

VOICES FOR GREEN CHOICES

a handy guide to non-toxic household products

Vinita S.

Vanasree

2015

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PREFACE

A visit to any shop today, including the neighbourhood kirana store, would have us believe that as urban Indian consumers today, we are spoilt for choice.

But, does choosing, say, *Colgate over Pepsodent* (toothpaste) or *Harpic over Lizol* (toilet cleaner) or *Ariel over Surf* (Laundry detergent) really amount to a choice?

In fact, with rising evidence of the dangers of chemical products for human health, as well as the increasing impact of humans on our environment, *what we choose to use or not use* is of utmost importance to us, our families, and the next generation.

Perhaps it is time to pause and examine the kind of choices we truly have as consumers today.

In our typically busy city lives, many of us have come to increasingly rely on quick-fix, instant solutions for all our home needs, including simple things that, until only a few decades ago, were, natural, home-made and devoid of a whole host of chemicals. Products have been created today, to service every household need, increasing consumption as well as waste.

Viewing this change as an inevitable fallout of our fast-paced lives obscures its far-reaching impact on our health and that of the environment.

These consumer goods are leaders, along with fuel, when it comes to emissions intensity per rupee spent*. Added to this is the fact that regulation of this sector has not necessarily kept pace with its expansion. 1000 to 3000

“The intelligence that might save us from ourselves requires a shared awareness by and coordinated efforts from all of us – as shoppers, as businesspeople, as citizens.”

– Daniel Goleman, Author
Ecological Intelligence: Knowing the Hidden Impact of What we Buy.

*[Http://www.wiod.org/conferences/groningen/Paper_Grunewald_et_al.pdf](http://www.wiod.org/conferences/groningen/Paper_Grunewald_et_al.pdf)

**http://www.nytimes.com/2012/03/15/garden/going-to-extreme-lengths-to-purge-household-toxins.html?_r=2&pagewanted=all&

new chemicals have been added to our environment every year for the last 30 years. Research on the safety of these ingredients can shed no light on their long term impacts.**

An increasing number of people today are concerned about the impact of their lifestyle on other creatures and the ecosystems on which we are all dependent.

So, how do we consumers make choices today? Typically, when a consumer chooses an everyday household product, the cost is a significant factor. The product should also be easily available and easily stored. Some people ask whether a product is poisonous, whether it could cause any immediate health problems such as skin allergies, asthma and whether it is safe for children. Others go a step further and ask whether a product could be toxic, carcinogenic (cancer causing), or whether it will impact unborn children. These questions mainly relate to individual and family health.

Over the years, our rivers have become darker, dirtier and contain more sewage than water. The air that we breathe has so much fine dust or suspended particulate matter (SPM) that childhood asthma, wheezing, lung-related problems have increased drastically. The food that we eat may contain a high content of pesticide and other chemical residues. As these problems mount, concerned individuals are making the link between environmental degradation, ill health and consumption. Many consumers are now asking questions that concern the impact on the environment:

- * Is the product safe?
- * Is the product and packaging Biodegradable? Reusable? Recyclable?
- * Is the process of making the product polluting the air/water? Does it release toxic or carcinogenic substances?

* After the end-user has used the product, what remains and how does it impact the environment in the long term and short term? Will it harm or kill fishes and birds, insects and humans?

* What is the carbon footprint of the product? Where was it produced, how much fuel, water and other resources were used in its production? How far was it transported to reach me?

By asking such questions, the consumer transforms from an average buyer of everyday household products to a more environmentally- conscious and discerning individual.

However, for those looking for a safer alternative, navigating the multitude of products that beckon to be picked off the shelves can be quite a challenge!

What's more, with so much discussion around global warming, there is much bandying about on being 'green' and 'environment-friendly'. Products are now by companies (and their marketing departments), advertised as 'eco' or 'earth-friendly'.

How then does the average consumer sift through the maze of information out there and decide what is a genuinely healthier and safer product? Is it enough if a laundry detergent is endorsed by a popular public figure who informs us that it is environment-friendly because it consumes less water? Though it might seem like the obvious thing to choose the product, can something really be declared as green, merely on the basis of one or two features? Or does it call for a more nuanced

To the age old question "can one person's actions really make a difference?", We say yes, as the changing consumption patterns of one household directly decreases pollution and provides a positive example to others, paving the way for broad reaching social change.

understanding of the issue?

Producers/ manufacturers may not have undertaken research about the toxicity of the various chemicals used in their products and have no legal responsibility to ensure that the life of their products post-consumer use is not harmful; there is no 'cradle to cradle' design standard. Furthermore, our country's laws do not mandate that such product information be shared on the packaging. Many products are not even obliged to detail their ingredients on the packaging. Developing a better understanding of the products out there can therefore take more time and effort.

*How can you and I become discerning buyers without obsessing?
What are the thumb rules to follow without spending too much time or needing an in-depth knowledge of chemistry?
Voices for Green Choices seeks to facilitate this process and build a rich information base*

Voices for Green Choices offers critical information about products, ingredients and their impact on the environment; enabling the concerned consumer to link such information with individual choices made at the time of purchase and use. It attempts at helping the consumer ascertain which products in the market are ecologically safe or unsafe and why; or whether the ingredients of a product labelled 'natural/less-toxic/eco-friendly' indeed make it so.

Our country is rich in traditional knowledge systems and practices that ensure minimal residual effect of products. These remain the norm in most parts of rural India; though even here, things are changing due to the emulation of urban practices and aggressive rural marketing by companies selling consumer goods. The need to reconnect and adapt this traditional knowledge and practice to our urban lives is imperative – if we are to mitigate the growing pressure on natural resources caused by our increasingly consumerist lives.

Voices for Green Choices shares a few such traditional recipes/methods/practices, as well as some modern alternatives.

Voices for Green Choices seeks to grow as a movement; building a pro-active, sensitive community across urban India, a dynamic network of consumers who share experiences and information about safer alternatives; with region-specific resources and other relevant details.

What we need is not a mere shift from buying hazardous to buying safer alternatives, but more significantly, a rethink of our choices, our lifestyle and our wants and needs.

*Perhaps it is time,
to pause and rethink what we use,
to question the inclusion of harmful ingredients
in our everyday cleaning products,
to choose wiser and safer.*

We could try to look at ways of reducing our impact on the environment by using a product or service or adopting a behaviour that:

*Uses less energy
Conserves water
Is less toxic
Contains recycled material
Is derived from plants
Is less processed
Uses reduced packaging
Is rebuilt, reconditioned or reused
Is organic and
Is regionally produced.*

1.1 Introduction to Home Cleaning

We spend a fair share of our lives cleaning our homes, worrying whether it is clean enough and shopping for home cleaning supplies that we think will clean it even better.

Typically, we seem to choose our home- cleaning products based on:

- Appearance (is it white, does it have multi-coloured granules, does it froth more),
- Fragrance (does it smell good?),
- Value for money (is it cheaper than the competing brands?),
- Packaging (does it come in a handy and attractive pack?is it easy to store?, does it travel well?); &
- Advertisements (“it removes stubborn stains or cleans twice as strong or has that special xx formula to makes whites whiter”).

Cleaning our home with non-toxic alternatives is one of the simplest and best gifts we can give ourselves, and our environment.

Hardly ever, if at all, do we buy a cleaning product based on its cleaning ingredients!

Simply because, we don't know these ingredients.

The product labels do not tell us.

Our country laws do not mandate it.

We don't ask.

Safe-Home Cleaning Kit

By making our own home cleaning products, we can ensure that we avoid inhaling and handling toxic products and are assured of our health and safety. Using these products has visible advantages of efficiency and economics too.

Listed here are a few basic cleaning materials that we can stock in our homes. Once we understand how these work, we will be amazed at the range of possibilities these magic ingredients offer to clean almost every surface at home.

We will probably need to scrub a little harder initially – to undo the damage and build-up of the previous toxic cleaners.

Making the transition from toxic commercial cleaners to homemade non-toxic alternatives is primarily a mental shift. Once we decide to go ahead, sourcing the ingredients and changing our habits is only a matter of time.

All the same, when we do start using home made cleaning products, it will take a few uses before we see a visible difference.

TABLE 1: SAFE HOME CLEANING KIT

Ingredients	Properties	Approx Cost	Source
Baking Soda*	Odour absorbing & Deodoriser	Rs 50/400g	Chemist/ Baking supplies
Borax*	Disinfectant; deodorizer; inhibits mold growth	Rs 75/400g	Chemist
White Vinegar	Cleaner, Water Softener, cuts grease; freshens air; Inhibits mold growth		Grocer
Washing Soda* (Sodium Carbonate)	Strong cleaner -should be handled with care; Cuts grease;		Grocer/Wholesale market
Lemon	Disinfects, Mild fragrance; Cuts grease; Mildly acidic; Stain removal	2 – 5 Rs per Lemon	Market
Sea Salt	Non-scratching abrasive cleaner;	10 Rs per Kg	Grocer
Soapnut/Ritha (Sapindus mukorossi, Sapindus trifoliatus,)	Natural detergent; Cleaner; Hypoallergenic; Gentle on skin	50 Rs/ 500 gms	Grocer/ Local granthige/kirana shop
Plant oil based soaps* (coconut/olive/neem)	Natural cleaning and anti-bacterial properties.		See resources list
Wood Ash	Cleans; removes mold;		
Hydrogen Peroxide**	Anti Bacterial, Anti viral, Anti fungal, kills mold and mildew, strong action, biodegradeable.		

* called Castile soap in other countries-
<http://www.davidsuzuki.org/blogs/queen-of-green/2012/03/what-is-castile-soap/>

While washing soda and borax are less toxic than commercial products, they still can have an impact on humans, pets, soil fertility and water availability; and should be used consciously.

Soapnut is an example of a traditional product, grown locally, barely processed, totally biodegradable and non toxic, besides being a versatile and effective cleaner.

Sodium Carbonate is caustic with a higher pH than Baking Soda, while Borax is a naturally occurring alkaline mineral salt. Baking soda is the most gentle. Hydrogen Peroxide comes in different concentrations and should be handled with care; for cleaning purposes we only need a 3% concentration.

Essential oils are a useful addition to the safe-home cleaning kit. They are best used sparingly as they are concentrated. In addition to its particular fragrance, each oil has its own set of unique properties including anti-bacterial, anti-fungal, or disinfectant.

1.2 Laundry

1.2.1 Overview

The market today is inundated with laundry cleaning products – almost as if there is one for every type and colour of material, or model of washing machine. While some promise whiter whites, others claim to remove tough stains magically.

As consumers, our concern is limited to such cleaning properties, often ignoring the costs at which they are achieved.

1.2.2 Toxins in laundry cleaners

Like many other modern day convenience products, laundry detergents come with their own side effects. Behind those attractively coloured granules, pleasant fragrance, intense frothing action or strong stain removal action is, in fact, a whole range of toxic ingredients and additives.

Safety tests for chemicals in laundry are typically conducted by feeding them to animals*. Inhuman as this is in itself, such testing does not even address their long-term effects on humans.

Chemicals in laundry detergents enter the human body primarily via inhalation or skin contact in small repeated doses over a long period of time; not by ingestion. We also come into contact with some of these harsh chemicals through residues left in folds of clothing, towels, sheets, and other washables.

**Theo Colborn, PhD, a leading researcher on environmental toxins and coauthor of Our Stolen Future quoted at <http://www.care2.com/greenliving/what-lurks-in-your-laundry.html>*

The skin is the largest organ in the human body and these chemicals enter the pores of our skin and react chemically, leading to skin rashes and allergies, and the chemicals also make it more difficult for wounds to heal.

Chemical detergents have also long been associated with environmental degradation and pollution of water bodies*. Several ingredients of detergents pollute drinking water and food by combining with toxic metals already in the environment.

Once the washing is done, *phosphates* from the laundry get washed along with the dirty water into the water bodies. This causes accelerated algal growth in the water bodies (eutrophication) – rendering it toxic, stripping it of oxygen and killing all other aquatic life. Lakes and other water bodies suffering from eutrophication become stagnant and eventually may dry up all together.

The European Union has placed limits on the use of phosphates in laundry. Successful campaigning has also led to the removal of phosphates from most laundry products in America, Canada, Australia and Japan.

Estimates suggest that removing phosphates from ingredients can decrease the carbon footprint of a product by 30%**

A 1998 study by Consumer Voice debunked the popular consumer notion, that “costlier typically means better”. It found, among other results, that:

-> Cheaper laundry detergents contain lesser phosphates and Sodium Tri Poly Phosphate(STTP).

-> Premium brands do not qualify as ‘Grade 1’ as they do not meet quality and performance requirements prescribed in national standards.

Fortunately, the news is not all bad. To rethink our laundry cleaning habits, perhaps we could begin by choosing detergents that are plant-based, natural, do not contain non-essential additives like perfumes, colour and brightening agents and come with minimal packaging that is safe for the environment.

Plant based ingredients will break down much faster; reducing the chance of an unhealthy buildup of additives in our bodies as well as water bodies.

* <http://www.thehindu.com/life-and-style/homes-and-gardens/article3262216.ece>

**<http://dosomething.net.au/issues/phosphates.aspx>

TABLE 2 : LAUNDRY INGREDIENTS & IMPACT

Ingredients	Function	Chemical components	Problems	Alternatives
Surfactants	Dissolve the dirt from the laundry surfaces. Creating bubbles, they also reduce the surface tension of water so that it is less likely to stick to itself and more likely to spread and wet the surface, to interact with oil and grease	LAS, DDBS, SL(E)S, QUATS, and Alcohol Ethoxylates	Disrupts endocrine, harms lungs (data from http://grist.org/article/its-a-wash/)	derived from corn, coconut and soy that are gentler.
Builders	lower the water hardness, makes the wash solution less acidic, helps inulsify oils in the soiled fabric, 'breaks' clay types of dirt			Phosphates are common builders, appearing in a variety of compounds. Zeolites, citrates, sodium carbonate, and sodium silicate are others considered safe for human consumption
Bleaches	Makes fabric whiter	Chlorine , sodium perborate		Sodium hydroxide based alternatives that break down into water, oxygen and natural soda is a better alternative
Optical brighteners	Causes white fabrics to appear whiter by converting UV light wavelengths into visible light and offsetting the yellowing of the material		Finds its way to the skin	Benzene, a toxic carcinogen, is a common brightener. Natural enzyme cultures, or hydrogen peroxide, can be just as effective.
Fillers	Primary role is to modify the physical properties of the detergent. Fillers also 'fill' i.e. they help to add bulk to the detergent; almost 30-40% of the detergent is in fact made up of the filler!	Silicates, talc, soda ash and China clay	Possible links to ovarian cancer	

Ingredients	Function	Chemical components	Problems	Alternatives
Fragrance	Synthetic chemicals that give the laundry cleaner its artificial fragrance of rose or jasmine or other such	Phthalates	Fragrances can be irritants, have negative interactions with the nervous system, and some are carcinogens. Cause deformities in reproductive organs	Essential oils
Fabric softeners	Chemicals in fabric softeners are pungent and strong smelling -- so strong that they require the use of these heavy fragrances (50 times as much fragrance) just to cover up the smells.)			using soapnuts for laundry ensures softening of clothes without the use of additional softener. Alternatively a final rinse with vinegar and water also ensures softening of clothes.

