Teacher Notes

Shampoo – Is there Truth behind the Advertising ?

Background information for the teacher

What's a shampoo?

It is a surfactant, or surface-action cleaning agent that works by bonding with oil, dirt, and styling products, and lifting them away from the hair so they can be rinsed out. A typical bottle of shampoo contains active cleaning ingredients and up to 90% water. But, in addition the shampoo may have; dyes, fragrances, oils, softeners, humectants, and natural additives like herb and plant extracts that make each brand unique. A chemist might argue that these last ingredients really aren't that important, and that any good detergent product will do, but just try to convince someone to switch from their favorite shampoo to another brand and you'll learn that when it comes to having a Good Hair Day, science isn't everything.

Making and Comparing Shampoos

- Sample ingredients for a herbal shampoo
  - Pure liquid Castile soap (4 ounces)
  - Food colouring (2 drops)
  - Lemongrass essentials oil (1 tsp.)
  - Rosemary essential oil (2 tsp.)
  - Glycerine (1 tsp.)
  - Distilled water (2 cups)
  - Jojoba oil (1tsp.)
  - Vitamin E oil (1 tsp.)
- Also used commercial shampoos, for example:
  - Herbal Essence
  - Physique
  - Pantene Pro-V
- Extra materials needed:
  - Blow dryer
  - Showerhead

Procedure

1. Purchase the three commercial shampoos.
2. Purchase the ingredients for the herbal shampoo.

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3. Obtain human hair from the hair salon.
4. Make herbal the shampoo.
5. Cover human hair bulk with dirt.
6. Separate human hair into four sinks.
7. Label sinks by the shampoo the label indicates.
8. Rinse hair thoroughly.
9. Dry hair with blow dryer.
10. Take one strand of hair from the sink.
11. Look at each strand of hair under a microscope.
12. Determine which shampoo cleaned the hair shaft the best.
13. Draw conclusion.

Making the Shampoo

1. Measure 4 ounces of liquid Castile soap (the Castile soap has a distinctive scent).
2. Poured the Castile soap into the boiling hot water (it makes very few suds and the soap turns the water a yellowish colour and became diluted almost immediately).
3. Add the glycerol, which was supposed to facilitate the mixing process, but was found to be useless.
4. Add the essential oils (the shampoo base takes on a new personality) Rosemary doesn't change the color very much, but gives a soothing scent. Lemongrass oil turns the emulsion yellow and masks the rosemary scent. Jojoba oil does not change things much.
5. Add two drops of food colouring. The entire shampoo changes colour.
6. Refrigerated the shampoo for a day.
7. On the next day, use the shampoo to washed the hair.

Before Washing the Hair

1. Cut out four pieces of hair.
2. Dirty the hair with dirt.
3. Place the four section of hair into separate bowls.
4. Label the four bowls by shampoo to be used to wash the hair.
5. Use about a quarter size of shampoo.

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Experimental Procedures/Observations (Washing and Drying the Hair):

Procedure

A The hair was wetted with warm water; poured Homemade Herbal shampoo on to the hair. The hair was washed for approximately two minutes; then rinsed with cold water.

B The hair was towel drying and then blow drying for 1 minute

Observation

Homemade Herbal: The hair was kind of tangle and shed a little. After B it was less tangled. It was slightly softer and wavy.

Pantene: Soap establish, while the Homemade Herbal shampoo didn't. After rinsing the hair become shiny. After B, the top of the hair seems to be fuller with some body. Other than some fuzziness that formed it came with a softness that made the hair full of life.

Physique: Not a really superior detangling. After B, fewer tangles and had a wavy and fizzy texture. It was much fuller.

Herbal Essence: It had a fine lather, clean sensation, but gave the hair a very frothy feel, and a magnificent scent. Created a lot of tangles.. After B, it had a pleasant and delicate feeling.

Conclusion

In conclusion, our hypothesis was incorrect. Our shampoo didn't lather as well as the other shampoo. The scent was horrible it was really runny. Next time we should be more careful in making our shampoo. Also the Pantene Pro-V shampoo work the best due to our data. The lather was great and the scent of the hair wasn't that bad itself. We learned how to make shampoo out of scratch. In the future, we have a skill to make our own shampoo, if it is needed.

What are the ingredients of your shampoo ?

