Responsible Packaging

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A brief background

Plastic Pollutes Life

Plastics surround us.

A vital manufacturing ingredient for nearly every existing industry, these materials appear in a **high percentage of the products we use every day.**

Although modern life would be hard to imagine without this versatile chemistry, products composed of plastics also have a dark side, due in part to the very **characteristics that make them so desirable—their durability and longevity**.

Plastics

An Important Part Of Your Diet

Plastics and their additives aren't just around us, they are inside virtually every one of us— present in our blood and urine in measurable amounts, ingested with the food we eat, the water we drink and from other sources.


ALL PLASTICS
CONTAIN
BISPHENOLS

Most Plastic Products Release Estrogenic Chemicals: A Potential Health Problem that Can Be Solved

Chun Z. Yang,[1] Stuart I. Yaniger,[2] V. Craig Jordan,[3] Daniel J. Klein,[2] and George D. Bittner[1,2,4]

[1]CertiChem Inc., Austin, Texas, USA; [2]PlastiPure Inc., Austin, Texas, USA; [3]Lombardi Comprehensive Cancer Center, Georgetown University Medical Center, Washington, DC, USA; [4]Neurobiology Section, School of Biology, University of Texas, Austin, Texas, USA

Background: Chemicals having estrogenic activity (EA) reportedly cause many adverse health effects, especially at low (picomolar to nanomolar) doses in fetal and juvenile mammals.

Objectives: We sought to determine whether commercially available plastic resins and products, including baby bottles and other products advertised as bisphenol A (BPA) free, release chemicals having EA.

Methods: We used a roboticized MCF-7 cell proliferation assay, which is very sensitive, accurate, and repeatable, to quantify the EA of chemicals leached into saline or ethanol extracts of many types of commercially available plastic materials, some exposed to common-use stresses (microwaving, ultraviolet radiation, and/or autoclaving).

Results: Almost all commercially available plastic products we sampled—independent of the type of resin, product, or retail source—leached chemicals having reliably detectable EA, including those advertised as BPA free. In some cases, BPA-free products released chemicals having more EA than did BPA-containing products.

Conclusions: Many plastic products are mischaracterized as being EA free if extracted with only one solvent and not exposed to common-use stresses. However, we can identify existing compounds, or have developed, monomers, additives, or processing agents that have no detectable EA and have similar costs. Hence, our data suggest that EA-free plastic products exposed to common-use stresses and extracted by saline and ethanol solvents could be cost-effectively made on a commercial scale and thereby eliminate a potential health risk posed by most currently available plastic products that leach chemicals having EA into food products.

Key words: bisphenol A, endocrine disruptor, endocrine-disrupting chemical, estrogen receptor binding, estrogenic activity, plastic. *Environ Health Perspect* 119:989–996 (2011). doi:10.1289/ehp.1003220 [Online 2 March 2011]

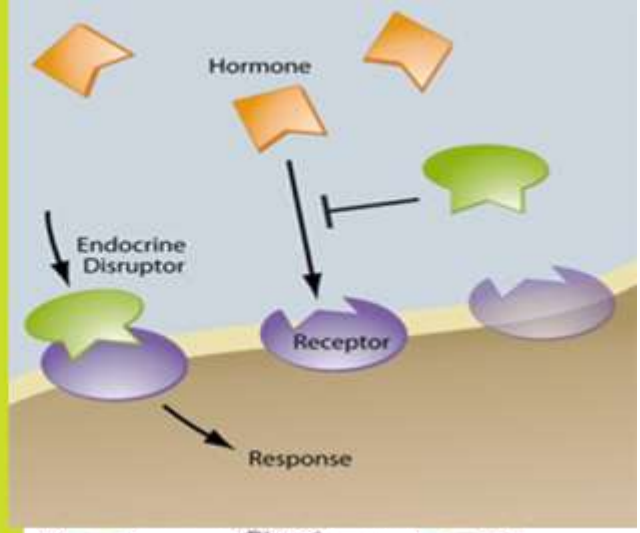
Chemicals that mimic or antagonize the actions of naturally occurring estrogens are defined as having estrogenic activity (EA), which is the most common form of endocrine disruptor activity [Interagency Coordinating of vertebrates (Kavlock et al. 1996; National Research Council 1999).

