Happy New Year Kung Hei Fat Choi

Dear All,

Time so fast, herein is our second communication. After the first publication, I received a lot of comments Thank you!

"... Historically cosmetics have been important throughout the ages but the progression of cosmetics from art to science did not occur until the later 19th Century whilst the modern cosmetic industry, as we know it, has developed in this century ..."

Do you ever think of being a Cosmetic Chemist? Do you want to know more about their daily job? What are the major components inside the cosmetics?

I really hope you can find the answer in this issue.....

Cheers,

The Chemical Hazardous

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FEATURE ARTICLE

ANCIENT EGYPTIAN COSMETICS AND CHEMISTRY

An analysis of Egyptian cosmetic powders dating back to as early as 2000 BC revealed an unexpected level of sophistication in the 'wet' chemistry practiced by the ancient Egyptians.

It was already well-known that they were using firebased technology to produce their blue pigments prior to 2500 BC. Yet this is the first time that the analysis of the black, green and white cosmetic powders shed light on the level of their practices in chemistry.



Researchers identified a number of organic and mineral ingredients in the powders. Two of the mineral ingredients were naturally occurring ores which were crushed, ore of galena (PbS) and cerussite (PbCO₃). However, the surprise came from laurionite (PbO-HCl) and phosgenite (Pb₂Cl₂CO₃), which were both compounds which occurred rarely in nature. They are found when lead artifacts are weathered by sea water. Or in the case of phosgenite, the compound could also be found when lead-containing minerals were exposed to carbonated and chlorinated waters.

The researchers ruled out the possibility that these compounds were extracted from scarce natural sources since they were too abundant in the preserved cosmetic samples. Also they ruled out the alteration of the other natural lead compounds in the make-up as a source. And in doing so, they arrived at the conclusion that the Egyptians were capable of artificially synthesizing the compounds.

They reconstructed the process which the Egyptians probably used by following recipes documented by classical authors. According to the ancient recipe crushed purified silver foam (PbO) was mixed with rock salt and sometimes with natron (Na₂CO₃). This mixture was filtered and the

procedure was repeated daily for several weeks.

The authors recreated the process using PbO and salt powders in carbonate free water. The resulting precipitate was successfully identified as laurionite. The same process in the presence of carbonate would produce phosgenite.

Given that the procedures required repetitive operations, the manufacturing of these compound revealed a previously unknown level of sophistication of ancient Egyptian chemistry.

Original article: Nature, 11 February 1999; Making make-up in Ancient Egypt, P. Walter et al., p. 483-484

COMMENT: WHAT IS COSMETIC CHEMISTRY?

"...A cosmetic product means any substance or preparation intended to be placed in contact with the various external parts of the human body (epidermis, hair system, nails, lips and external genital organs) or with the teeth and the mucous membranes of the oral cavity with a view exclusively or mainly to cleaning them, perfuming them, changing their appearance and/or correcting body odors and/or protecting them or keeping them in good condition...."

Historically cosmetics have been important throughout the ages but the progression of cosmetics from art to science did not occur until the later 19th Century whilst the modern cosmetic industry, as we know it, has developed in this century.

Currently the cosmetic industry constitutes a £4000 million turnover in the UK, with over 200 companies manufacturing or supplying ingredients for colour cosmetics, toiletries and perfumery products. The continued success of our industry relies heavily on research and development consequently careers in the cosmetic sciences present many exciting and challenging opportunities for people with diverse areas of interest and training to contribute to the quest of finding new products and processes and improving existing ones.

INSIDER: What Inside Natural Cosmetics?

Beauty with a Conscience

Question:

What do the terms "natural" and "organic" mean on a cosmetic label?

Answer:

In general, the term "natural" on a personal care product means it was made with minimally processed ingredients (such as dried, concentrated chamomile leaves); ingredients extracted or synthesized from raw substances (chamomile oil); and/or ingredients still in their pristine, untouched state (chamomile flowers). Additionally, natural personal care products don't contain artificial fragrances or colors which can cause allergic skin reactions. The term "organic" broadly means the product is manufactured from ingredients grown without pesticides or chemical fertilizers, although it can also mean that some, but not all, of the components are organic.