Of all cosmetic products sold in the world, the biggest group is hair care cosmetics; basically shampoos and conditioners. Almost everybody uses shampoo and conditioner on a daily basis, but do you know what these products you use every day are made of ?

1. The main ingredient is soap since the main purpose of shampoo is to clean your hair. Since soap in concentrated form is a solid, it is diluted with water to get a liquid soap. Soaps used are non irritant to the eyes and form a good thick foam.

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1. For dry hair some oily substances are added to replace the natural wax of the hair that was removed by the soap.
2. To enhance the strength and volume of the hair natural animal proteins are added.
3. Anti-dandruff shampoos include a special anti-dandruff ingredient which reduces the rapid desquamation of the horny layer cells.
4. Conditioners contain chemicals that make the hair better manageable and easier to style.
5. The shampoo or conditioner needs a fragrance to make your hair smell nice.
6. And if we want it to be a nice pearly looking shampoo a chemical can be added for this also.
7. Special additives like Aloe Vera in the Aruba Aloe shampoos are added in the end phase of the production in order to prevent the scalp from getting dried out.
8. If desired, a very small amount of colour can be added.
9. Finally add preservatives.

The shampoo is now ready for packaging, marketing and making your hair clean.
(Needless to say that the formulation is tested before the customer will use it and that very severe safety and quality controls will be applied during the manufacturing process).

Life Cycle Analysis

Introduction

Life-cycle assessment (LCA) is a process of evaluating the effects that a product has on the environment over the entire period of its life. The purpose is to increase resource-use efficiency and decreasing liabilities. It can be used to study the environmental impact of either a product, or the function the product is designed to perform. LCA is commonly referred to as a "cradle-to-grave" analysis. As LCA is a continuous process, companies can begin an LCA at any point in the

What is an Environmental Life Cycle Analysis?

An environmental LCA is a means of quantifying how much energy and raw materials are used and how much (solid, liquid and gaseous) waste is generated at each stage of the product's life.
Data needs to be collected from all stages:

- obtaining the resources
- production
- distribution
- use
- disposal

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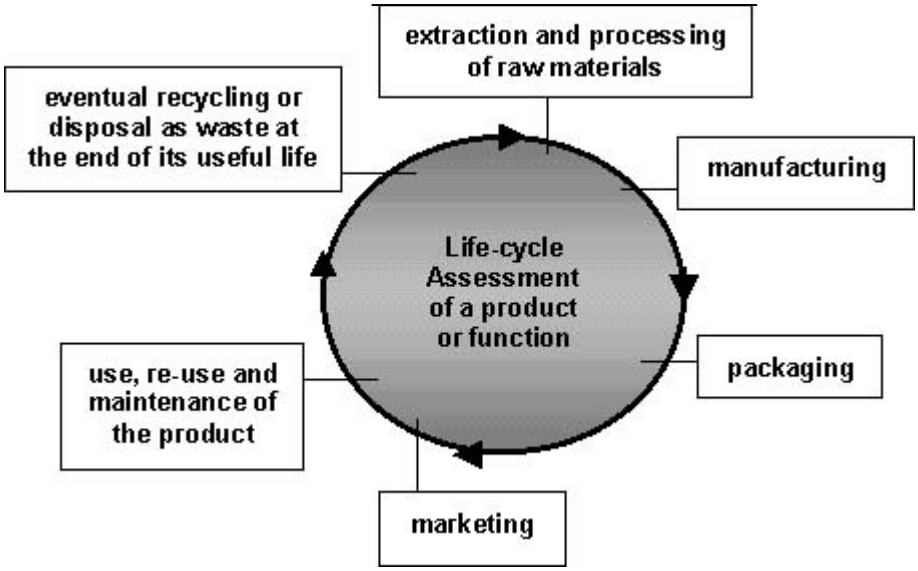
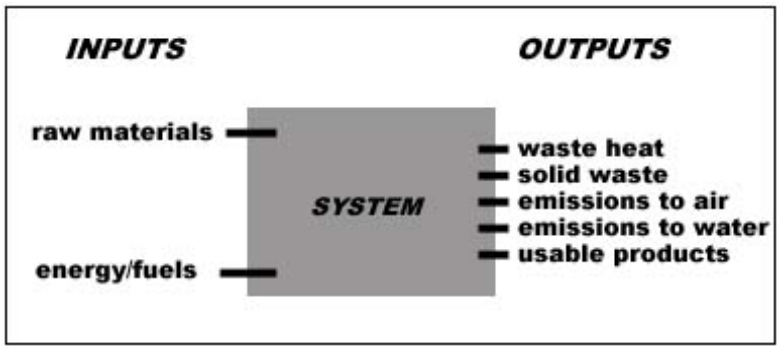
Before carrying out an analysis, the boundaries of the operations that together produce the process or product have to be defined. This is important because of any part of the system contained within the boundaries is changed, all the other inputs and outputs will also change.