Safer Alternatives

Safeguarding our health and environment is not just about choosing safer alternatives, but also about reducing the use of resources. Here are a few pointers to take us further along this path:

? Many times clothes don't really need soap but just a soak and rinse with water. When you feel clothes are dirty you could first soak the clothes in water for half an hour (using hot water for particularly soiled clothes). The waste water obtained when you remove the clothes could be kept aside for washing the bathroom/basin or toilet.

? Hand scrubbing or beating the clothes on a washing stone as well as using a plunger are effective ways to remove dirt. Scrubbing with a brush is particularly effective for stain removal.

Most clothes that carry a label advising dry cleaning can safely be hand-washed using a mild soap. If you have to dry clean, then air it well for at least 1-2 days to remove traces of the chemical left on the clothes.

Another safe and traditional method for washing is to use aritha powder (soapnut or *Sapindus marginatus*) or moong dal flour (green gram flour) as soap powder. This could be made in large quantities and stored in airtight containers to last a few months at a time.

Shikakai, aritha and moongdal flour are versatile, effective, yet gentle cleaners used as hair wash, and a face and body scrub.

Many of us may remember that our grandmothers used to wash their silks by uniformly applying a paste of shikakai, aritha powder or moongdal flour and soaking it for a while before washing away the powder.

It is easy to find locally grown and produced aritha and moongdal, so there is the potential to greatly decrease the carbon foot print of your laundry.

80% of the energy for a hot wash is used to heat the water. Merely maintaining 30C (or a cold wash) would reduce greenhouse emissions drastically.

A front loader is said to use 40% less energy, 1/3rd less water and half as much detergent as a top-

It may take a little while for some of us to get used to small differences once we start using safer alternatives. Nevertheless, our overall experience of knowing the exact ingredients of our laundry detergent, being certain that we are not contributing to the pollution of the environment, and having clean clothes to boot will more than compensate for the otherwise cosmetic and mostly harmful ingredients that we have gotten used to.

Most modern synthetic cleaning products are based on tried and tested formulae using natural ingredients that worked well and were handed down over the years.

Going back to the original natural ingredients is a way to make cleaning products that work, don't pollute and save money.

Alpana's Personal Experience

I have been using completely plant based eco friendly laundry liquids and powders for over a year now and i have found a big difference in my clothing.

With standard detergents, I found the cloth feels stiffer, and my skin felt itchy. Plant based laundry detergent leaves my clothes feeling soft and smelling like the delightful essential oils I add to the wash (Eucalyptus, Tea Tree and Orange are my favourites).

I also found the cleaning by the plant-based detergents to be just as thorough as the chemical detergents. I recently discovered the application of aritha (soapnut) to laundry, and the results have been great too- soft, stain-free clothes, that smell good. Try it!

TABLE 3: RECIPES FOR LAUNDRY

Recipes
These recipes have been collected from various sources – individuals, magazines, websites. It is suggested that you first make them in small quantities to decide which combination best suits your needs.
 T = Tablespoon
 t=teaspoon
 C-= Cup (250ml)

<p>Detergent Powder 2 Cups finely grated soap (use a biodegradable soap) 1C washing soda 1 C borax Mix well and store in air tight container. Use 2 T per full machine (5kg) load.</p>	<p>Liquid Detergent Add 2C grated bar soap to 1 litre of boiling water on low heat till it melts. Pour in large bucket and add 2c each of borax and washing soda. Stir till dissolved. Add 8 litres of water and stir. Cover. Once cool can add 5-7 drops of essential oil. Stir before use as it can gel. Use 1/4C for each load.</p>	<p>Whites Add ¼ C lemon juice and ¼ C baking soda to the load together with the regular detergent. This will work as a mild bleach. Adding ¼ to ½ C lemon juice to the wash cycle can brighten up fading whites too. Adding 1 ½ C of vinegar* to the rinse cycle will also help to whiten clothes. Hydrogen Peroxide at 3% will brighten whites.</p>
<p>Soapnut Detergent Soak a handful of soapnut shells in 100 ml of warm water (approx 1:2 ratio) for 15-20min or 1:3 ratio if you use soapnut powder. Strain this liquid and dilute with water, mixing well. Soak the clothes for an hour. Then scrub and rinse well. Works well for all types of clothes and prevents bleeding of colour. Silks and woollens have been washed for ages using soapnuts.</p>	<p>Fabric Softener 1C vinegar* or ½C baking soda for final rinse. To reduce static cling in tumble-dried synthetics, dampen hands when folding or line dry instead. * Vinegar is too mild to harm clothes yet acidic enough to act on alkaline residues left by detergents. Since it breaks down uric acid it is especially good to use in the rinse cycle for babies' clothes.</p>	<p>Variations 1/3 C washing soda to the machine . Now add clothes with 1 ½ C of soap flakes or detergent powder. If the water is hard, add another ¼ C soda or ¼ C vinegar* during the first rinse. Add ½ C borax for additional cleaning power. Add a few drops of your preferred essential oil for fragrance</p>

<p>Stain Removal</p> <p>Mix 1/4 C borax with 2 C cold water. Use this mixture as a soak for clothes and fabrics and apply with a sponge and allow to dry. This can be used for blood, chocolate, coffee, mildew, mud and urine stains. One can also add baking soda, washing soda to this mixture for additional stain and odour removal. A thicker paste would work better; though additional rinsing would be necessary. Baking soda is not advised on woollen clothes.</p> <p>Hydrogen Peroxide (3% dilution) is also a good stain remover when applied as a paste to the stain and allowed to sit before washing off.</p> <p>Vinegar works well against perspiration stains.</p>	<p>Traditionally the dhobis used to boil clothes in caustic soda (sodium carbonate) or washing soda and then wash with water.</p> <p>Household items such as hand towels and kitchen napkin could be washed by this method. Half cup of washing soda could wash about 20 kitchen towels which have to be soaked in boiling water and then in washing soda. As this is relatively harsh on the clothes it is not advisable to use this for other clothes. It appears that impact of washing soda is far lesser than any of the detergents!</p> <p>While using the washing machine, add 1/3 C washing soda per bucket of water used and then use soap powder instead of detergent. For more cleaning power, Borax could be used.</p>	<p>Starch</p> <p>1-3 t cornflour(light to heavy starch) 1 C water mix well and add to a spray bottle . Spray on clothes and iron.</p> <p>To starch large pieces of fabric, prepare a large amount of this starch solution in a bucket or sink, then dip the fabric into it, ring it out, and iron it dry on coloured clothes use as an additional rinse cycle</p> <p>2T cornflour in 1 C water.</p> <p>The starchy solution obtained while cooking rice is another easy and simple method of starching clothes.</p>
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Experiential difference

As with all new habits, before we make that switch to natural and safe laundry detergents, there are bound to be questions and clarifications that we seek answers to:

- > Are these alternatives more expensive,
 - > Are they tedious to use,
 - > Will they be difficult to source, and more importantly,
 - > Are they going to be effective on soiled clothes?
- Subsequently, when we do start using these alternatives, we need to prepare ourselves for certain differences in the entire laundry cleaning process that we might experience, compared to the regular commercial products.
- > The safer alternatives will not be brightly coloured or include multi-coloured granules, as these are additives in the regular detergent.
 - > They are also likely to produce less lather than what we have grown accustomed to with commercially available detergents.
 - > Sometimes they may not even have a fragrance of their own or their fragrance may be derived from essential / non-edible plant oils, unlike the various artificially perfumed laundry detergents in the market today.

Washing can never be a completely environment-friendly process.

Knowing this, perhaps as consumers what we can hope to ensure, at the least, is mitigate the negative impact of the products that we use for laundry.

1.3 Bathroom Cleaning

1.3.1 Overview

The cleanliness of the bathroom is often an indicator of the overall cleanliness of a place of stay. The bathroom also happens to be a place that most people dread cleaning. Often our fear that we may contract an infection from what we regard as a storehouse of germs sees us take aggressive measures to 'disinfect and clean' the bathrooms in our homes. In fact the stronger and more powerful the cleaning liquid, the better chances that we will buy it.

The good news is that only 1-2% of the bathroom germs are pathogenic and these can be dealt with without having to resort to toxic cleaning solutions. The bottom line is we need to address the problem; not create new ones, in the process.

1.3.2 Toxins in bathroom cleaners and their impact

Our fear of a germ-infested bathroom has led to the use of some incredibly strong chemicals! Apart from the risk through skin contact, inhalation or accidental ingestion, toxins from bathroom cleaners get flushed into the water and sewage system, increasing the risk to our drinking water supply.

Below we describe some of the more potent ingredients:

Acid toilet bowl cleaners are hazardous products. Formulated with hydrochloric, phosphoric, or

hydroxyacetic acid, these cleaners are very effective in removing hard water deposits and stubborn stains. However, we do not need such strong cleaning power on a daily basis.

Other common ingredients, such as dibutyl phthalate and some of the alkyl phenol ethoxylates persist as wastes in the environment and have shown evidence of affecting the hormone systems of animals.

Bleach and chlorine-based cleaners used to remove grime and to disinfect. They are known to trigger asthma.

The toxicity of these products means that they pose a serious danger to children and animals.

1.3.3 Safer Alternatives

Traditionally bathrooms didn't require products for cleaning! Water, a broom and brush, and maybe river sand, were adequate to keep bathrooms clean throughout history. The key to a clean bathroom was a dry bathroom, preventing the spread or growth of mold. So as much as possible,

* Keep the bathroom aerated and dry.

* Fix any leaks! This will help minimize the life breeding in your bathroom.

To avoid the spread of disease, a useful rule of thumb is to clean toilets any time a household member falls ill.

When the time comes to replace brushes, sponges and scrubs, consider biodegradable natural fibres like coir, jute or palm tree fibre, rather than plastics or other synthetics, to minimise landfill.

A good strategy to avoid the use of harsh acidic cleaners

in the bathroom is to spray a solution of white vinegar in the toilet bowl one night a week. In the morning, swish a toilet bowl brush around the inside of the toilet bowl and flush the water. Lemon juice can be used instead of vinegar.

Lemon juice and vinegar are natural substances that can work not only as a toilet bowl but also as a surface cleaner. The acid in lemon juice kills harmful germs and leaves a fresh scent. Vinegar absorbs odours and kills germs; for those who do not like the smell of vinegar, this is easily taken care of by adding 2-3 drops of a preferred essential oil (tea tree/lemongrass/eucalyptus oil work well for toilets). Otherwise, wait twenty minutes and the odour of vinegar will disappear.

Baking Soda and Borax are great cleaning agents, and their action is amplified when used with vinegar. Use them as toilet bowl cleaners, stain removers, drain cleaners or tile cleaners. For stubborn stains, one could sprinkle baking soda in the toilet bowl and chase it down with vinegar, almost as soon as you spot the stain. They

absorb odours and scour surfaces without scratching.

Using sand paper on tiles also removes stubborn stains almost magically, without damaging or removing the shine off the tiles.

Wiping showers after each use helps prevent mold and mildew.

When making the shift to non-toxic cleaners, first remove any residue from the commercial cleaners on the cleaning tools (brushes and scrubs), using vinegar.

Making a shift to new cleaners can make your bathroom cleaning experience more enjoyable and exciting as you start to experiment and see what combinations you can come up with. Taking a bath may be a whole new experience when your bathroom is full of natural scents and compounds instead of irritating, toxic and abrasive synthetic chemicals.

Experiential Differences

Changing from chemical to natural cleaning products, one will first notice the difference in smell. Our natural options will not have that same strong chemical smell of store bought cleaners and bleaches, smells that we may associate with clean bathrooms. Keep in mind that these smells are often indicative of toxic chemicals in the air. On the other hand, natural fragrances found in alternative products or from essential oils, will tend to be pleasant, effecting different aroma therapeutic responses. Essential oil fragrances can be distinct at first, but will dissipate in less time than lingering synthetic fragrances.

In terms of their strength, these alternatives are just as potent cleaners as those harsh chemicals!

While it may seem to require a lot of effort, bathroom cleaning can in fact be a fairly simple task, if we make a habit of it. Thankfully, there are a range of harmless everyday items we can use, as well as simple behaviours we can adopt, that will keep our bathrooms clean, fresh and germ free.

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Alpana's Personal Experience

In terms of the strength of cleaners, I have found the combination of vinegar and bicarb to be a strong cleanser. It really scours away stains with minimal scrubbing required! The same goes for borax and hydrogen peroxide, which are both powerful cleaners.

The citrus enzyme cleaner is a fun DIY project and the results are rewarding: it has a great natural scent and it really brings a shine to surfaces. I pour a little down all the drains in the house on a regular basis to keep them blockage free. It's a great use for citrus peels which otherwise make my compost pile too acidic. Its also a great excuse to make orange juice! Exploring all the combinations that can be used in the bathroom can be engrossing and makes cleaning the bathroom a fun experience.