However, since there aren't legal definitions for natural or organic, some cosmetic manufacturers have exploited these terms for marketing purposes.

In many cases, natural and organic mean whatever the product's manufacturer wants them to mean. For instance, some cosmetic manufacturers define organic as any substance that contains a carbon atom, since carbon is an essential part of every organic compound. That interpretation allows them to use petroleum derivatives in their products and still label them organic. Therefore, it's up to consumers to read labels carefully and decide for themselves what natural and organic mean.

Question:

What does "cruelty free" mean on a label?

Answer:

"Cruelty free" indicates that the product wasn't tested on animals before reaching the market. Cruelty-free companies certify that neither they nor their subsidiaries conduct or order animal tests on cosmetic ingredients, formulations or finished products and won't do so in the future. People for the Ethical Treatment of Animals (PETA) sponsors this program to regulate cruelty-free products. PETA publishes a list of companies that don't test on animals, and a companion list of companies that do, with updates every two months (for information, contact PETA, 501 Front Street, Norfolk, VA, or call 757-622-PETA). Cruelty free does not guarantee, however, that products contain no animal by-products. The only by-product that doesn't involve killing or traumatizing an animal is lanolin, which is made from sheep sebum.

"If you want to avoid using animal-sourced ingredients, look out for ingredients such as elastin, placenta, collagen, beeswax, silk and tallow," says Rebecca James Gadberry, instructor of Cosmetic Sciences at University of California Los Angeles Extension. "When you see ingredients containing the syllables PPG, *stear, cet* and *gly*, the source could be plant, animal or petroleum. Ingredients that contain the syllables *myr*, *lipids*, *ole*, *sterol* or amino acids can come from plants or animals."

Question:

Are natural products better than conventional products for my skin and hair?

Answer:

Depending on the product, natural ingredients may be less irritating than synthetic chemicals. Pierce Soussat of CamoCare says, "They may cause fewer allergic reactions, promote healthy skin, and help regenerate cells. Some natural remedial products help heal damaged skin." He adds, "Nature evolved her cosmetics over thousands of years."

Earth Science co-founder and cosmetic chemist Michael Rutledge appreciates natural body care products as much for what they don't contain as for what they do. "These products have no artificial fragrances or colors to trigger allergies and sensitivities. There are no heavy metals, petroleum and formaldehyde (a chemical that irritates skin, causes allergies, damages DNA and is a known carcinogen. Japan and Sweden prohibit its use in cosmetics, but its use is still permitted in the United States)."

On the other hand, "Natural substances contain more protein, which can irritate the skin and lead to allergy attacks," warns Ben Fuchs, cosmetics formulator of Rocky Mountain Natural Labs in Boulder, Colo.

Question:

Since these products contain natural ingredients, do they spoil? How long can I keep them before they go bad?

Answer:

The general rule is that natural personal care products have a one-year shelf life. "The proteins in natural cosmetics are very unstable," says Fuchs. "Natural products need to be preserved if you want to use them more than once." Preservatives extend a product's shelf life and keep it bacteria free.

The most commonly used preservatives in conventional cosmetics are butyl-, methyl- and propylparaben and parahydroxybenzoate, which are petroleum derivatives. According to Ruth Winter, author of *A Consumer's Dictionary of Cosmetic Ingredients* (Crown), parabens can cause allergic reactions. Most natural cosmetics manufacturers eschew parabens and instead use ingredients such as vitamin E and grapefruit seed extracts to preserve products. However, some manufacturers consider parabens naturally derived and argue that they're nonirritating and nonallergenic. So, once again, it's up to the consumer to experiment and find out what works for them.

If you use products without preservatives, they may last six months or less and you'll need to keep them in the refrigerator.