Thermoplastics, which are used for many items that contain food, are made by polymerizing a specific monomer or monomers in the monomers and additives that may exhibit EA because they have physicochemical properties, often from an insufficiently hindered phenol (HP) group, that enable them to bind to ERs (see Supplemental Material, Table 1). Because polymerization of monomers is rarely complete and additives are not chemically part of the polymeric structure, chemicals having EA can leach from plastic products at very low (e.g., nanomolar to picomolar) concentrations that individually or in combination can produce adverse effects, especially in fetal to juvenile mammals. This leaching of monomers and additives from a plastic item into its contents is often accelerated if the product is exposed to common-use stresses such as ultraviolet (UV) radiation in sunlight, microwave radiation, and/or moist heat via boiling or dishwashing. The exact chemical composition of almost any commercially available plastic part is proprietary and not known. A single part may consist of 5–30 chemicals, and a plastic item containing many parts (e.g., a baby bottle) may consist of ≥ 100 chemicals, almost all of which can leach from the product, especially when stressed. Unless the selection of chemicals is carefully controlled, some of those chemicals will almost certainly have EA, and even when using all materials that initially test EA free, the stresses of manufacturing can change chemical

Structural damage to your brain	Changes in gender-specific behavior and abnormal sexual behavior
Hyperactivity, increased aggressiveness, and impaired learning	Early puberty, stimulation of mammary gland development, disrupted reproductive cycles, ovarian dysfunction, and infertility
Increased fat formation and risk of obesity	Stimulation of prostate cancer cells
Altered immune function	Increased prostate size and decreased sperm production

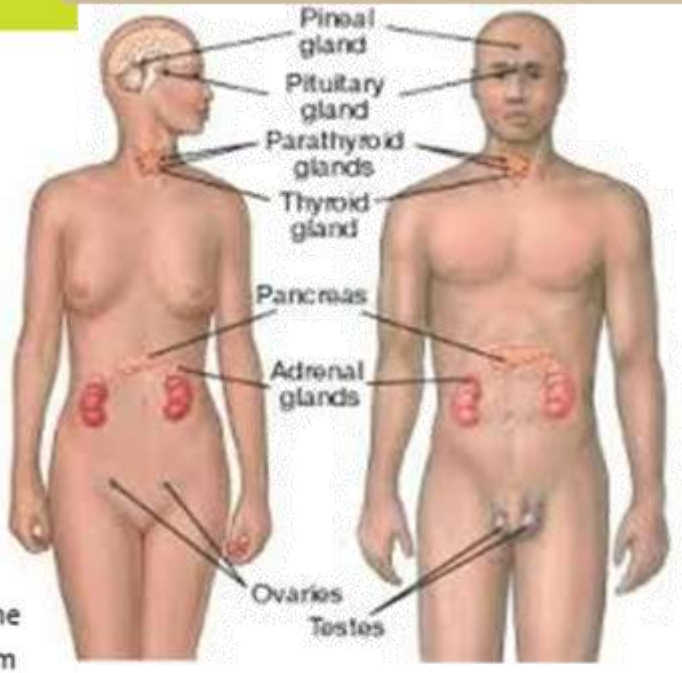
Endocrine disruptors are chemicals that can interfere with the hormone system.

EVEN AT EXTREMELY SMALL DOSES, THESE CHEMICALS CAUSE DISRUPTIONS THAT MAY LEAD TO REPRODUCTIVE PROBLEMS, CANCER, BIRTH DEFECTS, CHANGES TO METABOLISM AND OTHER DISORDERS.



