Pollution is defined as the introduction of contaminants into an otherwise natural environment. Ironically, as industrialization has improved quality of life around the globe tremendously, it has simultaneously increased the pollutants we live with on a daily basis. Air pollution has a direct impact on health and wellness. As your first line of defense, the skin is consistently exposed to environmental stressors.

The latest standard of pollution, the EPA's PM 2.5 (Particulate Matter 2.5, air pollutants with a diameter of 2.5 micrometers or less) are tiny particles in the air that reduce visibility, and have implications in overall air quality. Capable of penetrating deeper layers of the epidermis causing inflammation, dehydration, and a cellular reaction that can lead to the loss of elasticity and firmness. Although even simple surface interactions can drastically alter the composition of the skin, influencing surface barrier function, or causing dryness and acne.

Regardless of where you live, you might be surprised to hear that pollution has found its way into your life. UVB light from the sun causes the buildup of free-radicals on and under the skin leading to fine lines and wrinkles. Public water is another commonly overlooked source of pollution, capable of stripping the skin of its natural minerals. Recent presentations in Asian markets have even suggested cellphones and computers can be harmful to the skin.

As the number of consumers living urban lifestyles continues to grow around the globe, it seems that many are turning toward beauty products to protect themselves from the impact of pollution.
Emanuelle Moeglin, a global cosmetics analyst at Mintel says "To fight pollution we need to put up our own skin barriers!" Eliminating the need for repair measures by dealing with the problem in real time.

Cosmetics manufacturers are turning to a range of ingredients to fight pollution’s negative effects: plant extracts are especially popular due to consumers’ current high demand for green formulations.

For years the Industry has successfully been developing and marketing products that protect against UV induced skin damage. Now, scientists and formulators are focusing on warding off the effects of air pollution in major cities. Air pollution in Asia is at an all time high as auto emissions, cigarette and industrial smoke have allowed cosmetics brands to expand their influence into skin care that works to actively fight pollution. The Environmental Protection Agency is leading the charge against air pollution in the East. Soon, Europe and North America will be as concerned about anti-pollution claims as Asian countries are. 

In the UK, 83% of adults feel lifestyle has a big impact on skin and 22% of women look to cleansers to protect their skin from the environment or pollution. Older consumers are a particular target, 31% of UK women who use facial skincare products use a moisturiser to counter the effects of pollution or the environment on the skin, but the figure rises to 48% of women aged 65 and over. -Mintel
The **Anti-Pollution Movement** first began in the Asia Pacific region and is finally moving into western markets. As the newest standard of the natural, sustainable marketplace, anti-pollution has been drawing the attention of consumers living an urban lifestyle. Though not all anti-pollution products on the market originated in Asia, hundreds of commercially successfully products can be seen in nearly every major market.

Mintel’s independent research has confirmed anti-pollution is the trend to watch as product claims grew *63%* in 2011 and 2013. In 2013 Mintel also reported *40%* of the population bought items designed to protect from the effects of environmental pollution in the past year. These numbers are only projected to increase as more innovative products are developed with the goal of fighting environmental pollutants.

- **AmorePacific Future Response Age Defense Crème** - A soothing cream that protects the skin against environmental aggressors and guards against the appearance of aging.
- **Tata Harper Purifying Cleanser** - A hydrating cleanser that combats the daily wear and tear of environmental exposure and pollution by effectively clearing pores of excess oil, dead skin, and buildup.
- **RENEVERCALM™ Global Protection Day Cream** - An antiaging moisturizer for skin that is delicate or affected by everyday stressors like smoke and pollution.
- **Clarins Extra-Comfort Anti-Pollution Cleansing Cream** - The anti-pollution cream cleanser for skin challenged by a polluted urban environment.
- **Etude House Dust Cut Facial Mist** - A facial mist that protects skin from environmental pollutants by skin shield formed with fitting polymer.

**Shiseido White Lucent Brightening Protective Cream Broad Spectrum SPF 18** - Achieve comprehensive skin protection against UV rays, air pollution, and dryness.
Beyond PM 2.5 - The New Standard

Inhibition of PM 2.5

As with any new technology or trend, the development of standards is imperative to quantify total efficacy. At **Active Concepts** we have developed a standard assay using the EPA's PM 2.5 (particulate matter 2.5μm in size) standard to simulate the accumulation of these particles on the skin.

**Phytofuse Renew®** was applied to the skin and then contaminated with a premeasured amount of activated charcoal (>2.5μm size particles). It was then washed using a controlled amount of water in order to quantify **Phytofuse Renew®’s** ability to inhibit these particles from remaining or penetrating the initial skin barrier. These results were compared against an untreated control, as translated from a histogram denoting color change (lower is better, indicates skin tone).

**Figure 1.** Phytofuse Renew® pre-wash

**Figure 2.** Phytofuse Renew® post-wash

**Figure 3.** Phytofuse Renew® histograms

**Figure 4.** Untreated control pre-wash

**Figure 5.** Untreated control post-wash

**Figure 6.** Untreated histograms

A-nti-pollution extends beyond the scope of skincare. The age of consumer awareness has led to the desire for multifunctional protections, hair care, and hygiene products in addition to popular and effective creams and lotions. This has created a pressing issue for the personal care industry to discover and create novel raw materials and products that not only correct and improve compromised aging skin, but also provide an active barrier against environmental pollutants.

