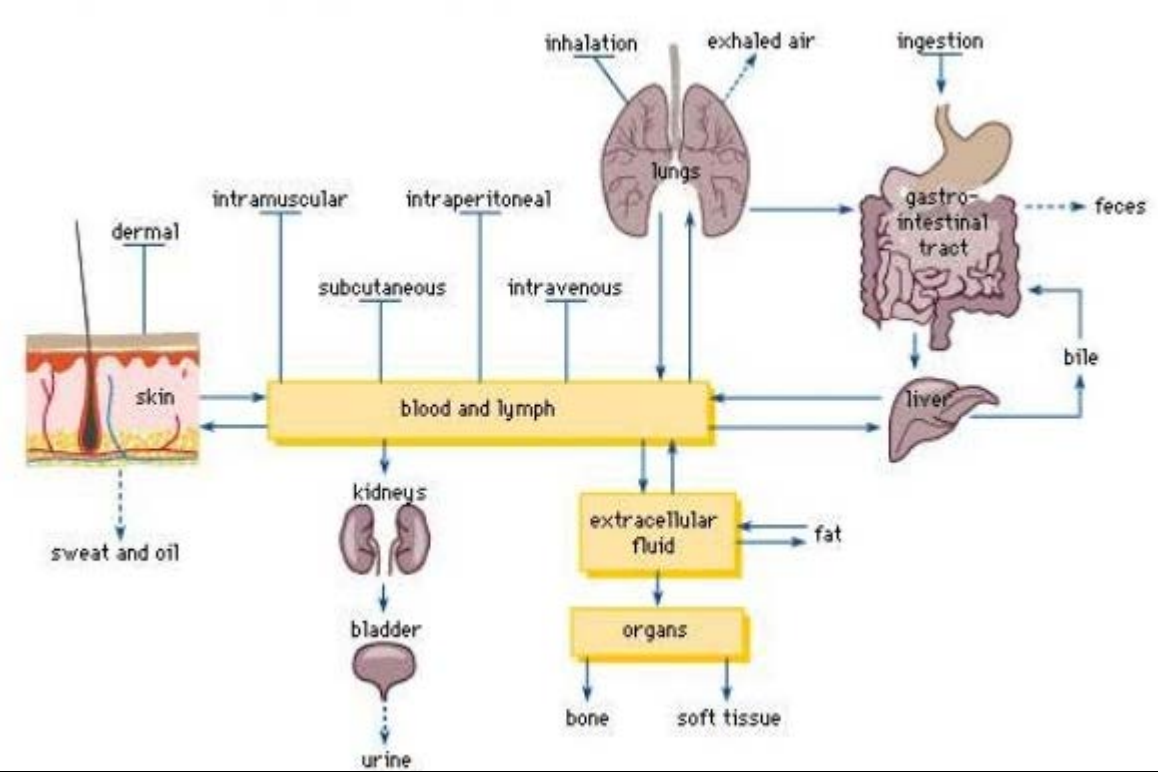
-no predictable pattern



No change in pesticide concentration unless dimethylformaide added.

ROUTES OF ENTRY





ALL PESTICIDES ARE TOXIC

Even…

- Regular pesticides
- Herbicides
- Natural products
- Organic pesticides
- Rodenticides
- 25(b) products
- Non-synthetic pesticides
- Synthetic pesticides
- Essential oils
- Minimum risk pesticides