HOW CHEMICAL ENDOCRINE DISRUPTERS ARE HARMFUL

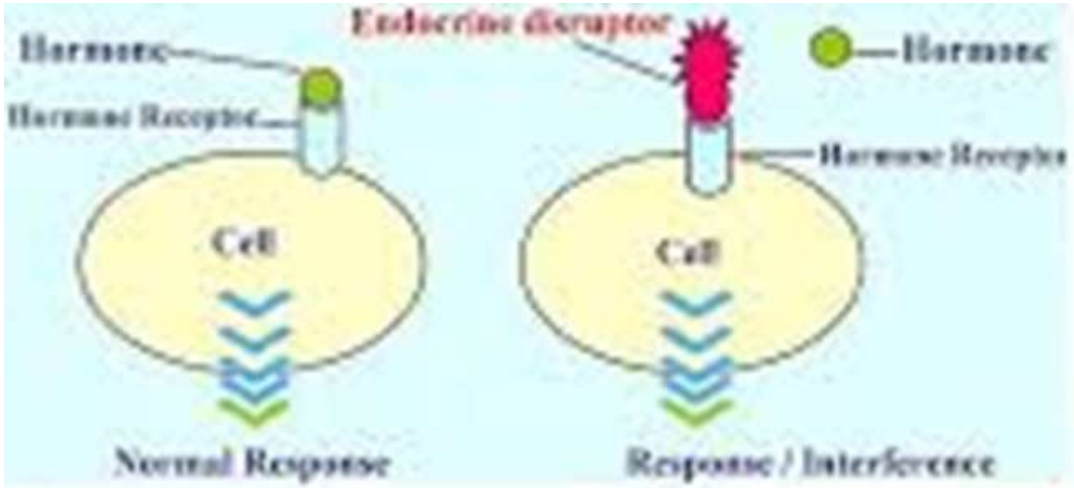
The 8 glands in our endocrine systems produce and release hormones that regulate metabolism, growth, development, tissue function, sleep, reproduction, sexual function and mood. Almost every cell in the body is affected by the endocrine system. A report issued in March 2013 jointly by the United Nations and the World Health Organization states that "Endocrine Disrupters (EDC's) are a global threat to fertility and the environment."



And a recent report from the Environmental Working Group says:

There is no end to the tricks that endocrine disruptors can play on our bodies–increasing pro duction of certain hormones, decreasing production of others, imitating hormones, turning one hormone into another, interfering with hormone signaling, telling cells to die prematurely, com peting with essential nutrients, binding to essential hormones, and accumulating in organs that produce hormones.

(Anderson, 2014)


Endocrine disruptor
Hormone
Hormone
Hormone Receptor
Hormone Receptor
Cell
Cell
Normal Response
Response / Interference

Estrogenic effect

Wagner and Oehlmann (2009) [4] emptied the bottles of their contents, then filled the empty PET bottles and glass bottles with a defined culture medium (pH 8.0 ± 0.5) and incubated New Zealand mudsnails, *Potamopyrgus antipodarum*, for 56 days.

Production of embryos was significantly enhanced among snails incubated in the PET bottles compared with snails incubated in glass bottles, across all brands ($p < 0.001$).

For example, production of embryos incubated in PET bottles of brand D was **roughly double the production of embryos** incubated in glass bottles of brand D; curiously, on the yeast estrogen screen, this same brand showed no difference in estrogenic activity between PET-bottled water and glass-bottled water.

Estrogenic effect

This finding suggests that the *in vivo* snail bioassay might be more sensitive than the *in vitro* yeast estrogen screen.

Regarding the snail bioassay, Wagner and Oehlmann (2009) concluded that "it is obvious that the observed effects can only be attributed to xenoestrogen leaching from these plastic bottles. Moreover, the compounds released by the PET material were potent [enough] to trigger estrogenic effects *in vivo* similar to those of E2 [17α ethinyl estradiol] at a concentration of 25 ng/L."

The maximum estrogen activity that they detected in any brand of water was equivalent to 75 ng/L of ethinyl estradiol.

Phthalates

A growing literature links many of the phthalates a major component of PET bottle and one of the compound identified to leech into the bottle ingredients, has been associated with a variety of adverse outcomes, including:

"The concentration of all **phthalates combined was more than 12 times higher in PET** than in glass bottled water."

- increased adiposity and insulin resistance (Grün and Blumberg 2009), (5)
- decreased anogenital distance in male infants (Swan et al. 2005), (6)
- decreased levels of sex hormones (Pan et al. 2006), (7) and
- other consequences for the human reproductive system, both for females and males [reviewed by Hauser and Calafat (2005)]. (8)
- Infants and children may be especially vulnerable to the toxic effects of phthalates (Sathyanarayana 2008). (9)

Endocrine Disruptors

The critical period of development for most organisms is between the transition from a fertilized egg, into a fully formed infant.

As the cells begin to grow and differentiate, there are critical balances of hormones and protein changes that must occur.

Therefore, a dose of disrupting chemicals can do substantial damage to a developing fetus (baby). Whereas, the same dose may not significantly affect adult mothers.

http://www.endocrine-disruptors.net/about_endocrine_disruptors.html

Human Health Effects

Specifically, they are known to cause;

- Learning Disabilities,
- Severe Attention Deficit Disorder Cognitive And Brain Development Problems,
- Deformations Of The Body (Including Limbs);
- Sexual Development Problems,
- Feminizing Of Males Or Masculine Effects On Females.