TABLE 4 : RECIPES FOR BATHROOM CLEANING

<p>Bathroom mold Remover ½ C vinegar ½ C salt ½ t peppermint essential oil Mix ingredients in a spray bottle and shake well.</p> <p>Orange essential oil can be added to the mix as it kills mold. Tea Tree oil also fights mold.</p>	<p>Citrus Enzyme Cleaner 2 litre plastic bottle 100g or 1/2 cup Brown Sugar 1 t yeast (optional, to speed up process) 1 litre water 300g (or about 2 cups) Lemon and/or Orange scraps</p> <p>Combine Sugar, Yeast, Scraps and Water in a water bottle. Mark date on bottle. Shake to dissolve sugar. Wait three months for mixture to ferment or two weeks if you add the yeast. For the first couple of weeks give the bottle a shake once a day and leave the lid loosely fastened to avoid a build up of gas which might cause an explosion! Drain liquid and dilute with water as required. Pulp can be used to start new batch, (1/2 fresh scraps, 1/2 starter), as drain cleaner, or blended up and mixed with bi carb soda for a cleaning scrub!</p>	<p>Toiler bowl cleaners 1 cup baking soda or borax 1 cup vinegar First drizzle baking soda into the toilet. Top with vinegar. Allow to bubble for 10 minutes then use a toilet brush to scrub toilet clean. If using borax leave for 2 hours. After cleaning the toilet, wipe underneath the seat and around the rim with a damp cloth that has a few drops of peppermint essential oil.</p> <p>Either Baking Soda or Borax can be left overnight in bowl for odour and stain removal.</p> <p>Hydrogen Peroxide in a 3% solution</p> <p>Lemon or vinegar as a regular spray or soak in the bowl.</p>
<p>Tub Cleaner Make a paste with 1/2 C of baking soda and enough liquid soap to create a frosting-like consistency. Scrub clean.</p> <p>Spraying the sink and other surfaces with undiluted white vinegar also helps to keep it clean.</p> <p>Tile Cleaning Paste Mix 1 C each of Salt, Baking Soda and Vinegar.</p>	<p>Stain Removal Use lemon juice or vinegar to clean up lime and rust. Soak the spot in cleaner, then scrub. Repeat, if necessary.</p> <p>Saturate heavy rust spots in lemon juice or vinegar. For stains, combine water and baking soda to make a paste. Spread the paste on the stain. Either let it sit for a few hours or scrub it off.</p> <p>Baking soda cleans off blood, urine and other stains.</p> <p>1 C borax left overnight in the toilet bowl works wonders to remove stains.</p>	<p>Shower Scrub 1 C baking soda ¼ t essential oil Mix the ingredients and store in a glass jar with lid. To use, sprinkle on a wet sponge and scrub bath and shower walls. Rinse off with water.</p> <p>Clean shower head by soaking in water overnight.</p> <p>Shower Spray Solution of water and vinegar for use on shower screens and surfaces, will remove</p>

<p>Multipurpose Bathroom Cleaner</p> <p>2/3 C baking soda 1/2 C liquid soap 1/2 C water 2 T white vinegar 1 litre empty squeeze bottle with flip-top cap. Mix baking soda and liquid soap in a bowl. Dilute with water and add the vinegar. Stir the mixture with a fork until any lumps have been dissolved. Pour the liquid into the bottle. Shake well before using. Squirt on area to be cleaned. Scrub with a nylon-backed sponge. Rinse off with water. Keep cap on between uses.</p>	<p>All-Purpose Cleaner</p> <p>1 C distilled water 1/2 C household vinegar 1/2 t plant-oil based soap 1/4 t essential oil</p> <p>Mix ingredients in a spray bottle, shake and spray on tiles and walls. Wipe clean with a damp sponge.</p> <p>Limescale</p> <p>Left over white wine can be used to remove lime scale.</p> <p>Around fixtures: Soak cloth in vinegar, tie around fixtures, leave overnight then scrub.</p>	<p>Drain Cleaner</p> <p>Various combinations of vinegar, bi carb soda, borax and boiling water can be used to unblock drains.</p> <p>Natural Bleach</p> <p>Hydrogen Peroxide OR</p> <p>2 cups water 3 T liquid soap 20 - 30 drop tea tree oil</p>
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1.4 Dish-washing

1.4.1 Overview

Dish washing often entails dealing with burnt vessels, food scraps, grease and stains of various kinds.

Not many of us are aware that whenever we wash dishes, we release fumes containing toxins into the air we breathe. Apart from the dangers to human health, these detergents are flushed down drains to eventually join a water source.

Using wood ash or shikakai (*Acacia concinna*) powder with coconut fiber or a rough cloth to scrub dishes seems such an old practice that most of us urban consumers have completely lost touch with it.

Dishwashers in Indian homes are not yet a common occurrence but its only a question of time before they become a standard fixture. Not only will this hugely increase the power usage and emissions of dish washing, it will also entail buying those harmful commercial cleaners for yet another home cleaning activity. Thankfully, harmless alternatives are available.

1.4.2 Toxins in Dishwashing products

Chemicals in dish washing soap can be poisonous , carcinogenic, can contribute to genetic problems and asthma, and may cause skin irritation. Yes these chemicals are diluted during washing, but they leave a residue on the dishes which can then make its way into the food we eat.

If ingested, these chemicals can pose a serious threat to us, our children and pets. Derived from petrochemicals, they persist in the environment, accumulating in rivers, lakes and aquatic species, with the potential to cause great harm. Almost none of the dish washing bars and

soaps list their contents.

Likely ingredients in your dish washing liquid are:

*Naphtha, a fuel used in camping stoves. Naphtha is a central nervous system depressant.

* DEA , MEA & TEA (di-, mono- and triethanoloamine), liver poisons and hormone disruptors.

Chlorophenylphenol, a toxic metabolic stimulant.

* Chlorine, present in nearly all dishwashing detergents.

Other common dish washing ingredients include formaldehyde (a naturally occurring chemical, carcinogenic in larger quantities), ammonia, alkyl phenol ethanol, coal tar dyes, triclosan (human and environmental toxin, suspected endocrine disruptor), phosphates, and SLS/SLES (corrosive, irritant, aquatic toxin).

1.4.3 Safer Alternatives

Truly earth friendly dish washing liquids are gradually appearing in retail stores. However earth friendly options have always been available in India... With Soapnut, shikakai and coconut coir, we Indians have always had our dish washing needs taken care of. Natural, biodegradable and regionally produced, not to mention tried and tested!

Consider some of these ideas to reduce your dish-washing footprint:

* Once a vessel or dish has been used, remove the existing food that is stuck and soak the vessel in water or scrub it immediately and rinse it.

A lot of water is wasted if the tap is left open while you

scrub the dish so ensure that the tap is open only when you rinse the vessels. Especially for the kind of dish usage and washing practiced in Indian homes, it helps to

fit a shower like attachment to the kitchen tap to ensure washing all the parts of the dish simultaneously. This saves water significantly.

Another way to save water: Plug your sink and fill it up, using this water to wash all the dishes one by one. Drain the water, then run the tap to rinse the dishes. This will save water usage.

If you are blessed with a garden, consider washing in a bucket and using the water for your plants. You could even talk to a plumber about diverting your sink water to the garden.

Remember the detergent/washing powder you use must be plant and soil friendly for this to be viable. No chemicals!

Using baking soda as a scrub for stainless-steel pots and pans helps avoid the use of scouring pads. Baking soda is non-abrasive, so it does not scratch the pans and it gives them a nice shine.

No denying also that clean dishes are critical to our health and hygiene. However this does not in any way necessitate exposing ourselves to a whole host of dangerous chemicals that are sold as tough, powerful and effective, in the form of bright coloured liquids, synthetic citrus smelling soap bars or powders.

My grandmother reminiscing about the advent of dish washing detergent around the 1960's:

"They said it would make the plates nice and shiny and clean, but to my hands, what it did, it made them red, swollen, cracked, my fingernails as well, all in pieces pieces. Before that we used to use the ash of the cow dung and shikakai podi, and scrub, and this is the best! the best for cleaning, so clean, so shining were the plates!"

Ramamani, Prashanth Nagar

It is easy to use Shikakai and Aritha powder and coconut fibre scrub to remove grease and oil. Or Shikakai powder and ash mixed together act as good dishwasher. In water deficient areas sand can also be used as an abrasive agent to physically remove the dirt and food.

Experiential Difference

A difference in the foaming will be noticed, as natural alternatives will not bubble and froth up to the same lofty heights as standard dish washing detergent.

Shikakai and soapnut do form a soapy paste with bubbles, while baking soda will not, despite effectively cleaning stains. The citrus enzyme cleaner also will not bubble and froth but will leave you with sparkling dishes. Low foaming products also mean you will save on water.

All of the natural alternatives are likely to leave your hands feeling softer and conditioned, as opposed to itchy and dry, or even red raw as some sensitive hands turn after a dip in chemical detergent water. Shikakai in particular is a herbal treatment for skin disorders, and will leave you with happy, healthy hands.

TABLE 4 : RECIPES FOR DISH WASHING

<p>Dishwashing liquid A solution of soapnut (ritha) made by boiling a handful of soapnuts in ratio of 1:2 can be diluted and used to wash dishes. Add 2 or 3 tablespoons of vinegar to the warm, soapy water for tough jobs. Used lemon rinds can also be added to the solution.</p> <p>Alternatively use ½ cup of Citrus Enzyme Cleaner, as per recipe in Bathrooms,</p>	<p>Stain removal If food is stuck to the dishes, rub a paste of baking soda and water and allow it to sit for 30 min before wiping it down with a sponge. Salt on a damp sponge works well to clean grills and other metal trays. Or rub area to be cleaned with half a lemon dipped in borax.</p>
<p>Luffa Scrubber Soak an overripe ridge gourd (available at seed stores) in water for a couple of days . Peel of skin. Interior is full of fibre perfect for scrubbing!</p> <p>Coconut Scrubber Peel of the top fibrous portion of the copra coconut, known as kudumi in tamil, and bind together for use as a scrubber</p> <p><i>“Pull out the coir on the coconut that you buy, and use it as a scrubber for your vessels. It is the natural way, the old way; that’s what we used to do, nice and soft that becomes. Nowadays, they have turned that into plastic scrubbers! I have seen it in the US.”</i> Geeta, Bangalore</p>	<p>Brass and copper cleaner Use diluted vinegar or tamarind or lemon juice with salt.</p> <p>Silver cleaner 1t salt, one sheet of aluminum foil and 1t baking soda. Put foil at the bottom of a pan and add 3 inches of water, then add baking soda and salt. Bring to a boil and add silver items making sure that the water covers the silver and continue boiling for two minutes. Remove the silver article and rinse and dry. Empty the hot water into kitchen sink . again add foil and let items sit for a few minutes and then rinse and dry.</p> <p>Dish washing Powder 650 g powdered orange/lemon peels 200 g shikakai powdered 50 g soap nut 100 g ash Dry the fruit peels, and mix the ground ingredients, makes 1 kg dish wash powder.</p>

1.5 Floors & other surfaces

1.5.1 Introduction

Many homes have the floor mopped at least twice a day; sometimes more often if there are children or if the footfall is heavy. The strong dose of phenyl/ floor cleaning chemical used each time means we are inhaling and being exposed to potent toxins.

Do we really need such powerful anti bacterial or disinfectant activity inside our house? Apart from the direct interaction these chemical have with our bodies, what about the implications for our immune system? Will such a sterile home (or work) environment leave our bodies and immune systems well equipped for forays into the outside world? Even some natural disinfectant and anti-bacterial agents can harm our health, in particular, pine oil and citrus oils react in oxygen to create formaldehyde, so should be used with caution and only where absolutely necessary.

1.5.2 Toxins

Industrially produced Phenyl is a chemical that can be easily avoided. We use Phenyl because it removes stains, disinfects the floor, keeps insects away and may also be scented leaving a nice smell for the rest of the day. Each of these so called functions of phenyl can and should be substituted.

Some Phenyl producers claim their emulsion to be non toxic and a non irritant unlike standard Phenol. However, Phenyl does also contain phenol! Used to

emulsify pine oil, phenol itself is based on creosote oil, traditionally extracted from wood tar, today extracted from coal tar, petroleum or oil shale itself containing anti bacterial properties. Producers of Phenyl claim their product to be natural or herbal purely based on the pine oil content. Far from non toxic, phenol can irritate the skin and cause respiratory, liver and kidney damage. It is highly corrosive in a concentrated form.

It is hard to find the ingredients of many other floor cleaners. Ingredients listed for sample floor cleaning products cover a wide range of chemicals, with varying health and environmental effects.

Table 6 : RECIPES for Floor Cleaning

Many ink spots, pencil, crayon or marker spots can be cleaned from painted surfaces using baking soda applied to a damp sponge. Rub gently, then wipe and rinse.

<p>Tiles A powder made of baking soda, salt and borax could be used to scrub the tiles with a flat brush.</p> <p>You could use use mild soap in hot water to clean mosaic or spartek tiles. A regular scrub of floor with the scrub used for kitchen vessels followed by flat brush is very effective.</p>	<p>Wooden Floor Apply a thin coat of 1:1 vegetable oil and vinegar and rub in well.</p> <p>Most floor surfaces can be easily cleaned using a solution of vinegar and water. For damp-mopping wood floors: mix equal amounts of white distilled vinegar and water. Add 15 drops of pure peppermint oil; shake to mix.</p>	<p>Bathroom floor To clean tiles you could use a scrub made of dried crushed lemon peel and tamarind to remove lime deposits. White vinegar could also be used. Kaveri dadphale (Indian express 28/3/2000)</p> <p>For a dirty grimy floor pour hot solution of washing soda over the floor and soak for a while then scrub to wash all the dirt. Several scrubbing sessions may be need to remove old dirt and then you need to maintain the floor by regular cleaning.</p>
<p>Stickers on walls/doors To remove, sponge vinegar over the stickers several times, and wait 15 minutes, then rub off the stickers. This also works well for price tags (stickers) on tools.</p>	<p>Lemon Floor Cleaner 1 liter water 3/4 C olive oil 1/2 C rubbing alcohol 1/2 C lemon juice Combine all ingredients in a bucket and mop the floor as usual.</p>	<p>Drain Cleaner Use ¼ C baking soda and chase it with ½ C vinegar. When the fizzing stops, flush it with boiling water (provided the drain cover and pipe is metal. Do not use boiling water for plastic).</p>

1.6 Glass & Window Cleaning

1.6.1 Overview

Look around and you will notice the rapidly growing trend to include glass in so many different aspects of our lives. Homes, offices, restaurants, shops – most buildings these days are heavily glazed; ostensibly to increase the amount of daylight, but the glass is often tinted or mirrored, thereby reducing the light! What's more, such heavily glazed buildings become energy hogs. Glass is also increasingly used for furniture. And then the undeniably large number of cars on the road today once again translates to the use of glass in large volumes.

1.6.2 Toxins in Glass & Window cleaners

By far, the main ingredient in glass cleaner is water, which is an inert substance. However, it's the active chemicals in glass cleaner that give it its actual cleaning power. Glass and window cleaners are typically administered in a spray bottle and there lies their particular danger. The spraying application of these cleaners means that these active ingredients, including toxins, are spread over a wide area, dispersed into the air we breathe. The main active ingredients are listed below:

☞ Detergents in glass cleaners work with ammonia (an irritant, linked to kidney, liver, and respiratory system damage) to actually clean glass, while alcohols act as solvents to break up dirt and debris on glass.

* Coal tar dyes (known allergen linked to hyperactivity in children), now derived from petroleum products, give

glass cleaners their various colours – blue, yellow or even pink!

Some cleaners also contain wax.

Volatile Organic Compounds (VOCs, known poisonous irritants) like isopropyl alcohol give glass cleaners their fragrance/smell.

1.6.3 Safer Alternatives

- Invest in a good spray bottle and squeegee (a T shaped cleaner with a rubber edge used to wipe water across glass surfaces), microfiber cloths are also very useful

- Initially, add a half teaspoon of natural liquid soap to the homemade window cleaners. This will help cut the wax left behind from the use of commercial window cleaners.

- Apply the spray, scrub the window with the squeegee scrubber and then squeegee the liquid over and down to a single corner.