The Chemistry of Natural Cosmetics

Ingredient: Emulsifiers

Oil and water don't mix until you add emulsifiers. Emulsifier molecules bind to oil and water molecules in a cosmetic and suspend them to hold creams, lotions and other products together. Some natural products leave out emulsifiers and direct the user to shake the product to blend separated substances before use.

What to Look for on labels

Beeswax - Comes from bee honeycombs and is used in ointments, cold creams, lipsticks and hair dressings.

Lecithin - This naturally occurring mix of several acid compounds comes from soy oil. It's high in the B vitamins choline and inositol.

Carrageenan - Derivative of Irish moss, it's used to give body to cosmetics and to maintain desired texture.

Ingredient: Emollients

These substances lubricate, soften, protect and soothe skin; they reduce roughness, cracking and irritation, and may help retard fine wrinkles. They're found in creams, lotions, skin softeners and moisturizers. Plant oils are high in vitamins, minerals, fatty acids, and proteins that soothe and nourish.

What to Look for on labels

Lecithin - A natural antioxidant used in eye creams, lipsticks, hand creams, lotions and many other cosmetics. It's found in all living organisms and is frequently obtained from egg yolk and soybeans.

Squalene (from vegetables) - Derived from olive, wheat-germ and rice-bran oils. It protects against oxidation, fights bacteria and is compatible with most skin types.

Cocoa Butter - A skin softener and lubricant that comes from the roasted seeds of the cocoa plant. It's used in a variety of creams, including massage cream and suppositories, because it melts at body temperature. May cause allergic skin reactions.

Ingredient: Preservatives

Because natural cosmetics contain few processed ingredients, they're especially vulnerable to bacteria. Preservatives extend a product's life and keep it bacteria free. Each state decides its own minimum requirements for shelf life. You'll find preservatives listed at the end of the label.

What to Look for on labels

Benzoic Acid - Derived from cherry bark, raspberries, tea and cassia bark. It's antifungal and can be mildly irritating to skin. May cause allergies.

Citrus-Seed Extract and Grapefruit-Seed Extract - Extracts from grapefruit and citrus seed protect both oil and water components of products.

Vitamins A, C and E - These antioxidants preserve the natural appearance of cosmetics and retard oxidation, rancidity and spoilage. Together these agents keep products safe and effective.

Ingredient: Thickening/Stabilizing Agents

They prevent emulsions from separating, which preserves the product longer. These agents add body and lift to lotions, creams, lipsticks, hair sprays and gels.

What to Look for on labels

Carrageenan - A bulky, gel-like substance, derived from Irish moss.

Gums (*xanthan and methylcellulose*) - Plant and tree extracts that expand when mixed with certain liquids. May cause allergic reactions in some people.

Waxes (carnauba, Japan, candelilla and rice bran) - Waxes help hold various cosmetics together.

Ingredient: Humectants

Humectants catch water. They attract and hold moisture within cosmetics, which helps create a rich and creamy texture. They also help the skin maintain moisture. Humectants are found in facial masks, toothpastes, creams and moisturizers.

What to Look for on labels

Oats and Oat Protein - This natural grain is rich in vitamins and minerals and has the best amino acid balance of all cereal proteins. Oats soothe

sensitive skin, moisturize dry skin and relieve itching, irritation and inflammation. Oat protein is rich in amino acids.

Vegetable Glycerin - Attracts moisture to hair. It also thickens products, holds moisture to skin, relieves dryness and aids in spreadability.

Sorbitol - Comes from the berries of the mountain ash tree. It inhibits mold and yeast, and replaces glycerin in emulsions, ointments and other cosmetics. It's thick and sticky until diluted.

Amino Acids - Help penetrate skin to dissolve grease.

Ingredient: Solvents

Solvents dissolve other things. They pull nutrients from a variety of substances and turn them into liquid solutions. You'll find them in plant extracts used to make most natural cosmetics in the United States.

What to Look for on labels

Water - The most common ingredient in the cosmetic industry. It extracts vitamins, minerals and many other nutrients from substances.