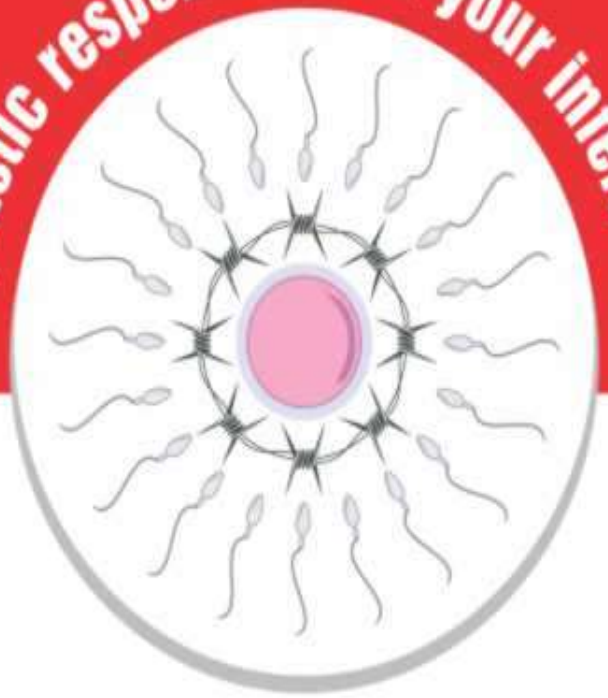
American Society for Reproductive Medicine (ASRM) and the International Federation of Fertility Societies (IFFS)

November 2013

American Society for Reproductive Medicine (ASRM) and the International Federation of Fertility Societies (IFFS) links bisphenol A (BPA) and phthalates to **decreased fertility and increased Miscarriage Rates.**

It raised an alert on use of plastics in females and males planning to conceive or in reproductive age and pregnancy, which was based on Stanford study which directly correlated use of plastics and direct increase in miscarriage by 80%.

Is plastic responsible for your infertility?



"American Society for Reproductive Medicine (ASRM)" and
"International Federation of Fertility Societies (IFFS)" based on various studies

Endocrine disruptors/Phthalates -
Common leaching from Plastic negatively impact reproductive capacity -

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- 20% decline in fertility in males
- Increased risk of miscarriage
- Potential chromosome abnormalities in the fetus

ARE YOU EXPOSING YOURSELVES TO UNWANTED TOXIC CHEMICALS?

American Society for Reproductive Medicine (ASRM)
President advised us

"To avoid drinking from plastic bottles which is allowed to get warm"

Studies suggest that chemicals which are responsible for various adverse events leached from plastic increase by 1000-fold when water of a bottle is exposed to sun.

Royal College of Obstetricians and Gynaecologists

October 2013

Mothers-to-be should be aware of unintentional chemical exposures, dealing with potential, but unproven, risks to child health, to make informed decisions that will predispose their baby to have the best possible health.

Exposure to considerable amounts of environmental chemicals has been linked to adverse health effects in women and children, including pre-term birth, low birthweight, congenital defects, pregnancy loss, impaired immune development, as well as impairment of fertility and reproduction in both the mother and child in later life.

Are toxic compounds released from plastic linked to the adverse effects in

women and children?

Royal College of Obstetricians and Gynecologists issued advice that pregnant women should "PLAY IT SAFE" and try to limit exposure to many chemicals found in plastics,

Studies suggest the amounts of environmental chemicals including chemicals leached from plastic has been linked to adverse health effects in women and children, including pre-term birth, low birth weight, congenital defects, pregnancy loss, impaired immune development, as well as impairment of fertility and reproduction in both the mother and child in later life.

Are we unintentionally risking ourselves to **Miscarriages?**

"Stanford study"
reveals
Excessive exposure to
Endocrine disruptors / Phthalates -
Common leaching from plastic had

80% increased

risk of miscarriage.

Is plastic a reason for your infertility?

"American Society for Reproductive Medicine (ASRM)" and "International Federation of Fertility Societies (IFFS)" based on various studies

Endocrine disruptors/Phthalates - Common leaching from Plastic negatively impact reproductive capacity -

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"Stanford study" reveals
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Common leaching from plastic had **80%** increased risk of miscarriage.

It's time that we demand a change!

Have you increased your chances of a **pre-term birth?**

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and try to limit exposure to many chemicals found in plastics,

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Printed from
THE TIMES OF INDIA

Environmental toxins may take a toll on newborns: Navi Mumbai study

Malathy Iyer, TNN | Apr 28, 2013, 12.48 AM IST

The Navi Mumbai study noticed an alarming increase, almost 200%, in the incidence of undescended testicles.