Life cycle analysis is only one of the names for this sort of analysis; it is also known as an eco-balance, cradle-to-grave analysis, resource analysis, environmental impact analysis.

Purpose

The main purpose of an LCA is to identify where improvements can be made to reduce the environmental impact of a product or process in terms of energy and raw materials used and wastes produced. It can also be used to guide the development of new products.

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It is important to distinguish between life cycle analysis and life cycle assessment. Analysis is the collection of the data - it produces an inventory; assessment goes one stage further and adds on an evaluation of the inventory.

An LCA does not define or explain actual environmental effect. For example, an LCA will tell us how many grams of limestone are used to make a bottle for mineral water and how much energy was used to extract it. But it does not tell us the environmental impact of this action, such as whether limestone is a scarce resource or whether its extraction causes pollution.

In the same way, it tells us, for example, how many grams of liquid, solid or gaseous waste are produced but not what happens to it. The next stage - assessment - tells us what happens to the waste

Although a consensus is beginning to emerge, there is as yet no overall agreed methodology for LCAs. This is hardly surprising in view of the inevitable complexity of environmental systems. However, provided all reports state the methodology used and the assumptions made, LCAs do provide a useful indication as to where work on essential improvement should be concentrated.

Environmental priorities

An LCA can never produce one simple result. The results are tables of ranges of figures showing quantities of resources used and wastes produced. Any comparison between similar processes or products will therefore depend on subjective judgements on the relative importance of energy consumption, raw material use and waste generation.

The problem of waste disposal currently dominates environmental thinking but environmental priorities change quickly. In the 1970s depletion of the earth's resources was top priority.

Waste control is important but shortages of landfill sites or litter are local problems that can be solved by local solutions and money the global problems should receive most attention.

Protection of the variety of living species, stabilising the climate by controlling carbon dioxide emissions and protecting rain forests, and reducing the rate of depletion of fossil fuels are of even more importance because they will be difficult, if not impossible, to reverse.

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Packaging studies

An LCA is especially applicable in the packaging field because, unlike washing machines, cars or many other consumer goods, packaging is a comparatively simple item made of few materials and follows a fairly simple lifecycle.

Packaging has a positive environmental impact in protecting food and goods (resources) during storage and distribution and it has a negative environmental impact in that it uses raw materials and energy (resources) to do so. It also has a positive impact in preventing the waste of food and goods and a negative impact in ending up as waste itself.

To make informed decisions about reducing the negative and enhancing the positive impact, it is essential to have a picture of the complete system and the physical nature of the product it is going to contain.

On shop shelves we only see the primary or sales packs but these are delivered in some form of secondary pack (usually cardboard boxes or shrink-wrapped trays) which in turn are grouped in larger units in transport packaging.

One of the first industries to use LCA data, was the UK glass industry, which commissioned a study in 1972. In the late 1970s Drs Boustead and Hancock carried out a detailed analysis of the energy and raw materials required to manufacture and use drinks containers for the UK Government's Waste Management Advisory Council.

They followed this in 1989, with a study (see footnote) of all liquid food containers. These studies are unique because, unlike many other LCAs, they did not use published statistics. The methodology and assumptions were clearly defined. They used basic data which reflected actual operating conditions. In a number of cases, inefficient operating conditions were identified and put right.

The main area where the negative impact of packaging can be reduced is at the design stage so that the packaging is a balanced combination of function and environmental impact.

In particular, there is still scope for re-designing primary and secondary packaging to fit as exactly as possible into transport containers. This reduces quantities of packaging materials needed and also reduces the number of vehicle movements which in turn have significant environmental advantages.

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