



Cleaning agents: the divide – human friendly Vs environmentally friendly

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Abstract

The choice of purchasing an environmentally friendly or 'green' cleaning product appears to be one that consumers are increasingly happy to make, however the reality is that environmentally friendly cleaners often contain ingredients that may adversely affect those people suffering from asthma and allergies. Confirming that a product will not adversely affect a user is not straightforward, there is little point to a cleaning product that is harmless to the consumer but is ineffective in its cleaning performance. However, adhering to strict guidelines regarding allowable concentrations of chemicals and other constituents may allow consumers to purchase a product that is both human (and environment) friendly as well as being effective. We discuss the basis by which cleaners may be assessed for suitability for those with asthma and allergies.

1. Introduction

As homes become more and more insulated and sealed (in an effort to conserve energy) natural ventilation decreases thus preventing fresh air from entering, and harmful off-gassing chemicals from exiting. Both the Environmental Protection Agency and the World Health Organization have recognised that indoor air quality is declining and this may have particular effects on those suffering from asthma and allergies.

Asthma is a very significant illness, particularly in modern society, with the numbers suffering from asthma increasing every year. It is a condition of the airways, whereby the bronchial tubes may become inflamed and mucus-filled, making it very difficult to breathe.

- In Western Europe the prevalence of asthma has doubled over the last decade.
- It is estimated that asthma accounts for about 1 in every 250 deaths worldwide; many of which are preventable.
- In the UK, it is estimated that 1 in every 7 children aged 2-15 years and 1 in every 25 adults have asthma symptoms that require treatment.
- In Switzerland, 25 years ago the frequency of asthma was 2%, currently it is 8%.
- The total annual cost of asthma care in Europe amounts to approximately €7.7 billion.

In a similar way to asthma, the prevalence of allergies has increased considerably over the past decade or so. An allergen is any molecule capable of eliciting an allergic response and includes dust, pollen, cat and dog dander. Allergens may elicit an allergic reaction by skin contact, injection, ingestion or inhalation.

- More than 1 in 3 children in Europe has at least one allergy.
- More than half of all US citizens test positive in a skin-prick test to one or more allergens.
- In a recent survey over 50% of homes had at least six detectable allergens present.

2. Cleaning Products

The development of cleaning products progressed rapidly during the 20th Century and with this increased development came the increased reporting of skin complaints related to these cleaning products. Shortly after the Second World War a myriad of skin complaints were blamed on household detergents as the medical profession deemed detergents as causative agents. It wasn't until the 1960s that dermatologists reassessed their reaction and decided that detergents were, after all, useful and necessary. However by the 1970s, with the advent of new irritancy assays, the pendulum swung back again in opposition to detergents, with a shift in the sought after qualities of a cleaning product. Mild cleaning products became the ideal, and continues to this day. Contact dermatitis is one of the main side effects from cleaning products. It is an acute or chronic skin inflammation resulting from contact with an irritating substance or allergen. There are two types of contact dermatitis – (1) irritant contact dermatitis (ICD) which involves inflammation resulting from contact with acids, alkaline materials such as soaps and detergents, solvents, or other chemicals and (2) allergic contact dermatitis (ACD) which is caused by exposure to a substance or material to which an individual has become extra sensitive or allergic to. Symptoms may include pruritus, weeping and crusted lesions, psoriasis and erythema.

- Contact dermatitis leads to approximately 5.7 million doctor visits each year.
 - ICD accounts for 80% of all cases of contact dermatitis.
 - Approximately 75% of all contact dermatitis cases affect the hands.
- Contact dermatitis is also more common in women with approximately 20% of women experiencing contact dermatitis at some stage in their lives.

2.1 Traditional Cleaning Products

Traditional household cleaners are those cleaners that rely mainly on synthetic chemicals for their mode of action. They are very effective but have been associated with numerous health and environmental effects. Occupational health effects due to cleaning products have been well documented amongst cleaners, janitors and housekeepers. Health effects have also been reported in the normal domestic setting.

Increased asthma rates, contact dermatitis and allergic reactions have all been associated with traditional chemical cleaners. Although it could be argued that those cleaning for a living will be more exposed to any allergen that they would normally be allergic to, the role of the constituents of the cleaning products cannot be ignored.

There is an understanding among the general population regarding the toxicity of traditional household cleaners. A survey of 1000 American mothers in 2008 revealed that:

- 95% agreed household cleaning products can be toxic
- 88% agreed they can be harmful to health and family's health
- 61% agreed that fumes from products bothered them
- 70% agreed that products are safe to use around their family
- 49% agreed that children may be exposed to household toxins
- 81% agreed that household cleaning products may trigger asthma in children and adults.

The toxic nature of some traditional cleaning products is due to constituents such as ammonia, solvents and sodium hypochlorite. All these chemicals have been associated with lung irritation, skin irritation or airway problems. Fragrance, a constituent of many cleaning products, is a complex product made up of numerous chemicals, and is so allergenic as to have been voted Allergen of the Year, 2007 by the American Contact Dermatitis Society.

Many factors have led to people becoming more environmentally responsible, and a Gallup Poll in 2007 showed that more than 70% of US and Japanese citizens were 'avoiding certain products that harm the environment'. A more focused survey of King County in Washington revealed that over 50% of inhabitants were 'choosing less toxic household cleaning products' and about 40% were 'considering the environmental impact of [their] purchase decision'.

2.2 Green Cleaning Products

With the move towards environmentally friendly products, the green market has expanded rapidly. Green sales in supermarkets increased 170% in 2007/08 and leaders in the green market (Method, Seventh Generation and Mrs' Meyer) benefited from this in the form of increased sales. Clorox released their green product (Greenworks) in 2008 and within 10 months controlled 40% of the green market. At present the green cleaning market is less than 5% of the total market, although this is predicted to rise to 30% by 2013.

It is clear that there has been a large increase in consumers purchasing green products and the reasons for this may vary, however the results of a Haystack Group Survey and Mintel Survey showed that:

- Negative long term effects of chemicals on the body were the most important thing to consider when thinking about adopting a green lifestyle.
- The biggest motivator for adopting green practices was health
- Four in ten cited allergies as a reason for buying eco-friendly cleaning products
- The environment was not a primary concern for respondents.

The paradigm therefore is that although respondents acknowledge that green is synonymous with environmental responsibility, they were more likely to adopt green practices for health reasons rather than environmental ones.

Worryingly, although consumers may be buying green products for their own personal health, there are many constituents in green cleaning products that may cause reactions, mainly for those suffering from asthma and allergies.

Table 1 outlines some of the main constituents of green cleaning products along with their potential health impact. These ingredients were released by green cleaning manufacturers and in these cases, the informed consumer may be able to make a judgment regarding their potential health effects.

Ingredient	Cleaner	Health Effect
Glycol Ethers (2-butoxyethanol)	All-purpose	Hazardous air pollutant toxic & irritant
Ammonia	Glass	Irritant, lung irritation and reduction of air quality
Sodium Hydroxide	Bathroom	Skin irritant, inhalation irritant
Sodium Hypochlorite		
Phosphoric Acid/Bleach		

Either traditional or green cleaning products may be used to clean effectively; however as has been established, both may contain asthma, allergy and contact dermatitis triggers. In order to control asthma and allergies, individuals are encouraged to discourage pests, reduce dust and reduce mold; in order to do this they require an effective cleaner, and this is where a potential problem occurs.

In effect, the ideal cleaning product is one that is environmentally sound, effective and health friendly. At present there are products that have achieved a balance between efficacy and environmental responsibility, and this is an achievement. However where health friendly is also a consideration, a further challenge is presented.