A medical study conducted among 1,000 children born in a Navi Mumbai hospital could be an indicator of the growing effect of environmental toxins on the human reproductive system.

The study, which was presented at the 24th congress of the European Society for Paediatric Urology i Genoa, Italy, on Friday, showed there is a growing incidence of genital abnormality among boys possibly because of the increasing exposure to endocrine disruptor chemicals. Known as phthalates and bisphenol-A, these chemicals are used in plastic bottles, food wraps, cosmetics, toys, etc. Experts say that chemicals in pesticides, painkillers and cigarettes too can disrupt the hormone system.

The study was conducted by Dr Arbinder Singal, a paediatric urologist with MGM Hospital in Vashi. His team checked 1,154 children on the first or second day of birth for genital abnormalities.

An increase in incidence of male reproductive disorders has been noted all over the world, said Singal. "Such disorders are thought to be the result of chemical exposure that interfere with the sex hormone during development and sex differentiation which happens during 8 to 12 weeks of foetal development," he said.

The Navi Mumbai study noticed an alarming increase, almost 200%, in the incidence of undescended testicles. "We found almost 5% of the full-term newborn male babies had undescended testes," he told TOI. The male hormone, testosterone, is produced in the testicles, which are two oval-shaped male sex organs located inside a small sac called the scrotum that is located under the penis. The last study in India done in 1972 showed an incidence of 1.6%. "If we include milder forms of undescended testes, the incidence may be as high as 8.7%," he added.

In 70% of the cases, testes descend within the first few months of life. But what is worrying is that 30% will need surgical correction. "An extrapolation of our results suggest that about 7 lakh babies would be born in India with undescended testes. Even if there is natural correction in 70% of the childre by 6 months of age, there would still be 2.1 lakh babies every year who will need surgery for the condition in India," he added. If this condition is not treated, it could lead to fertility problems, torsion and cancer formation.

Toxins leading to genital abnormality in babies

Malathy Iyer | TNN

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For the full report, log on t www.timesofindia.com

Are you leaving your child **feeling incomplete?**

Research and studies say that increased exposure to toxic chemicals released from plastic have led to **genital abnormalities** in boys.

- **IMPAIRS TESTICULAR FUNCTION**
- **UNDESCENDED TESTICLES**
- **REDUCED ANOGENITAL DISTANCE**

Effect on breast cancer cells

Naidenko et al. 2008 at the University of Missouri found that the PET-bottled water triggered a 78% increase in the growth of the breast cancer cells compared with the control water:

1,200 breast cancer cells multiplied to 32,000 in 4 days when incubated in PET-bottled water, versus 18,000 for the control sample.

Are you unknowingly exposing yours to chemicals responsible for Breast Cancer ?