Ethanol, SD - The second most common solvent, derived from starch, sugar or other carbohydrates. It produces extracts and preserves the extract. Brandy, rum and vodka are the most frequently used alcohols.

Plant Glycerol - This soft, gooey fluid is derived from vegetable oils. It helps products spread, and keeps moisture in creams, face packs and masks, skin fresheners, toothpastes, and other cosmetics. Some skin care experts describe it as soothing, nurturing and nourishing; others say it can irritate mucous membranes.

Ingredient: Surfactants

This term is an abbreviation for surface active agents. They relax water's surface tension so it can spread out to penetrate and cleanse the skin more easily.

In creams and lotions, they act as emulsifiers. When they cleanse the skin, they're called cleansing agents.

What to Look for on labels

Sodium Lauryl Sulfate - Derived from coconut oil.

Sodium Laureth Sulfatess - A salt widely used in baby shampoos.

Soy - A defoamer in soaps, shampoos and bath oils.

Amino Acids - Help penetrate skin to dissolve grease.

Saponins (*yucca*, *chickweed*, *saponaria*, *soapwort*) - Phytohormones that are derived from sugar. Cause waste to foam easily, and produce bubbly lather in shaving creams, shampoos, bath oils and baby shampoos.

How to Shop for Natural Cosmetics

Bring a reference book such as *A Consumer's Dictionary of Cosmetic Ingredients* (Crown) by Ruth Winter, M.S. Some natural products stores will have a reference copy you can borrow.

- Ask a salesperson for clarification if you don't understand something on a label.
- Don't worry if some of the ingredients on the label have names that are polysyllabic. Tocopherol, for instance, is vitamin E.
- Ask the salespeople about a product. Do other customers like it? What does the staff think of the manufacturer?
- Ask if the store rotates products. Natural products, like produce and vitamins, are perishable.
- Call the manufacturer and inquire about their philosophy for developing new products.
- Question the manufacturer about their lab, and discuss ingredients with their chemists.
- Find out if the manufacturer is a member of the Cosmetic, Toiletries and Fragrance Association, which sets labeling guidelines for its members.

- Ask if products are safety tested and guaranteed. Get documentation in customer-friendly language.
- Make sure the store guarantees that you can return the product for a full refund if it's not right for you. Make sure the product you buy includes the manufacturer's toll-free phone number.
- The bottom line is: Buy products from stores you trust, produced by manufacturers you trust. And, most importantly, trust yourself, your instincts and experience.

Botanicals for Beauty

Aloe vera

Stimulates cell renewal, deters wrinkles, soothes sunburn, burns and cuts; relieves pain; discourages scarring.

Elder flower

Normalizes oil secretions, soothes tired eyes, prevents wrinkles, heals blemishes, calms and cools sunburn, softens skin.

Chamomile

Soothes and softens skin, reduces inflammation and swelling, helps to accelerate healing.

Rosemary

Regenerates skin, stimulates circulation, soothes, cleanses, is good for acne and mature skin.

Rose

Calms and soothes skin, cleanses and hydrates skin, is mildly astringent.

Sandalwood

Rejuvenates skin, reduces inflammation, calms sensitive skin, is mildly astringent.

Geranium

Rejuvenates skin, reduces swelling, improves circulation, is mildly astringent.

Tea tree oil

Relieves skin disorders, soothes burns, heals cuts and wounds, helps clear acne.

Lavender

Balances skin, relieves burns, promotes healing, clears blemishes, reduces puffiness.

Source: Aromatherapy for Vibrant Health & Beauty (Avery) by Roberta Wilson, a licensed esthetician.

What are the AHAs cosmetics companies now put in their moisturisers?

AHA stands for alpha hydroxy acid and is supposed to even out skin tone. However it isn't one specific chemical. It is the generic name for fruit or food acids (in other words, organic acids). For example glycolic acid (the acid in sour milk) and lactic acid (produced by tired muscles) are AHAs. AHAs are supposed to "dissolve the glue that binds dead cells" according to the companies involved. Basically the suggestion is that they interfere with the cell adhesion.