- Use a lint-free cloth to polish streaks away. Using newspaper is another effective way to clean glass and mirrors. However, some people prefer to avoid it as it makes the newspaper non-recyclable.

- Clean windows on a cloudy day. Window cleaner dries too quickly on sunny days and leaves streaks.

* Once you remove wax, all you need to use is microfiber cloths-one wet, the other dry - to keep your glass/mirrors clean!

Table 7 : RECIPES for Glass Cleaning

<p>Screen & Window Cleaner Use a 1:1 vinegar and water solution and pour it into a reusable spray bottle. Lemon juice can be substituted for vinegar for those who don't like the smell of vinegar.</p> <p>For window cleaning, the use of essential oils will leave behind a pleasant scent and help mask the strong vinegar odour. Simply add 1-2 drops of any chosen oil into your cleansing mixture and mix well. Use lemon or peppermint oil for a refreshing fragrance or</p>	<p>Eyeglass Cleaner A microfiber eyeglass cloth and plain water does an excellent streak-free job and eliminates the need for any chemical cleaners.</p> <p>Mirror Cleaner 1C strong black tea cooled 3T vinegar Put tea and vinegar in spray bottle and use to clean mirrors</p>	<p>Another Window Cleaner</p> <p>Juice of 1 lemon 2 cups club soda 1/2 t. peppermint essential oil (optional) 1 t. cornstarch Spray bottle Paper towel</p> <p>Pour the lemon juice to an empty spray bottle. Then add the corn starch, essential oil and club soda to the spray bottle and shake well. Spray the window with the solution and wipe with a lint free cloth.</p> <p>Water can replace club soda.</p>
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1.7 Electric & Electronic Home Appliances

Cleaning and maintenance of our specialised home appliances is not necessarily complicated. However, as with all household cleaners, the commercially available appliance cleaners are likely to contain surfactants, builders, solvents, antimicrobials and miscellaneous ingredients including abrasives, fragrances, dyes, thickeners and preservatives.

Many of the alternative products already listed may be useful for cleaning home appliances, but it is important to first test them on the particular appliance with caution.

* For electronic appliances, wipe gently in one direction and use a soft, lint-free cloth with as little moisture as possible. Be sure to unplug the device and let it cool before cleaning.

☑ Wipe down stainless steel appliances with a soft cloth and warm water, and dry with a soft cloth to prevent water spots.

☑ Keep a bottle of vinegar handy. This can be used to descale kettles and flasks and can then be reused to clean glass jars or bottles/ hard water stains/ mirrors and other such surfaces

Table8: Recipes for Appliance Cleaning

<p>Oven Cleaner 1 C baking soda Water 1-2 squirts of liquid detergent Sprinkle water generously over the bottom of the oven, then cover the grime with enough baking soda. Sprinkle some more water. Let the mixture set overnight. The grease can easily be wiped the next morning. Now dab some liquid detergent on a sponge, and wipe the oven.</p>	<p>Stainless steel appliance cleaner 1 T olive oil 1 T white vinegar Drip olive oil on a soft cloth. Rub the appliance surface to clean. Drip white vinegar on the other side of rag. Wipe and let dry.</p>	<p>Kettle Fill the kettle with 1:1 white distilled vinegar and water and boil. Let it sit overnight. Boil again with same solution. (This liquid can be used to clean the toilets or sink). Now boil twice more with plain water to rinse clean. Leave the kettle open till the smell of vinegar disappears.</p>
<p>Washing Machine 1 litre vinegar 50gm citric acid. (for a 6-7kg washing machine) . Add citric acid crystals to the detergent dispenser and vinegar directly in the drum. Run the machine on regular cycle (empty) at 40C. Repeat every 2-3 months. Or a simple vinegar run, will clean dish washers also.</p>	<p>Microwave 1/2 C white vinegar 1/2 C water Mix in a microwave-safe bowl. Bring it to a rolling boil inside the microwave. Baked-on food will be loosened, and odours will disappear. Wipe clean. Or Add a few lemon slices to a cup of water and run the microwave for 3 min. Let the water sit inside for 3 more minutes. Wipe down the walls with a soapy cloth.</p>	<p>Refrigerator Remove the smell of spoiled food from a refrigerator by first rinsing the area with soap solution and water. Spray surface with white distilled vinegar and wipe with a damp cloth or sponge. Fill some containers with baking soda and place inside. Clean the shelves and walls of the refrigerator with a half-and-half solution of water and white distilled vinegar. The dust on the top of the refrigerator can be cleaned with a cloth dipped in vinegar.</p>
	<p>General Appliance Cleaner Mix 1 t borax, 3 T vinegar and 2 C hot water in a spray bottle. Spray on appliance and wipe with soft cloth or sponge.</p>	<p>Mixer/Blender Add 1/2 C of warm water and a few drops of soapnut solution and run the mixer/ blender. Rinse well with warm water to give it a thorough clean.</p>

1.8 Carpets & Upholstery

1.8.1 Introduction

The carpet industry in India has a long history with hand woven cotton and woollen carpets forming the mainstay of the traditional Indian carpet industry. In recent times this is being replaced with synthetic, polyester based carpets.

1.8.2 Toxins

Synthetic carpets contain toluene, benzene, formaldehyde, ethyl benzene, styrene, acetone and a host of harmful chemicals that are known carcinogens and produce foetal abnormalities in test animals.

In most of the synthetic carpets, the backing or padding is usually made of vinyl or synthetic latex. Padding can also contain Poly Vinyl Chloride, urethane, and other such materials. These chemicals may also cause hallucinations, nerve damage and respiratory illness in humans. 4-PC, the chemical that gives carpets their distinctive "new carpet smell", is associated with eye, nose and upper respiratory problems.

What's more, synthetic carpets cannot be recycled like those made of natural materials. They have to be burnt or buried to be disposed, thus causing further damage to the environment.

In addition, all carpets attract dirt, dust mites and other allergy causing organisms.

1.8.3 Safer alternatives

In tropical climate where heat and dust are twin problems- cotton dhurries and chattais have been traditionally used. They can be maintained by simply washing and drying. There is no need to use carpet cleaners or other possibly harmful chemical.

Also India has a rich tradition of weaving carpets and chattai using locally available material like sisal, screwpine, banana, palm and other natural fibres. In Tirunelveli district of TamilNadu a kind of grass known as korai is used to make mats called "pai " which feels cool when you lie on it. Up North, the traditional grass mats of Jammu and Kashmir known as 'Wagive', were also popular at one time. These grass mats are mainly of two types, the rugged ones made of twisted paddy grass and the soft and spongy ones made of typical grasses growing in wetland and lakes of the Valley.

The problem of cleaning the thick woollen, polyester based carpets can be solved by physical removal of dirt by beating with a stick or vacuum cleaning and then putting it in the sun

Here are a few safe and easy cleaning recipes that one could possibly use. For any of these or other cleaning options, it is recommended that you always test on an out-of-sight part of the carpet first.

Table 9: Carpet cleaning Recipes

<p>Basic cleaning Wash the carpet with a solution of 1 cup white vinegar in 1 bucket of warm water. Scrub using a brush or a broom and then rinse off.</p> <p>For a heavy duty carpet cleaner, mix ¼ C each of salt, borax and vinegar. Rub paste into carpet and leave for a few hours. Vacuum or use a hard bristle brush to clean.</p>
<p>Stain removal Make a paste of 2T white vinegar and ¼ C salt or baking soda. Rub into the carpet stain and let dry. Vacuum the residue the next day. Mix equal parts white vinegar and water in a spray bottle. Spray directly on stain, let sit for several minutes, and clean with a brush or sponge using warm soapy water.</p>
<p>Carpet freshener 6 cups baking soda 3 cups dried rosemary (or see list of alternatives below) 1 cup cornstarch Mix well and store in an airtight plastic container. Set aside for a couple days before using. Sprinkle generously and let sit for 1 hour before cleaning. * Alternatives: Cloves & Cinnamon; or Lavender & Rosemary or Dried Mint Leave or Eucalyptus Crush the herbs or flowers up a bit first before adding to the mix. Instead of using dried herbs, you can substitute with essential oils, experiment with amounts for best results. Make sure to mix it in thoroughly and let sit for a few days before using.</p>

1.9 Air Freshener, odour removal & insect repellent

1.9.1 Introduction

In the past, we used incense sticks and dhoop to 'freshen' the air around us. Today, commercial air fresheners in aerosol cans have found their way in almost every possible space – be it our homes, offices, vehicles, public toilets.

And while we may assume that repeated spraying of the freshener helps to clean the air, we need to clearly understand that commercial air fresheners rarely, if ever, actually break down the offensive odour. They usually act by:

- 1) killing our ability to smell by way of a nerve-deadening chemical
- 2) coating our nasal passages with an undetectable oily film
- 3) masking one smell with another

So the next time, instead of covering up a musty smell or mildew with an air freshener, we should remember to deal with the actual problem. Mold can cause a variety of respiratory problems, including coughing, wheezing, congestion, and recurring infections and therefore need to be attended to immediately.

1.9.2 Toxins

Most synthetic air fresheners typically emit significant amounts of terpene, a volatile organic compound that can react with naturally occurring ozone to create formaldehyde (a colorless, flammable, strong-smelling chemical that is known to be a human carcinogen). Ozone, a form of oxygen, exists at some level both

indoors and outdoors, so formaldehyde formation is practically inevitable wherever synthetic air fresheners are used. Indoor environments which may have elevated levels of ozone include those where photocopiers and ozone-generating air purifiers are used.

Phthalates are chemicals that are used to prolong the length of time that scented products maintain their fragrance. Regular exposure to phthalates can increase your risk of experiencing endocrine, reproductive, and developmental problems. The common mothball is made of para dichlorobenzene, which is harmful to liver and kidneys.

Insect repellents often come with big warnings of toxic and poison. Depending on the product different strengths of strong pesticides are used. Many come with instructions to use outdoors only, which should always be followed, as well as the suggested amounts used. If you do not want to use such poisons, no fear, there are a number of ways to keep your home bug free.

1.9.3 Safer alternatives

Perhaps the most effective, simplest and safest way to freshen the air and get rid of an unpleasant odour would be to open a window to ventilate the room with fresh air (yes, this works the best, despite the widespread atmospheric pollution in our cities!) rather than create closed spaces and then spray artificial chemical fresheners.

On other occasions, merely identifying and removing the

source of the foul odour (for instance, spoiled food, soiled clothes) and disposing of it carefully could be the solution.

There are also plenty of safe alternatives that one can employ instead of resorting to harmful commercial air fresheners. Here are a few suggestions:

☒ Baking soda or vinegar with lemon juice in small dishes absorbs odors around the house, including the bathroom. Camphor bits in a shallow bowl of water may also be used similarly.

☒ Fill jars with baking soda, and a couple drops of your preferred essential oil. Cover the jar with a piece of paper, seal with a ribbon. Poke a few holes into the paper lid with scissors to allow the air flow through. This will absorb odors and act as an air freshener.

☒ Keeping house plants also helps reduce indoor odors. A study by a group based in New Delhi has clearly indicated the positive impact of select house-plants on the quality of indoor air. The areca palm, mother-in-law's tongue and money plants are 3 key plants that if grown in adequate numbers can provide all the oxygen needed by us.

☒ Simmering vinegar (1 T in 1 C water) while cooking helps to prevent cooking odors.

☒ Wiping cutting boards and utensils with vinegar /lemon peel and washing with a soapy solution helps to get rid of the strong smell of fish or onions.

☒ Simmering water and cinnamon or other spices on stove builds a pleasant fragrance. Bowls of fragrant dried herbs

and flowers (pot pourri) in bedrooms/bathrooms spreads a nice odour.

☑Homemade moth-repelling sachets can also be made with rosemary, vetiver and rose petals or other fragrant herbs/flowers

Dried lemon peels are also a natural moth deterrent - simply toss in clothes shelf, or tie in muslin pouch and hang in the wardrobe. Half a stick of vanilla tossed in the wardrobe does the same trick.

☑Essential oils are another simple and highly effective way to freshen the air. These oils are liquids formed from the distillation of the leaves, stems, or flowers of a plant. They are very concentrated, so even just a few drops go a long way. Some essential oils also have natural anti-bacterial and disinfectant properties. However do make sure that the oils you use do not come from over-harvested sources.

Particular essential oils will repel insects, including citronella, lemongrass, thyme, catnip, eucalyptus and tea tree, which are particularly effective for mosquitos. Basil and oregano can be useful to keep away spiders. Mints, Citrons and Clove will keep away flies. Peppermint can help deter ants.

Others have properties useful to housecleaning:
Lavender is anti bacterial, anti viral, antiseptic and anti

fungal. Lemon cuts through grease and grime. Peppermint is antiseptic and invigorating. Orange is antiseptic, antibacterial and antifungal. Tea tree is incredibly useful, with anti septic, anti bacterial, anti fungal, anti microbial and insecticidal properties.

Vinegar removes the smell of the trail of ants, so will confuse and reduce your ant numbers. A vinegar spray on surfaces should also keep spiders and other bugs at bay.

Lemon or orange peel rubbed over surfaces is another method to deter spiders

Garlic, pepper and chilli will deter many insects as well as rodents.

Cucumber slices placed near where ants are crawling into your house will confuse them!

Voices for Green Choices

2.0 Personal Care

This chapter is only a brief attempt at capturing the effects of harmful ingredients in personal care products and cosmetics. As the nature of this category (Personal Care) is extremely complex and involves a wide range of products an additional in-depth study is required; However, that is beyond the scope of this initiative

2.1 Introduction

A report by Toxics Link observes that with the growing consciousness about beauty, the use of cosmetics has increased and the markets are flooded with various brands of beauty products. The Environmental Working Group estimates the average number of cosmetics or personal care products used by us daily as nearly 10! There are some who even coined the lipstick-index theory during the 2001 recession – believers of the theory say that people buy lipstick even in times of crisis considering it an affordable indulgence! Spending on personal care is thus hardly ever compromised on.

Indeed it is so closely linked to the history of mankind that the origin of several cosmetics today can be traced back to early human civilisations. However the introduction of preservatives, toxic ingredients and other additives has meant that the harmful impact of these cosmetics often outweigh their perceived benefits.

Human skin is extremely permeable and cosmetic ingredients are absorbed through the skin. Some chemicals enter the skin and build up to significant amounts over a period of time. As consumers who opt to use cosmetics and personal care products, we can choose safer alternatives and avoid those that contain harmful ingredients.

The range of health hazards posed by these products include irritation, allergic reactions, and sensitization. Irritation typically involves localised inflammation and can be controlled by stopping use of the product. Allergic reactions and sensitization however affect the immune system and are not limited to localised symptoms. The reactions may persist for several days after the use of the product.