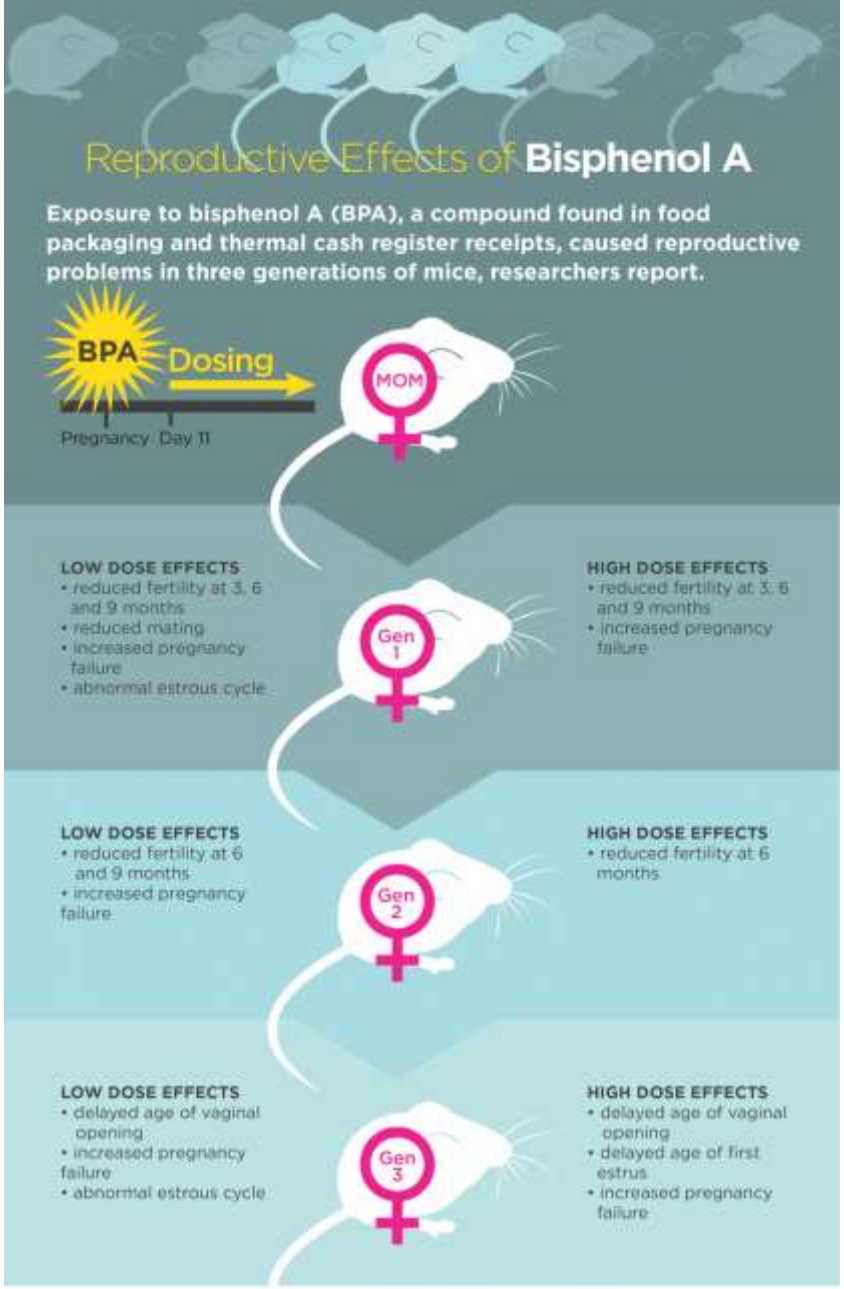
The study carried by University of Missouri states that

PET-bottled water triggered a 78% increase in the growth of the breast cancer cells when compared with control water.

Are you responsible for creating a generation of Asthmatics?

Columbia University researchers reported that excessive exposure to Endocrine disruptors/ Phthalates might increase a child's future risk of developing asthma.

80 percent increased risk of developing asthma between age of 5 and 11 if their mothers were exposed to high levels of phthalates during pregnancy.



Scientists with the U.S. Centers for Disease Control and Prevention found bisphenol A in more than 90% of urine samples tested from a representative sample of the U.S. population.

Plastic bottles are a ticking time bomb!

Plastic medical containers can be dangerous depending on the time in storage & temperature.

Studies suggest that chemicals which are responsible for various adverse events leached from plastic increase by **1000**-fold when water of a bottle is exposed to sun.

It's time that we demand a change!

ACT INDIA
Be Responsible | Demand Change

http://www.telegraph.co.uk/women/womens-health/10376043/Pregnant-women-warned-of-80pc-increased-risk-of-miscarriage-from-food-heated-in-plastic.html

For more information, visit us at https://www.facebook.com/pages/Act-India/739103502839718

Is plastic the cause of increased blood pressure?

As per the study published in **Hypertension,**

a journal of **American Heart Association** says that

chemicals leaching from plastic can be linked to quick rise in blood pressure.

http://well.blogs.nytimes.com/2014/12/08/bpa-in-cans-and-plastic-bottles-linked-to-quick-rise-in-blood-pressure/?smprod=nytcore-ipad&smid=nytcore-ipad-share&_r=0

For more information, visit us at https://www.facebook.com/pages/Act-India/739103502839718

It's time to demand change !

ACT INDIA

How will you feel if you were unintentionally risking yourselves to DIABETES?

Excessive exposure to Endocrine disruptors/Phthalates - Common leaching from plastic are responsible for various adverse events.

Research and studies say that exposure to considerable amounts of environmental chemicals leached from plastic can lead to increased adiposity and insulin resistance

It's time that we demand a change!

http://ehp.niehs.nih.gov/0901253/#r13

For more information, visit us at https://www.facebook.com/pages/Act-India/739103502839718

ACT INDIA

Leaching & Effect of storage time

Casajuana and Lacorte (2003)[11] investigated the effect of prolonged incubation on the concentration of various phthalates in water from PET bottles compared with water from glass bottles.

