

## Improving Innate Ingredients

The world of cosmetics and personal care ingredients is ever changing; however this change has not diminished the desire of consumers for natural products. Fundamental lifestyle changes have made health an important aspect of life and the use of artificial ingredients is getting reduced, or is being replaced with natural ingredients.

The word natural and its various analogues have a very strong influence in sales and marketing and this is quite evident when you look into consumer products available in the market. Marketers have used this inherent liking of consumers to nature to their advantage and marketed products with a natural or herbal brand halo. The reason generally proffered by consumers and marketers alike is that naturals are milder and so safer. The passage of time and the advancement of science and synthetic technology have not been able to change this false perception and the inherent desire to use nature based products.

### Why the need for naturals?

We are aware that consumers have always felt the need to use natural products and formulators cognizant of this inherent requirement have used a variety of natural ingredients like waxes, lipids and plant extracts in a personal care and cosmetic formulations. Using natural extracts, essential oils, refined vegetable oils in formulations as ingredients is easy, but to understand the chemistry and performance mechanism on usage is important. Increasing functionality of the natural raw material equivalent to their synthetics and reaching its required performance criteria should be the goal of formulators. Many natural ingredients, since early days of human civilization, have been attributed with

properties valuable for beauty, skin and hair care. Using natural ingredients, as such, in product formulations have either been impractical or when used have proved to be very poor performers. Many a times, the contribution of natural additives on product performance has only been negligible



and very rarely substantiated by clinical tests, even though its contribution has been substantial in making tall marketing claims.

### What consumers need

Today, consumers are sophisticated and consider performance as paramount and ingredient – natural or otherwise – used in a consumer product has to be an effective performer, unlike in the past. The challenge today is to create effective ingredients that offer functionality and performance characteristics as those im-

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parted by a synthetic and also provide wholesome benefits given by the natural substance. It is imperative that, regardless of its use in any formulation, it should offer a high level of performance, in addition to the uniqueness observed in a natural product. Consumers, in general, expect the product to perform as ideally required. It may not matter much as to whether it is natural or synthetic. However, nowadays use of natural ingredients has become a necessary fashionable marketing feature and so the preference to naturals is very strong.

### Lanolin based derivatives

Lanolin, the sebaceous gland oily secretion of sheep, is considered a safe and effective ingredient for skin and hair care applications. It has excellent moisturising and emollient properties, in addition to reducing trans-epidermal water loss.

Lanolin, as such, is water insoluble, but on alkoxylation turns water soluble. Lanolin derivatives are obtained by ethoxylation or propoxylation of refined lanolin and they are soluble in aqueous / alcohol mixtures. Water-soluble ethoxylated lanolin



## Special Report



alcohols are excellent solubilising agents for fragrances, vitamins, synthetic and natural oils that are otherwise not very easily soluble in cosmetic base preparations.

Lanolin fatty alcohol has a high proportion – over 30% – of free sterols like cholesterol, lanosterol etc., and reduces insensible perspiration. It is an excellent, cost-effective replacement for cholesterol in cosmetic preparations and a very good natural moisturiser to protect human skin. It is also useful in dispersing pigments and dyes in lipstick bases, and as an emollient additive in oil-in-water and water-in-oil hair creams. Lanolin alcohols exhibit emolliency in nail polish, nail polish removers, by reducing the degreasing property of solvents in the formulation and are used to control viscosity in shampoos and plasticize hair sprays. Lanolin alcohols in soaps improve emulsifying properties and increases fine persistent lathers.

Purified lanolin fatty acids when reacted with ethylene oxide produce non-ionic surfactants. The hydrophobic / hydrophilic balance and their properties in aqueous solution are directly dependent on the degree of ethoxylation. Lanolin non-ionic surfactant derivatives are used as cosmetic emulsifiers, wetting and solubilising agents in cosmetic applications.

Lanolin esters, obtained by esterification of lanolin fatty acids with iso-

propyl alcohol, and acetylated lanolin are other forms of lanolin used as an aid in cosmetics and pharmaceutical ointment preparations.

### Milk based derivatives

Milk, right from the early days of civilisation, has been considered a beauty treatment product for skin and hair, much beyond its primary function to provide nutrition to young ones. Formulators however find that using



milk in its original form in product formulations is rather impractical, as its performance gets limited. Many a time, synthetic additives that provide functionality of milk are used. The basic intention is to serve and address marketing claims, rather than to provide effective product performance. Today, when consumers are discerning, the ingredients used should better be effective and the challenge is to create a

product based on a natural source that provide both functionality and performance at a price that is economical for formulators to use.