Most manufacturers also claim that they penetrate the skin and act on the lower layers. However skin is designed not to do this. Skin cream cannot penetrate the skin and act on the deep living layers in any way, they can only affect the surface layers which are soon lost anyway. INTERVIEW: An Interview with ANITA RODDICK, Founder of The Body Shop By Dennis Hughes, Share Guide Publisher



When Anita Roddick started The Body Shop in 1976, she was a young mother with absolutely no business experience. Running that first shop in Brighton, England taught her all about survival--and also that good business is about more than just finances. Twenty-five years later, The Body Shop is an international phenomenon. There are now over 1,700 stores serving over 84 million customers in 24 different languages. Yet The Body Shop remains as famous for its ethics as its success. Anita Roddick's visionary beliefs--in fair trade, environmental awareness, animal protection, respect for human rights, social campaigning--have remained intact throughout.

Dennis Hughes: My first question relates to the subject of our theme, "Business and Spirituality." You have a quote in your book *Business As Unusual*. "Spirituality in business is not about religious ideas but rooted in concrete action of people whose sense of caring stands beyond themselves." Are you saying here that you think business leaders should shift their emphasis to the human spirit?

Anita Roddick: Yes, that's exactly it. All through history, there have always been movements where business was not just about the accumulation of proceeds but also for the public good. Look at the Quakers&emdash;they were excellent business people that never lied, never stole; they cared for their employees and the community which gave them the wealth. They never took more money out than they put back in. It is a good example of how you can actually run a business. You can view it as not just a job but as an honorable livelihood where you can, by using your imagination, develop the human spirit. I believe this has been done brilliantly by some small and large organizations. It is difficult and it is work, but it can be done. I believe in businesses where you engage in creative thinking, and where you form some of your deepest relationships. If it isn't about the production of the human spirit, we are in big trouble.

Dennis: So actually you are saying that instead of making the businesses shift their emphasis it is more a re-awakening of a consciousness that has always been, and going back to the old ways.

Anita: Yes. Years ago nobody was elected on the economic ticket. It was either the education platform, or it was health or it was other issues. It is only recently that economic values have superceded every other human value.

Dennis: You started The Body Shop back in 1976 I believe, so it is having its 25th anniversary this year?

Anita: Yes. 25 years is a rite of passage and it gives you pause for reflection. When you run an entrepreneurial business, you have hurry sickness--you don't look back, you advance and consolidate. But it is such fun. I am trying to find thoughtful time, not just for reflection but to find the resonance of what's going on. Finding balance, that's what is difficult.

If you can shape your business life or your working life, you can just look at it as another extension--you just fulfill all your values as a human being in the work place. If you are an activist, you bring the activism of your life into your business, or if you love creative art, you can bring that in. If I had learned more about business ahead of time, I would have been shaped into believing that it was only about finances and quality management. There is a sort of terrorism that comes with the operations and the science of making money, but by not knowing any of that, I had an amazing freedom.

Dennis: In other words, you did not know it couldn't be done. Anita: Right! I hadn't a clue. I had never even read a book on economic theory.

Dennis: When you started The Body Shop what were your main goals? Anita: My goal was livelihood. We don't use that word often enough. If I could give one piece of advice to anyone it's don't obsess with this notion that you have to turn everything you do in life into a business, because that ends up being a small version of a large company. But if you can create an honorable livelihood, where you take your skills and use them and you earn a living from it, it gives you a sense of freedom and allows you to balance your life the way you want. If we can actually bring in education, that polishes livelihood like they used to do in the old days, where there were apprenticeships for different skills like a woodworker or a blacksmith. This way is far more exciting and much more creative. For myself, I needed to earn money, to look after the kids while my husband was travelling for two years across South America.

Dennis: What do you see as the difference between a livelihood and a business?

Anita: If you take a measure of business, let's say a small start-up business, and you have the discipline, and you employ people, you create more than an income--you create and develop a process or strategy of developing it to make it bigger and bigger. That is the notion of it, expansion. But if you have a skill or interest and you polish it into a livelihood--in other words, you earn money for your survival plus your education plus travel, whatever, but you don't think big, that is a different thing. You're not thinking it's got to be bigger and bigger.