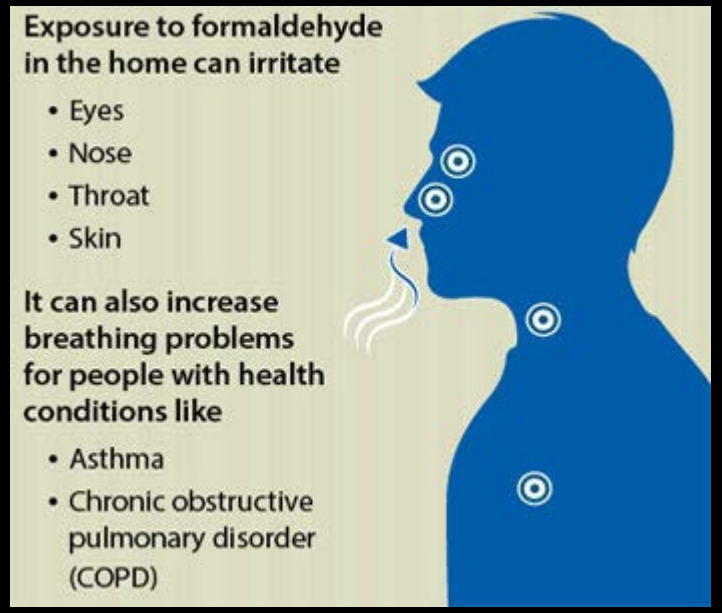
RISK = EXPOSURE X HAZARD

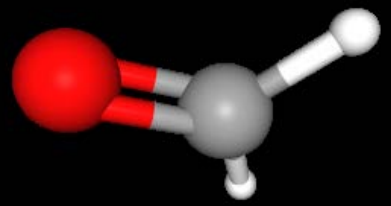
How “bad” it is

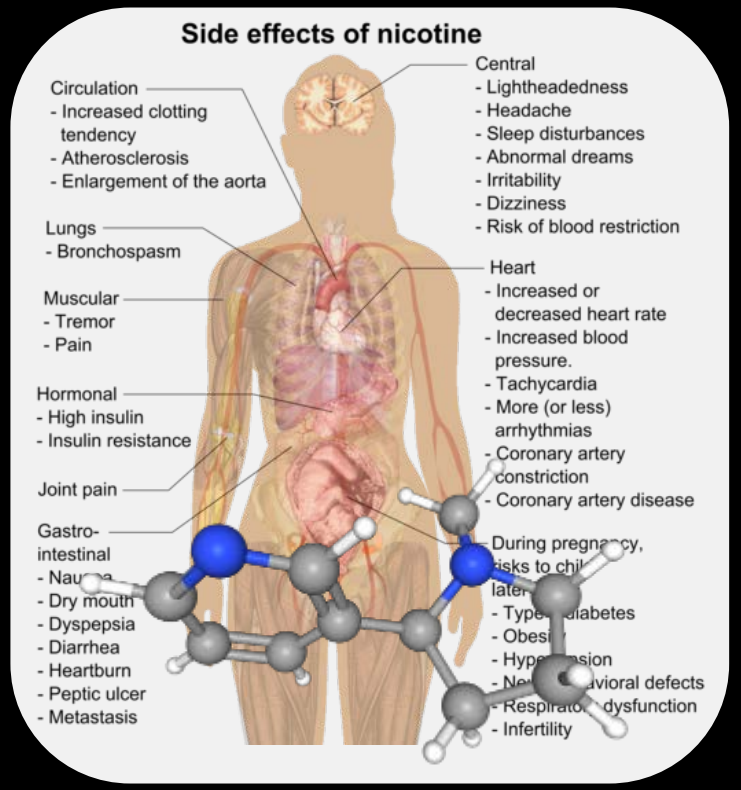
How toxic it is

How much gets in you and for how long it stays

“NATURAL” PRODUCTS

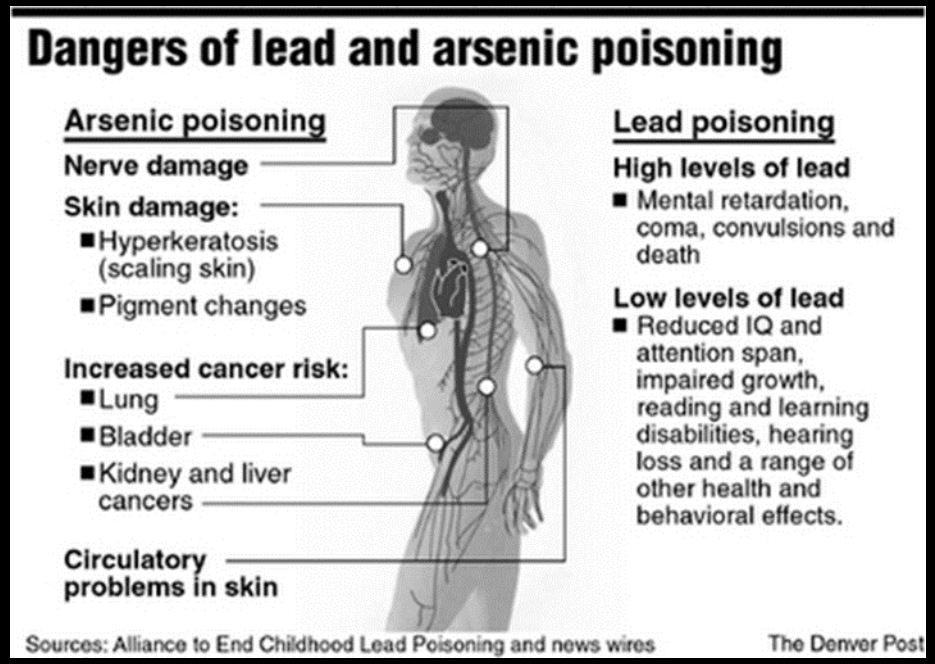






Mercury
Ergot
Belladona
Copper
Asbestos
Anthrax
Ricin -> castor beans
Cocaine
Tetrodotoxin
Snake venom
And more

“NATURAL” PRODUCTS



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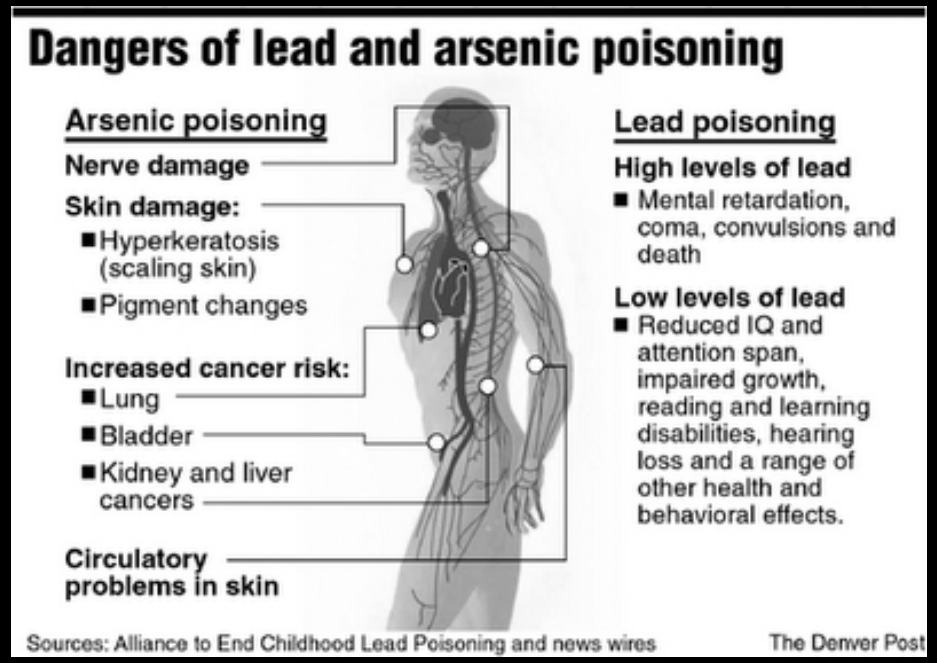

“NATURAL” PRODUCTS

POPULAR FACEBOOK POST

"Alternative to synthethic glyphosate"

- Mi

- This m
  - Si
- Is des

es severe eye, digest ma, dehyd of dental enam n of the respirat on. Can cause occupation asthma. Ingestion of large amounts may cause nausea and vomiting, rigidity or convulsions. Contact with liquid or vapor causes severe burns and possible irreversible eye damage.

One gallon of this mixture can kill 59 rats
(even without factoring in the salt)

One gallon of glyphosate enough to kill 6 rats