EYE & SKIN CARE

Fragrances and preservatives used in cosmetics are usually the cause of allergic reactions and health hazard. Harmful impacts of fragrances include red skin, watery eyes, nausea, lethargy, irritability and inability to concentrate.

Chemicals used in fragrances include toluene, methylene chloride, ethyl alcohol, benzyl chloride. Some of the preservatives causing allergies or irritation release low levels of formaldehyde, which is not just an irritant but a

The warnings carried by the products about the impact of certain ingredients have little or no meaning as they come with caveats of prescribed conditions of use and directions. Often, therefore, while we may suffer from allergies, irritation or other discomfort while using certain products, we treat it as an inevitable part of personal care.

carcinogen and neurotoxin too. Other preservatives such as parabens, methylisothiazolinone may not contain formaldehyde but can cause equally serious reactions.

None of these however are mandated by law to be listed on the product label.

Cosmetics that contain natural oils or fragrances may cause irritation or allergic reactions in some individuals. But the likelihood and severity of such reactions is certainly less than that with synthetic fragrances.

Gentler preservatives to look out for include

- Potassium sorbate, Sorbic acid, Vitamin C (Ascorbic acid), Vitamin A (retinol), Tocopherol (Vitamin E) and Grapefruit seed extract.

HAIR CARE

Shampoos usually cause a high degree of scalp irritation, burning eyes and contain synthetic detergents for cleaning the scalp. Often these chemicals are so strong that they strip the natural oil of the skin/hair.

Shampoos containing coal tar, formaldehyde, propylene glycol, quaternium 15, EDTA, Selenium sulfide as ingredients are best avoided.

Common cleansing ingredients in shampoos are Lauryl or laureth compounds. The Lauryl compounds are more aggressive while the latter though milder can contain

1,4-dioxane, a known carcinogen. It is best to choose the mildest cleansing agents. It is also suggested to look out for ingredients ending with 'eth', since this implies the 'ethoxylation' process that has 1,4 dioxane as a byproduct. Another chemical to avoid is polyethylene glycol (often listed as PEG in labels) . It is also ethoxylated and a carcinogen. Instead, look for products that have 'glucose'/'glucosade' in them.

Polysorbates are emulsifiers that bind oil and water together and are used to infuse fragrance in shampoos and conditioners. It reacts with the scalp, alters the pH balance on the surface of the skin. Products that list this are also on the 'avoidable' list.

Amodimethicone is the silicone-based polymer responsible for the feeling of 'silky smoothness' that you can identify with usage of conditioners. The trouble with this ingredient is that it does not allow anything to breathe. It seals the moisture and does not allow the scalp to breathe, eventually leading to thinning of hair. Jojoba oil, rose hip, olive oil, shea butter are all viable alternatives.

Nirmala has used soap nut boiled in water as a shampoo all her life, followed up with ground hibiscus paste as conditioner. The effect of this has been that over the years, she has had very healthy hair. She has used the same hair care system for her daughter through her growing up years. Despite shampoo usage over the last 10 odd years for the sake of convenience, both of them have been benefitting from the natural care their hair has received earlier

For many years, fragrances were produced using herbs, flowers and animals. Over time though, scarcity of these resources coupled with development of new technology meant that synthetic fragrances were used in cosmetics.

This meant new fragrances of course but a whole host of respiratory and skin ailments too.

if you are allergic or sensitive to cosmetics, the first and simplest step would be to avoid those that contain fragrances.

Table 10: Recipes for Safe Personal Care

<p>Natural shampoo: Grind dried shikakai (Acacia concinna), reetha (Sapindus mukorossi) and amla (Indian gooseberry) to fine powder. For every wash, soak the powder for 15-20minutes in a cup of warm water. Strain it and use the water as shampoo.</p>	<p>Natural Conditioner Lemon or lime juice alone acts as a natural conditioner. The juice of 1 lemon in a cup of warm water is enough to give your hair a lustrous shine. Diluted vinegar is also a good conditioner for oily hair.</p> <p>Soak fenugreek (methi) seeds and grind to a fine paste- it makes the hair soft and supple. Methi also removes body heat. hibiscus (Shoe-flower) leaves can also be ground to a fine paste and used as conditioner.</p>	<p>Dandruff shampoo: Rub a handful of dry baking soda (sodium bicarbonate) vigorously into wet hair, and massage into scalp. Rinse thoroughly. After a few weeks, old dandruff scales will disappear. The scalp will begin to generate its natural oils and hair will become soft.</p>
<p>Hair strengthener</p> <p>Use almond oil to treat dry and damaged hair. It is a very simple procedure, pour some almond oil in a bowl and heat it for 40 seconds. Then evenly distribute on your hair. Leave it for 30 minutes and then rinse normally with shampoo and conditioner using cold water.</p>	<p>Sun-damaged hair treatment</p> <p>Make a mixture of ½ cup honey, 1-2 tbsp olive oil and 1-2 tbsp of egg yolk. Apply this mixture on your hair for 20 minutes and then rinse with warm water. This treatment will help to replenish keratin protein bonds</p>	<p>Naturally shiny hair</p> <p>After the final rinse, apply 1 tsbp lemon juice to your hair. Simply towel dry your hair and style as normal to get rid of dry hair.</p>

<p>Cleanser: Grind some barley and mix it with 2 teaspoons lemon (or lime) juice and a little fresh milk. Use this as a face-mask. Apart from giving your face a deep cleanse, this mixture can also help to improve blood circulation. Or gently dab fresh (unboiled) milk on your face with the help of cotton wool. Allow it to dry and then wash.</p>	<p>Skin exfoliator Squeeze the juice of 1/2 a lime into a cup of warm water. Dip a soft cloth into the mixture, squeeze out excess water and cover face with the warm cloth for several minutes. Remove towel and rinse face with warm water. Using a fresh soft cloth, rub your skin gently. This will help to remove the flaky top layer of the skin and produce a clean complexion. Apply a thin layer of oil to soothe the skin.</p>	<p>Deep pore cleanser: Blanch some almonds and slide the brown covering off the nuts and place them on some absorbent toweling (overnight toweling is the best) till they are completely dry. Grind it to a fine powder. Whenever you want to scrub your face, just wet your hands and face and rub the powder. Rinse carefully after that.</p>
	<p>Natural Tooth powder Mix 3 T baking soda with 2 T salt. Use it as you would any commercial tooth powder. This recipe can even remove nicotine stains from your teeth. (You can also add ground orange and lemon peel to the mixture to whiten teeth).</p>	<p>Foot scrub</p> <ul style="list-style-type: none"> <input type="checkbox"/> 1 C brown sugar <input type="checkbox"/> 1/2 C olive oil (or other carrier oil) <input type="checkbox"/> 1 t vitamin E oil <input type="checkbox"/> A few drops of your favorite essential oil <p>Combine brown sugar and olive oil Add vitamin E. Mix in a few drops of your favourite essential oil (grapefruit or peppermint are favourites in this recipe)</p>

Table 11: Dirty Dozen Table (ref:dauidsuzuki.org)

In a 2010 study by the David Suzuki Foundation, the following ingredients (referred to as the Dirty Dozen) were surveyed in personal care products and cosmetics. Though the study was limited to Canada, the information is useful for urban Indian consumers who today opt for easily available domestic and imported cosmetic brands and personal care products. While there are several other ingredients too that are harmful, consumers would do well to start with avoiding these when choosing cosmetics and personal care products.

1. BHA and BHT	Used mainly in moisturizers and makeup as preservatives.	Suspected endocrine disruptors and may cause cancer (BHA). Harmful to fish and other wildlife.
2. Coal tar dyes: p-phenylenediamine and colours listed as "CI" followed by a five digit number		Potential to cause cancer and may be contaminated with heavy metals toxic to the brain
3. DEA-related ingredients	Used in creamy and foaming products, such as moisturizers and shampoos.	Can react to form nitrosamines, which may cause cancer. Harmful to fish and other wildlife. Look also for related chemicals MEA and TEA.
4. Dibutyl phthalate	Used as a plasticizer in some nail care products.	Suspected endocrine disrupter and reproductive toxicant. Harmful to fish and other wildlife.
5. Formaldehyde-releasing preservatives Look for DMDM hydantoin, diazolidinyl urea, imidazolidinyl urea, methenamine and quarternium-15.	Used in a variety of cosmetics.	Slowly release small amounts of formaldehyde, which causes cancer.
6. Parabens	Used in a variety of cosmetics as preservatives.	Suspected endocrine disruptors and may interfere with male reproductive functions
7. Parfum (a.k.a. fragrance) Any mixture of fragrance ingredients	used in a variety of cosmetics — even in some products marketed as "unscented."	Some fragrance ingredients can trigger allergies and asthma. Some linked to cancer and neurotoxicity. Some harmful to fish and other wildlife.

<p>8. PEG compounds</p>	<p>Used in many cosmetic cream bases.</p>	<p>Can be contaminated with 1,4-dioxane, which may cause cancer. Also for related chemical propylene glycol and other ingredients with the letters "eth" (e.g., polyethylene glycol)</p>
<p>9. Petrolatum</p>	<p>Used in some hair products for shine and as a moisture barrier in some lip balms, lip sticks and moisturizers.</p>	<p>A petroleum product that can be contaminated with polycyclic aromatic hydrocarbons, which may cause cancer.</p>
<p>10. Siloxanes Look for ingredients ending in "-siloxane" or "-methicone."</p>	<p>Used in a variety of cosmetics to soften, smooth and moisten.</p>	<p>Suspected endocrine disrupter and reproductive toxicant (cyclotetrasiloxane). Harmful to fish and other wildlife.</p>
<p>11. Sodium laureth sulfate Look also for related chemical sodium lauryl sulfate and other ingredients with the letters "eth" (e.g., sodium laureth sulfate).</p>	<p>Used in foaming cosmetics, such as shampoos, cleansers and bubble bath.</p>	<p>Can be contaminated with 1,4-dioxane, which may cause cancer.</p>
<p>12. Triclosan</p>	<p>Used in antibacterial cosmetics, such as toothpastes, cleansers and antiperspirants.</p>	<p>Suspected endocrine disrupter and may contribute to antibiotic resistance in bacteria. Harmful to fish and other wildlife</p>

3.0 Children

3.1 Introduction

Higher disposable incomes, smaller family sizes and other changing factors of the average urban Indian means that children are no longer regarded as just children; but also as key decision-influencers in the family. They are said to determine family buying behaviour not just of children's products, but also household products.

With early and excessive exposure to varied forms of technology and media, most children aged 4-14 years in urban India are familiar with different brands, products and associated features. Companies and marketing agencies therefore target their campaigns specifically to address the 'needs' and perceived needs of these children.

This growing trend does not merely raise issues related to the ethics of marketing to children but also issues concerning the nature and type of products for children and their impact.

The presence of synthetic materials in almost all children's products today (right from teethingers, diapers, water bottles, shampoo bottles to toys and food containers) means that children are exposed to toxins at every stage. In addition, there are a whole host of products that we use in our everyday lives such as household cleaners, air fresheners, mosquito repellents,

canned food, paints and other varnishes that add to the list of toxins in the child's environment.

This section includes simple, practical and safer alternatives, in an attempt to help parents and caregivers make better, informed choices.

Toys

India has the world's 8th largest toy market^{iv} and the sheer range of toys on the shelves today often attract parents as much as it does the children. Unfortunately though, a large percentage of these toys are the use and throw variety and are made of highly toxic materials including phthalates, lead and cadmium among others.

The most commonly found plastic in children's products are Poly vinyl chloride (PVC) and phthalates.

Poly Vinyl Chloride is an oft-used plastic due to its low production cost.

Phthalates or phthalate esters are organic chemicals commonly used as plasticizers to make plastic soft. Phthalates can damage the male reproductive system, impair the lungs and affect the duration of pregnancy. Animal studies have shown phthalates cross the placenta barrier and can also reach babies through breastfeeding. Children under 3 years are more likely to be exposed to phthalates because they tend to chew and suck on plastic toys.

Nothing seems to be spared from the presence of toxins – be it the food that infants are fed, the toys they play with, children's personal care products and other such products. Often, the impact of these toxins is long-term and cumulative;

A temporary ban by the Indian Government on Chinese toys (in response to high levels of toxins) in 2009 did little to change the situation as cheap Indian toys are also made of the same harmful materials. In the absence of any domestic regulations and standards, these toys continue to thrive. It is estimated that almost 90% of producers in India's domestic toy industry are beyond government control, belonging to its unorganised sector where standards are self-regulatory. Only those who export toys need to register with the Bureau of Indian Standards!

Thus, Indian manufactured toys do not carry details of constituent material on their labels – making it difficult to glean what goes into the production of these toys.

Food

The number of cases of childhood obesity and juvenile diabetes in urban India has definitely increased in the last few years. According to many, this is due to the sedentary lifestyle that urban middle-class Indian children lead these days.

A study of 4,000 Indian children in 15 cities published in August last year indicated that almost a quarter of 5- to 14-year olds in urban schools were overweight, while nearly 11 percent were obese. The diabetes portal of India in turn reports that Diabetes kills 12000 children in India every year. Fast food consumption is an emerging trend among the younger generation. The ready availability, taste, low cost, marketing strategies and peer pressure make them popular with children and

adolescents. That the Indian Association of Pediatrics has formed a “national task force on childhood prevention of adult chronic diseases”, is another indicator of the gravity of the situation. A study by the Centre for Science and Environment on the various junk foods that we like to indulge in, clearly indicates the risk we take in doing so. The high content of salt, sugar, fats and trans fats in these foods are a definite recipe for ill-health and reduced strength of our immune system.

What we need is not merely food alternatives; rather, a healthier, safer lifestyle that also addresses physical activity, reduced medication, and other related aspects of our lives.

Children's Personal Care

Shampoos, soaps, talcum powder, moisturisers – when buying any of these for children, most of us look for 'children's brands', in the belief that they are safe for children. Little do we realise what they actually contain.

Take for instance the recent case of a flagship baby shampoo to remove a cancer-causing chemical

<http://safecosmetics.org/article.php?id=888>

The formaldehyde-releasing chemical preservative quaternium-15 and 1,4-dioxane—both known carcinogens - are used, but not listed on the label of this shampoo. While the company does make and sell formulations without these toxic ingredients, these are not easily available to the average urban Indian consumer. What's more – this is a brand, recognised the world over as a preferred brand for children's products

(especially infants). Following tremendous pressure from health and environment groups, the company is now said to have committed to reformulate its products with safer alternatives to formaldehyde-releasing preservatives by 2015.

Diapers

Regarded today as a convenient and hygienic option, disposable diapers are now the norm for new-borns and toddlers, across urban Indian homes. For a start it is important to recognise that cloth diapers are the safest option for infants and despite the additional washloads it entails, it is still a more environmentally friendly option. It is also true that cloth diapers these days are much better designed and are just as convenient as disposable ones.