Samples of **water from PET bottles**, three out of five brands showed measurable levels of di-(2-ethylhexyl) phthalate (DEHP) **after 10 weeks of incubation, with an average DEHP concentration of 0.134 µg/L, and all five brands showed measurable levels of DEHP after 10 weeks of incubation, with an average DEHP concentration of 0.214 µg/L.**

Leaching & Effect of storage time

Biscardi et al. (2003) [12] examined then filled PET bottles and glass bottles with mineral water, both carbonated and noncarbonated. All bottles were stored at room temperature.

Each subsequent month, for 12 months, samples of water were lyophilized, and analysed. Throughout the first 8 months, no phthalates were detected in any sample.

Beginning at month 9 for PET-bottled noncarbonated water, and month 10 for PET-bottled carbonated water, the acetone extracts increased from 0.4 to > 3.0 mg/L. GC/MS analysis of the extracts identified the presence of DEHP.

Effect of time & temperature

Farhoodi et al. (2008) (13) studied the interaction of incubation time with storage temperature on the leaching of DEHP from PET bottles.

Using a solution of 3% acetic acid as a food simulant, they incubated the solution in PET bottles for up to 120 days, either at 25°C or at 45°C.

On day 0, at the beginning of the trial, the amount of DEHP in PET bottles was below the limits of detection.

On day 25, the amount of DEHP in the solution incubated at 25°C was 1.2 mg/L, whereas the amount of DEHP in the solution incubated at 45°C was 2.1 mg/L.

By day 66, the amount of DEHP in the solution incubated at 25°C had peaked at 1.4 mg/L, whereas the amount of DEHP in the solution incubated at 45°C had plateaued at 2.5 mg/L.

Evidence - National Test House

In a recently conducted laboratory analysis at a leading ***National Test House – Kolkata (NTH-K)***

Examining leaching from PET containers especially in pharmaceutical compound – Benadryl a leading cough syrup widely used in children, women in reproductive age and other patients tested showed leaching of various harmful compounds at levels much higher than the permissible range.

The leaching for all compounds tested was more pronounced at higher temperatures i.e. 40 and 60 degrees was significantly higher than the permissible limits.

Evidence - *National Test House*

Further, the most worrying health scare is from leeching of DHEP- Phthalate – known endocrine disruptor, at room temperature where the levels at room temperatures were higher than permissible limits.

This leeching of DHEP- Phthalate – endocrine disruptors which increased significantly almost as high as 4 times with increased temperatures at 40 and 60 degrees.

Evidence - National Test House

Summary of Report from National Test House

All in ppm or mg/l)	Pharma			Safety Limits	Source
	Room Temperature	40°C	60°C		
Antimony	0.004	0.022	0.033	0.005	BIS
Lead	0.007	0.011	0.040	0.010	BIS
Cadmium	0.005	0.009	0.011	0.010	BIS
Chromium	0.004	0.008	0.012	0.050	BIS
DEHP - Phthalate	0.009	0.024	0.032	0.006	EPA

A logical conclusion can be derived from this lab analysis done by NTH-K that patients consuming pharmaceutical compounds packaged in pet bottles are exposed to significantly higher levels of harmful compounds.

For the industry manufacturing lifesaving drugs and delivering healthcare to more than 120 million Indians, it is their social responsibility and moral obligation to ensure that the primary packaging does not have any sort of ill effects on human health.

Estrogenicity of Antimony, and Leaching of Antimony from PET

Antimony is widely used as a catalyst in the polycondensation of PET (Pang et al. 2006). PET resin typically contains antimony in concentrations between 100 and 300 mg/kg (Duh 2002).

The U.S. Environmental Protection Agency (EPA) has established an MCL (maximum contaminant level) of 6 ppb for antimony, which is the same limit set by Health Canada;

The German Federal Ministry of Environment has set a limit of 5 ppb

The Japanese drinking water standard requires levels of antimony < 2 ppb (Shotyk and Krachler 2007). [1]

However, these cutoffs are generally based on older research on antimony toxicity, related to cardiovascular risks and carcinogenicity.

Antimony - leeching

Shotyk and Krachler (2007) (1,3) measured antimony concentrations in 132 brands of bottled water purchased **in 28 countries.** They found a wide variation in antimony concentrations, with dramatic differences in the leaching of antimony over time.