Dennis: Does it become a business when you start hiring people? Anita: Definitely. For me it did. Then you really have to look at certain standards. You have to start playing by the rules and you have to honor paychecks and benefits, and you have to be disciplined.

Dennis: I had my first business grow into a dozen employees and basically get too big and too complex, and so I sold it. This second one, the magazine, I kept a home business, and for nearly ten years it was just me and my wife, other than outside distributors and the printer. Now we have one employee, the same person for over two years. I guess it is a "keeping it closer to your livelihood" kind of thing. Now that we have a third person, we can take a break now and then. The downfall is that if you are a mom-and-pop operation and you have no help, it can burn you out. The good thing is that you don't have to worry too much about employees with just one or two. So to me, small and careful is good but having a little help is really a benefit. Anita: But still it is manageable at that stage.

Dennis: Yes. I do have to pay employee taxes and keep it official now. Before we hired Lisa I didn't have to think beyond myself and my wife Janice. Anita: The hard thing when it grows larger is that you lose intimacy.

Dennis: I have been tempted to grow this business, to get more people and make it bigger. But I remember what happened with the first one, and I want to have a little more free time now. So you just wanted to get your

livelihood going when you started The Body Shop? Anita: The livelihood came about because women tend to say, "What can I do to make money?" Direct selling, knocking on doors and selling Tupperware really wasn't happening in England in those days. I traveled enormously during the 1960's, when you measured everything by where you traveled and what you did as travelers. I traveled in mostly pre-industrial areas. Because I have the interest of living with indigenous groups of people and pre-industrial groups, I learned so much. For example, when your shampoo is gone, you end up mashing up stuff to put in your hair. You put on mayonnaise, eggs, anything to clean and scrub. It is real experiences that change your values.

Dennis: This was before The Body Shop started? Anita: Years before, when I was in my twenties.

Dennis: How old were you when The Body Shop started? Anita:

Want to know more? Continue on "Interview" in our next issue.

FUTURE CAREER: Being a Cosmetic Chemist......

Susan Wade, a SUNY Oneonta <u>*chemistry graduate*</u> who currently works as a cosmetics formulator

As a Cosmetics Formulator (R&D chemist) it is my responsibility to use raw materials and make a finished product based on marketing's (or an outside customer's wishes). With that we must also make sure the sample is stable, by stressing the product for one to three months under different conditions. We must make sure there are no regulatory issues, paying attention to such things as approval of raw materials in different counties(Japan is a killer), making sure that there are no toxicology issues with ingredients, and following FDA regulations for over-the-counter drugs (sunscreens, hydrocortisone, etc). It is also the responsibility of the chemist to make sure that the product made on the bench can be scaled up, and when it is, that it meets the same exact criteria as the batch made on the bench.

There are several different types of quality control (QC) chemists in the cosmetics industry. A QC technician will examine every batch that comes out of production and test it for pH, viscosity, specific gravity, color, smell, etc. and compare it to the standard supplied from the Research & Development Department. Another job of a quality control chemist is to test every lot of every raw material that will be used in final production to make sure that specifications meet what the manufacturers say they are and are the same as previous lots of that material. All drug products must be tested analytically (either MS/GC or HPLC) to make sure the correct amount of drug is present in the product. In addition, some companies will ask their analytical chemists to analyze a competitor's product (perhaps using an FTIR) and determine exactly what it contains.

Job Nature, Career Prospectus, and more.....

California Society of Cosmetic Chemists: <u>www.caliscc.org</u> New York Society of Cosmetic Chemists: <u>www.nyscc.org</u> The Society of Cosmetic Chemists (UK): <u>194.205.122.12/webapp/scs/servlet/SCSDisplay?purpose=home</u>

Any <u>comment</u> on this issue? Your kind suggestion is much appreciated. Thanks!!