Disposable diapers contain traces of Dioxin, an extremely toxic by-product of the paper-bleaching process. Dioxins form in the wood pulp when it is bleached from brown to white before use in the diaper. The use of chlorine in the bleaching process creates dioxins. Chlorine-free processes are available but this is rarely used for diapers. Diapers also contain known toxins such as tributyl-tin and sodium polyacrylate.

Disposable diapers release Volatile Organic Compounds (VOCs) such as toluene, ethylbenzene, xylene and dipentene. Studies have also been done to show that the chemical emissions from disposable diapers can cause respiratory problems in children.

In addition, diapers are one of the most environment-polluting commodities that end up in the landfill. There is no proven data to indicate the time taken to decompose, but it could be anywhere between 250-500 years!

Other

There are a whole range of household products that may contain toxins which children are especially vulnerable to. These include (but are not restricted to) Paints, Wood preservatives, Cleaners Disinfectants, Pest Control solutions and even Jewellery.

Lead components of costume jewellery are often covered with a protective or decorative coating, but such coatings may be readily removed when the item is sucked or chewed. Young children have a natural habit of putting items into their mouths and lead has a sweetish taste, which encourages children to chew or suck lead-containing jewellery even more.

It is suggested that one looks for safer alternatives to ensure that children are not subject to slow invisible poisoning that only shows up when it is too late to remedy.

Table 12: Toxins in Children's Products

Lead	As stabiliser in PVC toys. As pigment in paints used in the house In children's trinkets and artificial jewellery	Lead is a Neurotoxin. It has both short-term and long-term impact. Its effect is cumulative in nature. It affects blood pressure, kidneys and can even cause There is no 'safe' level of lead for the human body – it is toxic even in minimal amounts particularly to children and pregnant women.
Cadmium	As stabiliser in PVC toys	A Nephrotoxin. Causes kidney damage and is linked to cancer. Leaches out and ingested through chewing or sucking on toys or even through particle dust.
Phthalates	As plasticizers added to polyvinyl chloride (PVC) products - such as teethers, rattles, pacifiers, and bottle nipples - to impart flexibility and durability.	Wide-ranging chronic effects. Can cause liver and kidney lesions and cancer as well as reproductive abnormalities.
Bisphenol A (BPA)	Used as a plastic hardener in infant feeding bottles, water bottles, juice bottles and other plastic food containers.	Is an endocrine disruptor and even exposure in small doses can have negative effects on the brain, behaviour, and prostate gland in foetuses, infants, and young children.
Quaternium-15	A preservative used in children's shampoos that kills bacteria by releasing formaldehyde -which is a known carcinogen	A skin eye and respiratory irritant. Can cause allergies and immunotoxicity, Organ system toxicity (non-reproductive); formaldehyde-releasing preservative
1,4-dioxane (Common ingredients likely to be contaminated with 1,4-dioxane include sodium laureth sulfate, cetareth-20, PEG-100 stearate, polyethylene & other chemicals beginning with "PEG-"or ending with "eth.")	A byproduct of ethoxylation during which various chemicals are processed with ethylene oxide to make them more soluble and, in the case of personal care products, make them gentler on people.	It is known to be a skin and lung irritant. Its presence even in trace amounts is believed to be toxic to the kidneys and nervous system.

Safer Alternatives

Wooden and cloth toys have a charm of their own and there are several individuals/groups and others today promoting these toys as alternatives for children's play. Not only are they safer, they also foster open-ended imagination; unlike gaming today which is typically predetermined and structured. Some sources for such safer alternatives include:

- kreedagames.com
- Jodogyan.org
- mayaorganic.com
- redbugstore.com

With regard to children's personal care, it is best to select products with fewer ingredients and no synthetic fragrance or dyes; and try to use fewer products overall.

Minimising children's exposure to BPA (Bisphenol A) and other such toxins in everyday products involves keeping in mind a few basics:

- To begin with, the type of plastic can be identified by the number.

#3 plastics may contain lead and phthalates,

#7 plastics may contain bisphenol A.

Instead, choose plastics that are labeled #1, 2, 4, and 5 or

Replace polycarbonate water or baby bottles (and liners) with glass, porcelain or stainless steel ones. Several companies now sell BPA-free baby bottles and sipper cups.

- When possible, replace canned foods and beverages with foods and drinks that are fresh, frozen or packaged in shelf-stable boxes or glass containers. BPA leaches into canned food (and drinks) from the lining. Particularly avoid canned soup, pasta and infant formula.

- Avoid the use of plastic containers to heat food in the microwave. The plastic is more likely to release BPA when repeatedly heated at high temperatures. Opt for ceramic, glass or other microwavable dishware.

4.0 Pet Care

4.1 Introduction

The number of urban Indian homes with pets today is visibly on the rise; the reasons for this are varied – the rise of nuclear families, a perceived need for greater security, companionship, and other such. Whatever the reason, pets are often treated as an integral part of the home and utmost care and attention is paid to their food, vaccination and other needs. In many instances specialised care becomes inevitable, as a large percentage of pet-owners choose to adopt rare/imported breeds that need such care and attention to help them cope better in a foreign climate and region.

In fact, a Euromonitor research report estimates that India's pet industry is expected to grow 22 percent this year and reach 4.5 billion rupees (around \$81 million), in a nation where the per capita income is \$1,256. Dogs account for 80 percent of all pets in India, with cats and fish also popular.

The other side of this story is that, the growing numbers of pets in urban Indian homes involves relying on uninformed or poorly informed choices of commercially available pet products as a convenient option. This in turn, often translates to the unintentional introduction of toxins in our / the pet's environment. An unstated common belief typically is that imported (more expensive) pet care products in the market are better or safer. This is not always the case.

So how do we choose products for our pets? How toxic are these products? Are there safer, convenient alternatives?

4.2 Toxins in Pet Care Products

Pet Food

Traditionally, food for pets came from the home kitchen. Any meat/bones in excess/not in use were fed to domestic pets - dogs or cats. Rotis, dal, rice and vegetables also formed part of their daily diet. Perhaps a biscuit or two as an occasional treat. But hectic work schedules, paucity of time, and constricted living spaces among other factors have contributed to a greater demand for ready-made pet food in Indian cities today.

The Indian pet food market is currently expected to grow at an annual rate of 10-15 per cent. Eighty per cent of the market is occupied by dog food, followed by cat food (15 per cent).

Other segments include aquarium fish food, bird food and food for other animals. Effem India is the leader in the pet food market in India, with Pedigree, a brand for dog food. Some other popular brands are Royal Canin, Purina and Whiskas. However, 40 per cent of the market consists of imported brands.

Research done by organisations working in this area show that the commercial pet food industry is in fact

Despite there being a number of native Indian breeds, many of us are still unaware of the various breeds either due to insufficient documentation or lack of clarity with regard to standards of the breeds.

Some of the known Indian breeds include

- Caravan Hound*
- Combai*
- Chippiparai*
- Rajapalayam*
- Rampur Hound*
- Kanni*
- Mudhol Hound*
- Manjil*
- Indian Mastiff (Bulli*

built on cleaning up the remnants of the human meat packing process for those scraps which are not food-grade (i.e. not fit for human consumption). While it is commonly assumed that such meat may be rich in fat and protein, it is not the most nutritious or healthy for the pet

Nowadays, giving commercial pet-food is also commonly recommended by veterinarians for a particular health issue. The lack of any further information among pet-owners about pet-food ingredients means that this is taken to be the best possible solution. No doubt such ready made food serves as a convenient option for many pet-owners today; but the real cost and impact remains hidden.

In fact, the processing of the food to its ready-made form destroys many important nutritional components such as vitamins, amino acids and natural digestive enzymes. Some research even suggests that processed pet food can suppress the activity of a pet's immune system which can then lead to illness and premature death.

Synthetic preservatives form part of the pet food to extend the shelf life (usually up to 1 year or so).

Unfortunately this list often includes chemicals that are believed to be carcinogens such as BHA(Butylated hydroxyanisole), BHT (Butylated Hydroxytoluene), propyl gallate, propylene glycol and ethoxyquin. Claims that some of these preservatives are also found in human foods is not really a justification.

It is the cumulative effect of these preservatives/toxins that is worrisome and poses a risk to the health of pets. Reading the label of the pet food container before making a purchase and avoiding products that include these preservatives would be a good way to begin.

Ingredients in Pet Food

Several companies today have large manufacturing and

processing industries (called rendering plants) to recycle dead animals and their wastes into products known as bone meal, and animal fat. These products are sold to the companies that grow animals for meat or milk cattle, poultry, swine, sheep and put into their feed. In fact, most slaughterhouses have a privately owned rendering plant nearby. India's first rendering plants came up in 2001.peopleforanimalsindia.

Litter

When toilet training new or young pets, many owners typically use a litter box, sometimes called a sandbox, litter tray,for disposal of litter since these animals are not yet ready to go outside to relieve themselves.

"Pet waste contains bacteria that can contaminate local waterways if it washes from your lawn into storm drains. In large enough quantities, this pollution can remove oxygen from streams and rivers and contribute to algal blooms, threatening marine life."

Commercially available cat litter is typically made of calcium bentonite- a natural material that has useful absorption and adsorption qualities and finds several use for humans too. However it is good to remind ourselves that this clay is not the most environment-friendly as it is sourced from strip mining and is a non-biodegradable material. Further, the clay sediment contains carcinogenic silica dust that can coat kitty lungs.

Commercial pet food which is compressed in its solid dry form expands in the pets' stomachs and further expands on intake of water. In large breeds this leads to bloated stomach, which can also lead to a painful death. In some instances, the food also sticks to the intestines and over a period of time lead to painful blockages and cancers. The hormones in the animal byproducts survive the rendering process and this gets absorbed by the pet often leading large breeds to grow at a disproportionate rate causing muscle and hip problems.

There are safer environment and pet-friendly alternatives without added chemicals or fragrances that one could opt for. Some owners also believe that if the pet is taken out several times in the initial period, this helps in toilet-training too.

Grooming

All domesticated dogs and cats need their fur and skin groomed and checked frequently for parasites such as fleas, ticks and mange; as well as for any skin allergies, injuries wounds or lumps.

Many common pet grooming products (like personal care products for humans) contain toxins such as petroleum, parabens, propylene glycol artificial fragrances and dyes, harsh soaps and other such. Many dog-owners in fact bathe their pets using shampoos and soaps used by humans in the belief that it is more gentle on the pets' skin.

Traces of these chemicals that remain on the pet's coat can easily be transferred to family members when coming in contact with the pet. These chemicals are also toxic to the environment. The rinse water after bathing the pet goes into the ground, carrying chemical toxins into our soil. Here they could remain for very long periods of time, contaminating local water sources such as lakes and rivers.

Talcum Powder is another commonly used product in pet grooming. Animals are often dusted with talc to smell fresh and absorb oil on their fur. Talc is also a common

filler used in flea and tickpowders. Unrefined talc can contain asbestos, which is known to cause lung cancer and various respiratory diseases and inhaling talc is known to cause breathing difficulties.

Parasites

Flea and tick treatments for pets come in various forms – shampoo, powders, collars, and sprays. The chemical ingredients of these products are invariably absorbed by the animal's skin where they stay on for several weeks; so they are easily ingested and inhaled by humans in contact with the pets.

If flea medication in shampoo form is not rinsed thoroughly, any residue can be ingested by dogs and cats as they tend to lick themselves. Flea medication is also highly concentrated; when rubbing the medication onto an animal, high concentrations can be left on one spot on the dog or cat. The high level in one area then seeps into the skin and into the pet's circulatory system.

These products contain pesticide chemicals that are known carcinogens and can cause damage to the brain and nervous systems. The primary ingredients of concern in these products are from groups of chemicals called *organophosphates and carbamates*.

These chemicals act by blocking the transmission of nerve signals. Since this is a process common across insects, pets and humans, these chemicals affect humans

The truth is that the skin of pets easily absorbs harmful toxins into the bloodstream that ultimately shortens their lifespan.

Table 13: Toxins in Pet Foods

Ethoxyquin	may cause allergic skin reactions, irritation to the eyes and skin. Its manufacture and handling involves requires eye and respiratory protection.	Pet food to extend shelf-life but is a high risk preservative. Known to be a carcinogen.
BHA () BHT ()	In large doses it is believed that they can trigger tumours in animals. They tend to eat away the stomach lining of animals. Studies abroad show that they induce liver and bladder problems.	Preservative in pet food
Tetrachlorvinphos (TCVP) Belongs to the Organophosphate group of chemicals	Acts by jamming communication in nerve cells of insects. Can therefore have similar effect of being toxic to nervous system for pets and humans too. In high doses, these chemicals can cause nausea, vomiting, diarrhea, wheezing, sweating, and tearing eyes. More severe poisoning can cause muscle twitching, drooling, seizures, and death. May be a human carcinogen. Likely to be toxic to endocrine system. Long term effects on children could include cancer and Parkinson's.	Flea & tick Collars, Powders and sprays
Propoxur Belongs to N-Methyl carbamate family – closely linked to Organophosphates	Propoxur, a known carcinogen, works similarly to TCVP.	collars

and our pets too. Young children are at most risk as their nervous system is still developing so the damage can be long-lasting. Further they tend to spend a lot of time in close proximity with pets and can inhale/ ingest any residues from these harmful products.

One dog owner shared that the first time he used a no-flea shampoo for his dog, she developed high fever and ever since he has stayed away from using it. Another owner who has always had dogs at home (sometimes even 14-15 at a time!) Says she prefers to use the neem-based flea powder now available in the market.

4.3 Alternatives

Pet food

Just as important as what should be left out of an animal's diet is what should be put into it.

Fresh, whole, raw foods are vital because they provide digestive enzymes and vitamins that can be destroyed by cooking.

Flaxseed oil (available in health-food stores) is excellent for the promotion of healthy skin.

Vitamin C and B-complex vitamins are also essential for a healthy coat; and

Coconut oil, which contains caprylic acid, is excellent for combating yeast infections on the skin or in the ears.

Some owners take the time to make their own pet food using healthy, lean meats. There are also many natural pet foods available on the market today that do not contain by-products. Products without corn, wheat, soy, fillers, artificial colours and chemical preservatives should be opted for. These products may be more expensive, but will offer greater health benefits to the pet. After integrating these changes into the pet's diet, one will notice that the pet has fewer skin ailments, allergies, and digestive disorders.

For canine nutrition, food which is approximately 40% protein, 30% starch, and 30% vegetables is often suggested. Cooked ground meat such as chicken or beef for protein may be used. Fish can be used as a source of protein, but avoid fish which may be high in mercury, such as tuna. Use whole grains such as brown rice, cracked wheat, millet, and oats for a source of starch, and mild vegetables like carrots and spinach to make up the remainder of the food. Cat food should be higher in protein, and one should avoid onions, bones, and pork in cat food. Both cats and dogs will become sick if given chocolate or alcohol, so avoid adding these substances to home made pet food.