Demand for **efficacious** active raw materials is at an all-time high. Setting realistic standards and test parameters is a necessity when both testing a product, and making claims.
Phytofuse Renew® is a tremendous film former, improving barrier function, while still offering intense moisturizing benefits, antioxidant protection, and real sensorial change to a product. Phytofuse Renew® is able to effectively inhibit the accumulation of pm 2.5um sized particles on the skin, an excellent standard (adapted from the EPA) for quantifying pollution.

- Enhances the feel of Formulations
- Provides intense Antioxidant Benefits
- Highest standard of Anti-Pollution

ABS Moringa Pterygosperma Seed Extract G is a more classic anti-pollution product, offering anti-pollution claims with the same resounding efficacy, but with fewer fringe benefits and a cost to match. Able to effectively film-form and improve barrier function, new studies and research suggest that Moringa can offer skin conditioning and nourishment.

- Improves Cellular Viability
- Great for Skin Conditioning
- Increase in Collagen Synthesis

ACB Yerba Santa Glycoprotein PF offers strong evidence of protection vs. particles under 2.5um in size. With the ability to improve barrier function as a natural film-former ACB Yerba Santa Glycoprotein PF is the anti-pollution product for nearly any formulation. With other benefits such as moisturization, antioxidant protection, and increases in hydration/lubricity, ACB Yerba Santa Glycoprotein PF is a great choice for a variety of applications.

- Great for any formulation
- An excellent Moisturizer
- Natural Antioxidant Protection
Active Concepts' Product Comparison

<table>
<thead>
<tr>
<th>Product Trade Name</th>
<th>Recommended Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phytofuse® Renew</td>
<td>Prestige</td>
</tr>
<tr>
<td>ABS Moringa Pterygosperma Seed Extract G</td>
<td>Mastige</td>
</tr>
<tr>
<td>ACB Yerba Santa Glycoprotein PF</td>
<td>Mass</td>
</tr>
</tbody>
</table>

Figure 7. Product market recommendations

Active Concepts' categorized the aforementioned products for the prestige, mastige, and mass markets, respectively. As demonstrated by the graph below, the products were plotted based on the relative change between wash sites, clearly demonstrating a cost-benefit ratio. However, with consistent use levels across each product test, Active Concepts' demonstrates our commitment to providing all customers with a competitive edge no matter their price point or market-area expertise.

In order to lead the market in customer service and continue to produce products with a purpose, we must continue to effectively support each level of the personal care industry with value added benefits for finished anti-pollution goods.

Figure 8. Relative change between products ability to reduce pollution

Figure 9. ACB Yerba Santa Glycoprotein PF pre-wash

Figure 10. ACB Yerba Santa Glycoprotein PF post-wash
“As awareness of the effects of pollution grows, we are seeing the expansion of beauty products that shield from its effect, with an increasing number of consumers living more urbanized lifestyles, looking forward we expect to see a rising number of beauty and personal care products launched carrying more specific anti-pollution terminology, that specify the sources and composition of the pollutants”

- Emmanuelle Moeglin

There is a focus on reversing free-radical damage with the use of anti-pollution products: new ingredients will go beyond traditional antioxidants like vitamins A and E - which only neutralize oxygen-based free radicals and not pollution’s nitrogen-based free radicals. Major anti-pollution claims for cosmetics emphasize film-forming, anti-oxidant, and anti-inflammatory capabilities. Skin care products formulated specifically for anti-pollution can address both skin barrier function and hydration concerns. Based on the research, Olay plans to increase the use of vitamins E and B3 in its Total Effects skin care product line. Dr. Frauke Neuser, a senior scientist at Olay, explains that the use of niacinamide in anti-pollution products is because of the ingredient’s proven ability to restore and strengthen the skin’s protective barrier, while improving skin hydration and promoting skin surface exfoliation.

Clinique has developed a sonic system purifying cleansing brush targeted towards anti-pollution. Claims for the brush include “Two bristle types for targeted cleansing in hard-to-reach, contoured areas of the face where dirt hides. In today’s environment, skin needs a deeper clean. The brush’s gentle sonic action helps dislodge a world of impurities, dirt and pollution that hand washing may miss.” Along with the brush, Clinique has recently launched Superdefense Night Recovery Moisturizer with claims that the product “…fights early signs of aging by warding off daily environmental aggressors”.

Clinique and Olay are not the only brands to be tapping into the anti-pollution trend. A whole host of brands in the West have launched products in the skin and hair care fields over the past year. Cosmetics manufacturers are turning to a range of ingredients to fight pollution’s negative effects, and it is likely that in the future anti-pollution claims could become as highly demanded as sun protection. This shift is expected as urban populations expand and the awareness of pollution’s effect on appearance increases. As the scope of anti-pollution expands to include a variety of other environmental and physical stressors so too will the desire for multifunctional products that provide protection and consumer benefit.

“…pollution will become a key media focus. The cosmetics industry in particular has been awakening consumers to the immediate, visible, personal effects of pollution. As a result, we can expect protective claims against PM 2.5 and others to grow in product marketing in skincare and cosmetics in general. In addition, consumers are already embracing apps that scrutinize a product’s environmental credentials and we anticipate more brands to become increasingly transparent in the coming year.”

- Emmanuelle Moeglin, Global Fragrance and Colour Cosmetics Analyst at Mintel
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6) Clinique - Sonic System Purifying Cleansing Brush
7) Etude - House Dust Cut Facial Mist