In 14 brands of PET-bottled water purchased in Canada, **antimony concentrations increased on average 19% during 6 months of storage at room temperature.**

By contrast, **48 brands of PET-bottled water purchased in Europe increased on average 90% during 6 months of storage, under identical storage conditions in the same laboratory.**

Antimony - leeching

Shotyk and Krachler also reported wide variations in antimony concentrations even among the same brand of PET-bottled water, depending on the location of purchase.

For example, one brand of PET-bottled water yielded 1,650 ng/L of antimony when first purchased in Hong Kong, increasing to a concentration of 1,990 ng/L when tested 6 months later, whereas the same brand of bottled water purchased in Europe had a concentration of 725 ng/L when first purchased, increasing to 1,510 ng/L 6 months later.

Antimony – leeching
Time & Temperature related

Westerhoff et al. (2008) (16) found that raising the ambient temperature significantly increases the leaching of antimony from PET bottles.

The average antimony concentration from nine brands of PET-bottled waters was 0.195 ± 0.116 ppb at the beginning of the study and 0.226 ± 160 ppb after 3 months indoors at 22°C. When the bottles were incubated at 70°C, however, the concentration reached 6 ppb in just 12 days; at 80°C, in just 2.3 days. After 7 days at 80°C, the antimony concentration reached 14.4 ppb. Noting that temperatures within a closed-container truck may easily exceed 60°C

Westerhoff et al. (2008) concluded that "short duration exposure to elevated temperatures during transit or storage by the seller or consumer could yield antimony concentrations that approach or exceed the 6 ppb MCL."

Harmful effect - Antimony

The primary effects from chronic exposure to antimony in humans are

1) **Respiratory system:** effects that include antimony pneumoconiosis, alterations in pulmonary function, chronic bronchitis, chronic emphysema, inactive tuberculosis, pleural adhesions, and irritation

2) **Cardiovascular effects** (increased blood pressure, altered EKG readings and heart muscle damage)

3) Gastrointestinal disorders

4) **An increased incidence of spontaneous abortions**, as compared with a control group, was reported in women working at an antimony plant. Disturbances in the menstrual cycle were reported in women exposed to various antimony compounds

Source: http://www.epa.gov/ttnatw01/hlthef/acetalde.html

Acetaldehyde - Toxicity

It is well-known and all scientific reports agree, that formaldehyde and acetaldehyde are thermal degradation products of PET and that they could be released into the bottled water depending on certain storage parameters and according to the type of drinking water (Nawrocki et al., 2002; Dabrowska et al., 2003; Mutsuga et al., 2006) (17,18,19,22).

Strube et al. (2009) (20) investigated UV-light degradation products of fatty acid amides as a source of plastic off-odors in packed mineral water; The main source of formaldehyde and acetaldehyde in bottled drinking water is PET packaging.

Chemical migration in drinking water stored in polyethylene terephthalate (PET) bottles: a source of controversy.
Cristina Bacha,b*, Xavier Dauchya, Marie-Christine Chagnonc, and Serge Etienneb
published in "Water Research 46, 3 (2012) pp. 571-583“ DOI : 10.1016/ j.watres. 2011.11.062

Acetaldehyde

Porretta and Minuti (1995) (3) found trace amounts of acetaldehyde in 34 different brands of drinking water purchased from retail outlets. All of the samples of 16 brands of still water exhibited levels of acetaldehyde above the taste threshold of 15 µg/L after 9 months of storage at 42°C.

After six months of storage, levels of acetaldehyde in carbonated water increased to 100 g/L in samples kept at room temperature and at 40°C

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Harmful Effect - Acetaldehyde

The primary acute **effect of inhalation exposure to acetaldehyde is irritation of the eyes, skin, and respiratory tract in humans**. At higher exposure levels, erythema, coughing, pulmonary edema, and necrosis may also occur. (3)

Acetaldehyde can irritate the lungs. Higher exposures may cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency

Exposure of high concentrations can cause headache, dizziness, lightheadedness, and passing out

Acetaldehyde may be a Carcinogen in humans since it has been shown to cause cancer of the nose and larynx

www.epa.gov/ttnatw01/hlthef/acetalde.html

Conclusion

Strong evidence of health hazards of PET bottle leeching compounds has been published.

Side-effects ranging from estrogenic effects to cancer has been documented.

Increase in temperature and storage time have been directly co-related to leeching of harmful compounds from PET bottles.

European regulations on PET bottles recommend for products that need to be stored for more than 6 months stability testing for 10 days at 60° C . (23)

Thank You