Some suggestions to be included in a pet diet

Dal/Chicken/Rice/Roti/Bread

2-3 biscuits /day

Add a pinch of turmeric to the food everyday – it acts as a guard in the gastrointestinal tract and helps to keep arthritic issues at bay

1. Simple Recipe

cups cooked oatmeal or cream of wheat

cups cooked ground beef

tbsp. plain yogurt

small apple cut or sliced into small pieces

mix together and serve. This meal can be served as breakfast lunch or dinner

In addition to all the products used directly for petcare, often other products used around the house also contribute to pet poisoning and ill-health. For instance, home cleaning products, insect repellent sprays, medications, lawn and garden products all contain varying degree of toxic ingredients that can be extremely harmful to pets.

Iodised Salt fed to pets is one of the worst possible causes for their ill-health, particularly thyroid-related disorders.

Animals are much smaller than humans, so it is no surprise that it is more difficult for their smaller organ systems to filter and eliminate toxins that are encountered in everyday life. We can help protect our pets' health, improve their quality of life, and increase their lifespan by simply taking a more holistic, all-natural approach to pet care regimen.

2. Chicken, Rice, and Vegetables

(From The Dog Menu page 116 Food Pets Die For: Shocking Facts about Pet Food 2003 Ann N. Martin)

2 cups of ground or chopped chicken, cooked
1 cup of cooked brown rice
1 cup grated carrots
cut chicken into small pieces. Run carrots through food processor. Mix chicken and rice and if there is any fat from the chicken, pour about two teaspoons over the mix. serve at room temperature.

3. Wholesome main meal recipe (Yasmin Master)

Pressure cook 400g beef kheema (lean)

Rice with carrot, pumpkin, spinach, chow-chow, Onion, garlic, and a pinch of turmeric.

Litter

Compost cat litter using sawdust

Plain sawdust is an inexpensive and safer way to dispose cat litter, while simultaneously utilising an otherwise wasted resource. After adding the first layer of sawdust, soil, or leaves, simply dump the cat's waste directly into the bin. Cover it with a one-inch layer of sawdust, soil, or leaves, and leave it alone. Repeat this process till the bin is full and make sure to aerate the litter frequently with a shovel or rake. In addition to preventing any offensive odour, this will also accelerate the composting process.

Earthworms can also be used to catalyse the process. Baking soda can also be used to control odour. After 1 year, (or 6 months if the bin is continuously aerated), the top layer can be removed and a shovel used to check the status of the compost. Most likely, by this point, the manure will have a sweet, earthy smell and loamy texture. It can be used on ornamental plants and fruit trees, but one would need to wait a few months longer before using it on vegetable crops like potatoes, carrots, or peanuts, which it would directly contact. At the end of about 18 months the cat litter would be completely ready to use on any crop.

Other safe alternatives for cat litter include unused corn cobs with baking soda, recycled newspaper, oat hulls, wheat, and alfalfa.

Grooming

It is important to do a weekly inspection through the pet's hair, which is easily achieved during a petting, or grooming session. It is always easier to treat skin conditions and parasitic infestations using natural based products, if one gets onto them earlier rather than when they become full-blown.

Bathe with neem soap or boil tulsi and neem leaves in water and bathe

Shampoo only when absolutely necessary.

Some dogs' tear ducts create a residue that collects in the hair below the corner of the eye. Pour a little coconut oil onto a cotton ball and gently use on the area to loosen and remove.

To clean ears dip a cotton swab in a 1:1 vinegar water solution and wipe the ears without inserting cotton into the ear canal. Use separate cotton swabs for each ear.

To make an effective natural insect repellent that can be applied to dogs daily, add five drops each of tea tree oil, citronella oil, rosemary oil, peppermint oil, and eucalyptus oil to one cup of water, shake it, and put it in a spray bottle. (This smells great too.) (Do not use this on cats—they are sensitive to essential oils.)

Lemon skin tonic works well to keep the pet's skin clean. Thinly slice one whole lemon and add it to half a litre of near-boiling water. Steep overnight. Sponge the solution the next day on the pet's skin and let it dry, repeating daily for severe skin problems.

Parasites

Fleas

Remove fleas from pets without poison by using a flea comb, treat the indoor environment.

Vacuum the pet's area thoroughly and wash the bedding in hot water the same day that the pet is bathed.

Vacuuming any rugs/ carpets at least weekly will eliminate flea eggs that could be hidden there.

Groom the pet regularly with a flea comb, put petroleum or plant-based jelly on the base of the comb's teeth to make the fleas stick and flick any that are found into alcohol or soapy water, or dip the whole comb.

The most important medicine for a pet-owner is Brewer's Yeast. Crush and add half a tablespoon to wet food everyday and it will reduce the flea population.

Orange peel works very well to control fleas. Sprinkle freshly grated peel all over beds, sofas, television tops, and other places where the cat sits and sleeps. One can even spray the cat's fur with it (if it allows!). Keep vacuuming it off after a day or two and putting fresh orange peel over the suspect areas. The flea population will reduce considerably. Lemon and Grapefruit peel will also work.

Salt water is another very useful rinse for cats. But keep it away from the eyes and genital areas. The salted rinse will drown the fleas.

Apply Honge oil, neem oil and coconut oil in 1:1:5 ratio to remove fleas from pets.

Neem oil can be added to pet shampoo to kill ticks and fleas. Neem oil spray on area that the pets usually use will also help.

Ticks

One could rub in pure aloe vera gel a few times a day until the ticks disappear.

Ear mites

For ear mites, mineral oil works well. Use an eyedropper and massage the outside of the ear to work it down into the canal. Repeat four to five day intervals for two weeks to get rid of new generations that may have hatched.

Worms

Dry papaya seeds in shade. Grind to a powder and give to pet at night in doses of 1 teaspoon mixed with milk

and jaggery. For 3 days continuously and repeat after 2 weeks for another 3 days. Works well against all worms except tapeworm. Papaya seeds kill larvae and adult worms so repeat dose is advised.

For tapeworm use betelnut (variety called kotte adike or sadi supari) . Pound 5-6 of these nuts and boil with 100ml milk. Once it its reduced to 50ml cool and feed to pet as a single dose every evening for 4 days continuously. Repeat dose only after 6 months. If heavily infected this may lead to vomiting of the worms but will not affect appetite or energy of the animal.

Other

Place 5 drops each of rosemary and peppermint essential oil on a cloth and place it on all furniture. Pets will not like this scent at all and the furniture will stay safe!

To stop the pet from scratching wooden furniture use lemon-scented polish! Or try rubbing citrus soap on chairs and sofas. The smell will keep the cat away.

If the cat claws the curtains or books, dab a little peppermint oil on to the fabric to warn her off!

Grow some grass in a pot in the house and outside and the cat will happily eat it to help her digestion.

Planting garlic around a rose bed will keep cats away. Similarly spraying houseplants with diluted lemon juice will keep the pet away from them.

Some plants are toxic to pets if ingested so make sure that you avoid them or keep them out of reach of your pets.

Choose pet toys made from natural materials. Many dogs end up eating small bits of their toys, so make sure that they will not ingest harmful plastics. Similarly if there are children's discarded toys lying around, make sure these are not made of harmful materials.

Use natural, organic safe pest-control methods for the home, lawn or garden.

Companies and their pet food brands

- * Nestlé - Alpo, Come 'N Get It, Mighty Dog, Chef's Blend, Fancy Feast, Friskies, Kit 'N Kaboodle, Deli-Cat, and Nestlé Purina products such as Dog Chow, Pro Plan, Beneful and Purina One
- * Colgate-Palmolive - Hill's Science Diet Pet Food
- * Del Monte - 9-Lives, Kibbles `n Bits, Cycle, Gravy Train, Nature's Recipe, and Reward
- * Procter & Gamble - Eukanuba and Iams
- * Mars - Pedigree, Advance, Cesar, Whiskas and Sheba , Kitekat, Royal Canin
- * Royal
- * Venkys

5.0 Garden

5.1 Introduction

Urban India is gradually waking up to the goodness of home gardening. And while this is good news in itself, it is critical that as an urban farmer, one is armed with adequate information on safe gardening products and processes.

The conscious urban farmer can have a manifold benefit on the natural environment by improving air quality, providing forage for bees, providing nutritious food for humans, preserving heirloom seed strains, reducing waste to landfill and lastly, acting as an inspiration to the local community; transforming inanimate homes and streets into living ecosystems.

Fertilisers, pesticides and hybrid seeds are among the most common products used by gardeners in an attempt to achieve quick results, irrespective of the overall impact. While some are aware of the toxicity of these products, others feel it is imperative for plants to grow well. Still others often believe that product labels that include words like 'bio', 'plant', are natural and safe.

The use of commercial pesticides stems from a perspective that views insects, rodents, weeds in the garden as unwanted creatures; therefore the need to use a wide range of chemicals to destroy, prevent or control their development. Such a view tends to be insular in that it fails to acknowledge the role that these creatures

play in the overall ecosystem. The indiscriminate use of synthetic pesticides to control their population causes serious damage not just to them but to the entire food chain. There are many organic, natural, safe alternatives to standard pesticides that can transform your home and garden environment into a beautiful symphony of life.

While in the short-term, synthetic fertilisers are believed to enhance the fertility of the soil and increase plant yield; over a period they cause irreparable harm to the soil through depletion of resources, to water bodies through run-off and have serious adverse effects on human health too. On the other hand, organic fertilisers improve the long term health of the garden and soil, produce more nutritious food and help recycle household organic waste.

At the core of any garden or farm lies the **seed**. Seeds today are subject to commercial fungicide treatment ostensibly for preservation. However, these synthetic fungicides have serious adverse effects on seed quality parameters like vigor and viability. So the choice and use of seeds is also an area that requires caution.

When diversity is our first defence against volatile environments, our food resiliency is at risk. Purchasing heirloom seeds, (unmodified strains passed down through generations), can do a lot to help preserve our

DDT was the first synthetic pesticide used in the country – for the control of malaria. Since then pesticide use has expanded to being used for agricultural, domestic and public health purposes today. Studies show that less than 0.1% of pesticides used for pest control fall on targeted pests. The rest dissipate into the air, soil, water and food.

treasures. Heirloom seeds are also open pollinated, i.e. the seeds produced from these plants will be fertile and viable through the future, while GMO seeds are notable for producing dead seed, requiring the purchase of seeds from each season to season from those monopolising the Genetically Modified seed industry; further cementing their economic control over our food. Preserving heirloom seeds in the form of a personal, domestic or community seed bank is a small but important task we can all fulfil.

Standard seeds are also genetically modified. When grown on a large scale, these genes can jump into natural strains, altering their genetic makeup. The use of particular GMO seeds has led to a decline in the varieties of seeds available to us, as strains are lost from knowledge and existence in favour of a few GMO trademarked strains.

6.2 Toxicity

The 1984 Bhopal Union Carbide leak and the continuing tragic effects of Endosulfan use in Kerala ought to have served as a wake-up call for understanding the magnitude of the problem in using commercial/synthetic harmful pesticides and fertilisers.

Recognising the threat it posed to human health and the environment, a global ban on the manufacture and use of endosulfan was negotiated under the Stockholm Convention on Persistent Organic Pollutants in April 2011. However the pesticide and fertiliser industry continues to thrive in our country. What's more in a recent statement, the Centre has asked the Supreme Court to allow the use of pesticide endosulfan in all States except Kerala and Karnataka.

Pesticides

India allows a large number of pesticides to be imported or manufactured, ignoring the fact that many are outdated and not useful; some even banned in several countries. As of Jan 2012, the regulatory authorities have registered 234 active ingredients as pesticides, of which 67 are banned in other countries for human health/environmental reasons.

Besides killing the target organism, pesticides have a toxic effect on non-target species and humans that can be broadly classified as Acute (immediate/short-term) and Chronic (long-term). Women and children are particularly vulnerable.

The kind of toxic effect pesticides have on humans include

being **carcinogenic** – by producing toxins that can cause normal cells to turn cancerous

producing reproductive toxins – which affects the fertility of the adults and stunts the development of the offspring.

being **mutagenic** – producing mutagens that induce changes in the genetic makeup of cells and cause abnormalities/ diseases in later generations.

being **endocrine disruptors** – affecting one or more of the several glands that constitute the endocrine system (pituitary, thyroid, adrenal, pancreas and others).

being **neurotoxic** – here the pesticide inhibits the action of cholinesterase, a natural enzyme produced by both

The Bhopal Gas tragedy was the result of a gas leak of MIC (Methyl Isocyanate). This was a key ingredient in the use of manufacture of pesticides, which is a growing industry.” Endosulfan tragedy was the result of the continued use of endosulfan for pest control in cashew plantations. However its side effects on soil, water, air and the human Central Nervous System has destroyed life in an entire district of Kerala.

insects and mammals that turns off signals sent by the nervous system. When cholinesterase is blocked, the body cannot turn off these signals, which essentially locks the nervous system in an "on" position. The greater and more frequent the exposure, the more severe and long-lasting the effects on the central nervous system and especially the sensory nerves.

Pesticide residues (especially those of organochlorine group of pesticides) undergo two processes that change their characteristics and result in long-term toxic effects on the environment and other organisms.

Bioaccumulation – this is the accumulation of the pesticides in an organism, by absorption from the surrounding environment or through food consumed. It occurs when the pesticide is only absorbed and not excreted.

Biomagnification – this is the increased concentration of a pesticide in an organism as one moves higher in the food chain. This occurs due to repeated and concentrated accumulation of the pesticide and can even cause death in an animal at the top of the food chain.

Fertilisers

The use of commercial fertilisers in India is believed to have altered the composition of the soil; in some instances rendering it unproductive by depleting it of its original nutrients. Plants take up only a small amount of the fertiliser while the rest remains in the soil as salts and makes it more saline, therefore less fertile.

In addition to the toxic effects the use of fertilisers have on the soil and plants, the production of fertilisers is in itself a harmful process. It severely pollutes the groundwater and air around the region where it is manufactured.

Most conventional chemical fertilisers used to produce heavy yields include only Nitrogen Potassium and Phosphorus. (Commercial fertilizers are usually labelled with three numbers that indicate the fertilizer's ratio of Nitrogen Phosphorus and Potassium respectively). However, providing the soil and plants with only these 3 nutrients is insufficient and does not take into account the various other needs of the plant and soil. Over time, the soil is depleted of necessary elements. This is because plants take what they can from the soil but the mineral levels gradually decline as these minerals are not being replaced.

Another problem with synthetic fertilisers is that they need to be administered in precise doses to the plant. If too much is put at a particular location, the leaves or roots get burnt.

Commercial fertilisers often run-off from the land and contaminate the ground water; also contributing to algal blooms that can be toxic for animals and humans.