Nature's perfect products like milk could become a source to engineer derivatives that offer performance equal, if not better, than similar synthetic ingredients now used in personal care. If the product produced has multiple functions, in addition to its traditional ones, the advantage of using it becomes manifold for formulators to generate success.

### Natural phospholipid derivatives

Phospholipids, derived from plants and vegetable oils like coconut, palm, safflower etc., have been used in personal care formulations for their emolliency, conditioning and moisturising properties. Most phospholipids have very good and effective moisture barrier property on skin and are relatively inexpensive. However, they are not popular with formulators, due to their lack of substantivity; colour- and odour-stability issues; and their adverse effect on preservatives and preservative systems used in personal care formulations.

Researchers have claimed that by reversing the arrangements of phosphorus and the quaternary group in the phospholipid molecule, one can design a series of phospholipids that closely resemble the natural structure, but at the same time get over the disadvantage of the naturals in topical applications. This can also be used to stimulate the proper-





ties displayed by the natural lipids present in human skin and hair.

The challenge for product developers is to demonstrate higher effectiveness, stability and performance, among the hundreds of vegetable and plant derived materials by creative use of chemistry.

#### Why naturals are expensive?

The high cost of natural ingredients is due to the high capital costs and research and development investments needed to set up this industry. Some major manufacturers can afford to invest in such large measures, but all others, in order to remain competitive, have only to procure ingredients by locating alternative sources. This too is not very cheap. Some ingredients can be obtained from natural sources easily, but many occur in such minute quantities in plant sources that one has to be satisfied with its limited availability. Obtaining them is not only time consuming, but also require expensive extraction equipment and processes.

Environmental conditions and political upheavals are other reasons responsible for affecting availability and cost of natural ingredients, impacting supply and demand.

Natural products are unique, either due to their composition or any special characteristic they offer to a formulation. Nature derived products are expected to

be exceptionally mild, may be even counter-irritant, safe, non-toxic and environmentally friendly. In addition, savvy consumers require natural ingredients to offer significant performance advantages and fulfill product claims as represented in marketing advertisements.

Consumers are inherently pro-natural and will pay a higher price premium, but definitely not an exorbitant one. This does not mean that only natural ingredients are to be preferred. 'Anything natural is good,' is a statement to be taken with a pinch of salt and consumers too have a similar attitude. Natural and synthetics are both required and accepted by consumers. However, our goal should be to produce natural ingredients that have the same strength and character of the synthetics, but at a reasonable cost.

#### Major industry challenges

Natural ingredient manufacturers have to aim for a final product that is not only natural, but also priced close to their artificial or synthetic counterparts. Without doubt, the performance of the product is of paramount importance. Formulators and marketers can ill-afford to forget this aspect, while searching for newer natural ingredients, as only those products that perform to meet a broader spectrum of human need and fulfillment will succeed in a competitive environment.

The challenge for this industry lies in playing a larger role in the develop-

ment and use of natural ingredients and this is possible only if efforts are directed to locate high content and consistently available source or develop low cost production methods to produce a wide range of natural ingredients and allied products.

The increased consumer demand for natural ingredients in personal care products offers new market opportunities for producers to develop products. However, it is important that all products be safe, non-toxic and offer significant performance advantages to consumers, responding to their requirements as well as to claims made by advertisements.

#### The future of nature based products

From the time of the industrial revolution, industry emulated nature through creative chemistry. Now, we should attempt to emulate synthetic achievements through natural means. The creative use of chemistry is required if we have to enhance the effectiveness of products and at the same time introduce a wider array of other useful properties and benefits when used in product formulations. Research and development groups need to review the potential of raw materials available in nature, examine its functionality and develop ways to improve its effectiveness. It is important to tailor natural products to obtain performance equivalent to synthetics, if not better, so that in all eventualities it acts as a potential replacement in a formulation.

Scientific research will lead to discovery of newer technologies and develop complex natural ingredients and during this process of rediscovery it is very likely that researchers will stumble upon ingredient types that will offer an altogether different range of performance characteristics. It is important that nature's bounty should expand the horizons of cosmetics and personal care product formulations, keeping pace with consumer demand, along with changing the face of the industry.