Common synthetic fertilisers used in the market today include : Urea 46% N, Diammonium Phosphate (DAP) , Anhydrous Ammonia , Muriate of Potash, Zinc Sulphate – Heptahydrate/monohydrate

In the market, synthetic pesticides have a generic name (that denotes the chemical composition) and a trade name given by the manufacturer. Typically it is the trade name that we as consumers are more familiar with. Often therefore the same pesticide is produced under different names by different manufacturers; much like many of our medicines. Pesticides are used in various forms – as fumigants, wettable powder (WP), emulsifiable concentrate (EC), dust or tablets. Each of these comes with its own side effects. (Ref: Perils of Pesticides)

5.3 Alternatives

Since 1975, there is a widely accepted World Health Organisation classification of the acute toxicity level of various pesticides, based on experiments with rats for the purposes of this classification (here, the less it takes to kill, the more toxic).

Class Ia Extremely Hazardous (red triangle)

Class Ib Highly Hazardous (yellow triangle)

Class II Moderately Hazardous (blue triangle)

Class III Slightly Hazardous (green triangle)

O Hazard unlikely if used safely

It is worth noting that chemical pesticide registration does not depend on testing for all the above potential chronic impacts and does not depend on independent and long term testing before each chemical is allowed to be used (even if done, this does not incorporate possibilities of a cocktail

Rather than having to constantly inject plants and soil with doses of synthetic pesticides and fertilisers, it is important to understand that plants are happier and healthier when treated in a wholesome natural manner. And this is possible when the soil they grow in is living, healthy, with lots of organic matter, and teeming with a variety of beneficial micro organisms.

A home garden

Having a home garden gives us more control over our food and what enters our bodies. Initially,, organic produce can be more expensive than chemically farmed food, because it can involve more care, labour, while economically, there is, at this time, only a small market for such produce. This market can blossom with increased consumer interest and knowledge, allowing the produce to become more affordable for everyone. Discussing these issues within our community will raise awareness and boost the market. In the mean time, growing as much of our own food as possible will help detoxify our lives.

In our urban environment, pollution is a problem we are all familiar with, causing respiratory and other health problems to our communities. Any plants we can nurture in our environment will go a long way to cleaning up the air as they recycle pollutants and provide us with fresh oxygen. A screen of climbing plants, vines, or hedges along

the boundary of your home will act as a pollution screen. Furthermore, plants soak up water and then transpire this water into the atmosphere, producing a super fine mist, thereby acting as a natural air conditioner, keeping your environment cool during those hot and dusty seasons.

We can choose plants for the garden that will be of use to us - for food, for example fruits and vegetables, for flavour, for medicine, for pest control, and even for structural use - to provide shade, shelter and screening or hedging.

An essential organic gardening practice is transforming our organic waste into **compost** - rich and nutritious plant food. Natural processes of decomposition will create this with minimal effort required. Adding worms to the half-done compost will accelerate the process. Compost likes to be hot, so keep it in a warm, sunny area. Food scraps should be layered with brown organic materials where possible, for example dry fallen leaves, mulch, woodchip or straw. Cardboard, paper, tissues and liquids can also be added to your compost. Keep citrus, garlic and onion out of your compost as these foods are unpalatable and toxic to worms and will therefore slow or retard the decomposition process. Dairy, grains and meat are likely to attract rodents to the compost so keep them out. A healthy compost should not have an offensive smell, if there is adequate brown organic material added, and the mentioned items excluded. In an urban environment a contained compost is key

Growing our own vegetables in whatever little space is available to us – through safe, organic methods and practices – is perhaps the best thing we can do for ourselves, our children and the planet. Not only will this involve looking for safe alternatives for the garden, it also implies avoiding the use of commercial pesticides for household pest control.

TABLE 14: Safer Products for Gardening

<p>Neem oil spray: The main constituent of neem – Azadirachtin - is found to resist most plant feeding pests. So a neem oil spray is simple and cost effective method of pest control. Take 2-3 Tablespoons of neem oil and mix it in half litre of water. Add few ml of dishwashing liquid to make the mixture soapy and easy for spraying. Use a spraying nozzle to spray wide. Spray the solution over the soil to avoid the underground pests to feed into the crops that grow below the surface. In addition, spray below the leaves to stop the leaf-feeding insects. Do not spurt the neem mixture over the leaves as it can cause burns when it is exposed to sunlight.</p>	<p>Garlic/pepper spray for insects: Mix and crush a few Garlic cloves, pepper corns and vegetable oil until the residue mixture in the form of oil is obtained. Extract the residue oil leaving the solids. Add about half to 1 litre of water to it in combination with a small amount of liquid soap. Spray in places where aphids, worms, bugs, flies and spider mites are feeding on the crops.</p>	<p>For fungal diseases like mildews, leaf spots, stem and root rots, a 5% solution of sweet flag used as a spray will work well. Make sweet flag/bajje rhizomes to powder, soak 50g of it overnight, take the filtrate and make the volume to 1 litre and spray well on the plants. Repeat after 10 days especially during humid seasons and later if required.</p> <p>For Mealy Bugs, a similar spray made up of 5% Shikakai solution can be used. For aphids and mites a 5% spray of Chilli Garlic Ginger (50 g together) would work well. To ensure that it is effective, the spray is best repeated after every 10-15 days.</p>
<p>Coffee grounds Sun-dry the coffee grounds thoroughly. Can be used for rose and other acid loving plants by sprinkling around the base of the plants. Coffee grounds are a good source of nitrogen magnesium and potassium.</p>	<p>Vinegar Dilute 1 tablespoon of white vinegar in 3 litres of water . Water acid-loving plants with this solution once in 3 months.</p>	<p>Egg Shells Air dry the egg shells and mix in a blender till it becomes a fine powder. A good source of calcium carbonate (the main ingredient of lime). Good for tomatoes, capsicum. Eggshells deter slugs too</p>

<p>Panchagavya (a traditional indian concoction of fermented herbs and cow products - urine, dung, milk, curd and ghee). Can be made or bought. It acts as an immunity booster and can be used for seed treatment too.</p>	<p>Effective Micro-organisms First developed by a Japanese professor, EM or Effective Micro-organisms is a liquid concentrate made by naturally cultivating 3 microorganisms primarily - Lactobacillus, yeast, and Photosynthetic bacteria. All these are harmless to plant, animal, human, aquatic and marine life. It acts as a powerful plant growth promoter and has various uses in the home garden including seed treatment and composting.</p>	<p>Vegetable Waste Enzyme This enzyme made from vegetable and fruit scraps can be used as a fertiliser for plants in a dilution of 1:20. All you need is an old 2 litre plastic bottle with a lid 300 gms of fruit or vegetable peels (Peels of lemons, oranges, apples, pineapple, and even vegetables like cabbage and ladies finger can be easily used to make the enzyme) 1 litre tap water 100gm of brown (un refined) sugar Use a funnel to pour sugar into the bottle. Drop in the fruit peels and pour in the water. Cover the bottle and date it. The enzyme will be ready to use 3months from the day you start. Give the ingredients in the bottle a good shake to mix them thoroughly. Everyday, for the first month, open the cover for a few minutes to let out the oxygen build-up from the fermentation process. The process could be accelerated by adding a teaspoon of yeast.</p>
<p>Wood Ash A good source of potassium in the home garden. It works especially well for root vegetable plants.</p>		

Compost teas can also be made from your compost, by soaking some compost in a large amount of water, making a weak solution, which can be fed to the soil for a nutrient boost to your plants.

Cubas' Home Gardens

The collapse of the Soviet Union led to a crisis in Cuba especially with regard to food. But the manner in which the country became self-reliant by taking to organic farming is indeed a lesson for every nation²³. Home gardens became the norm and every inch of space was used to produce food. A natural (though unplanned) consequence of their organic farming practices was that health of citizens improved and State spending on health reduced substantially.

To manage pests, consider **companion planting**. The reason such large scale pest problems are seen is because a monoculture, that is, planting out fields with one crop only, provides a bulk amount of food to particular insects, attracting them and allowing their population to grow to pest proportions. Strong chemical pesticides are used to keep these numbers in check. The easy way out of this problem is to plant a variety of crops, and you will find a variety of bugs, some that eat certain plants, some that eat others, and some that eat each other! Likely you will find that you have a very small pest problem as their populations are kept in check naturally.

Companion planting offers some help when deciding which plants to incorporate: it is based on the idea that certain plants can benefit others when planted in near proximity. The reasons could be many - trap or repel pests, higher yield, complement light and space requirements. Companion planting tables, available for different climatic conditions, offer a convenient guide for growing plants without the use of harmful pesticides.

Boosting the **biomass** of our environment is always beneficial, especially in the concrete jungle that we call home! Allowing us to breathe easier, gardening can also be therapeutic, providing happiness to our family, while also keeping other life forms happy, an often forgotten act of dharma.

When planning a home garden, it is useful to view our own house as a **micro ecosystem**: what enters our house and what leaves? Can this be balanced as much as possible to create a self sustaining micro system? How much waste do we produce? Can this waste be recycled in a useful manner within our house? How many living elements are there? Can these elements be increased and be linked to each other to form symbiotic or otherwise beneficial relationships? While many traditional practices conserve resources and look to reuse where possible, they are being forgotten for the convenience of ready made throw away products.

Other Materials in the Home

This section is meant to be a general guide for a safer, more conscious home especially with regard to aspects such as packaging, paints, lighting, construction materials, water, food, medicines and other such products used at home. However, given that each of these issues are complex in themselves, the section requires a lot more work to make it specific to the Indian context. It is hoped that this will grow with further inputs and experiences from appropriate sources.

Paints	<p>Lead content Lead is added to hasten the drying process. Exposure to lead starts after the painting work is complete. The revised (2014) standard for lead in the country is 90 ppm</p> <p>Volatile Organic Compounds (VOCs) in paint are the reason behind the strong, sharp odours of a freshly painted room. The international standard for VOC in paints is 50 gm/litre. In India now, though we have several zero VOC paint brands, these still contain up to 5 gm/litre.</p>	<p>White paints have a lower lead content compared to coloured paints.</p> <p>Water based paints do not typically contain lead</p> <p>A lower VOC level is healthier. VOC content is typically stated only for white paints (the base colour). Once colours are added, it increases the final VOC content significantly.</p>
Lighting	<p>Despite their energy efficiency, Compact Fluorescent Lights (CFL) pose a high risk due to the presence of mercury and other toxins.</p>	<p>In terms of energy efficiency, longevity and non-mercury risk, Light Emitting Diodes (LEDs) are proving to be a safer choice</p> <p>For the health of the human eye however, the luminescence of the regular filament bulb is preferred by many eye-doctors.</p>
Kitchen ware	<p>Teflon/Non-stick cookware is best avoided for the high health risks and environmental hazards</p> <p>Aluminium cookware and storage for food can reduce absorption of Calcium by the human body.</p>	<p>Cast-iron woks and griddles and Clay pots for cooking</p> <p>Steel or glass containers for storage</p>
Mattresses	<p>Synthetic foam mattresses are potential fire hazards due to the number of chemicals they contain. They also give off poisonous fumes</p>	<p>Coir mattresses are a safe alternative.</p>

Consumer Action

As consumers we can choose to make a difference purely based on our choice of products. To do so, we need to be adequately informed about the nature of products we choose, and consider a few aspects before making a purchase.

For instance,

- ☐ is it safe on my skin and body?
- ☐ Can I dispose of it safely?
- ☐ Will it harm the water and environment?
- ☐ Is there a safer, healthier alternative that works as well or better?

Conscious Consumers also need to be able to decipher the product label and sift through the information that the label includes or not. For example, claims like “dermatologist-tested”, “natural,” or “organic.”are insufficient to decide on a product. It is important to read the ingredient label instead. On the other hand, it is important to take label warnings seriously especially where they concern hazardous chemicals.

As proactive consumers, we could also choose to stop the use of certain toxic ingredients, write a petition for altering the contents/packaging of a given product, build greater awareness in our immediate communities and support safer, local alternatives.

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Resource Guide

VANASTREE

80/1, Asare, Vishal Nagar, Marathi Koppa, Sirsi, 581402,
Uttara Kannada, Karnataka, India +91 8384 233 293
Website: www.vanastree.org

DAILY DUMP

558, 4th Cross, 11th Main, HAL 2nd Stage, Off 100 ft
Road Indiranagar, Bangalore 560 038. INDIA Phone: + 91
80 41157311; Mobile: + 91 99164 26661;
Email: dailydumpcompost@gmail.com
www.dailydump.org

KRYA SUSTAINABLE GOODIES

Krya Consumer Products LLP Jammi Buildings, Ground
Floor , # 121 Royapettah High Road, Mylapore, Chennai
600004 +91 44 42049292;
Goodies@krya.in
krya.in

ANUSPA SOAP (BIO-D)

[Http://www.anuspasoap.com/](http://www.anuspasoap.com/)

RUSTIC ART

Erina Eco Craft Pvt. Ltd. 251, Palace Street, Bhawani Peth,
Satara 415 002, Maharashtra, India; +91 98220
20329 Bangalore Office: Ajay Rathi, D-704 (Annex),
Greens, No 1 Sampige Road, Malleswaram, Bangalore
560003, Karnataka, +91 98450 92566
<http://www.rusticart.in/>

STRATEGI MARKETING (Just Mop/Just Spray)

65/1 modi court, millers road, Benson town, Bangalore
46. 9845022056 ; strategi@strategindia.com

Common Oxen

[Wwww.commonoxen.in](http://www.commonoxen.in)

ProKlean Technologies

Plot No. 108 & 109 Perumal Nagar
Thirumudivakkam, Chennai, 600044
+91 44 6555 6855 +91 44 6545 3345
Email: contact@proklean.in
Proklean.in

ASAL - The Organic Food & Natural Products Store 5,
Tejpal Society, Nr Fatehnagar Bus-Stop Paldi, Ahmedabad
- 380 007

Phone: +91-79-26622020, 26622022 E-mail:
asalworld@yahoo.co.in web: www.asalworld.org

Toxics Link, H2 Jungpura Extension, Ground Floor, New
Delhi 110 014

Tel: +91-(0)11-4328006/0711; E-mail: tldelhi@vsnl.com
[Http://toxicslink.org/](http://toxicslink.org/)

Down to Earth

Centre for Science and Environment
41, Tughlakabad Institutional Area New Delhi-110062,
Phone: (91) (11) 29955124, 29956110, 29956394/9 Email:
cse@cseindia.org
<http://www.downtoearth.org.in/>

Consumer VOICE (Voluntary Organization in Interest of
Consumer Education) O-45, Basement, Lajpat Nagar-II,
Ring Road, New Delhi-110024 Tel : 011-47331000,
29841121, 29840455, 29841683 <http://www.consumer-voice.org/>

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