UNIVERSITY OF ARKANSAS
DIVISION OF AGRICULTURE

4-H Consumer Judging Guide

Laundry Detergents

Perhaps you remember the song you sang as a child: *This is the way we wash our clothes, we wash our clothes, we wash our clothes. This is the way we wash our clothes so early in the morning.*

Doing laundry is hardly anyone's favorite task. But, since most of us like wearing clean clothes, it doesn't leave us much choice. Fortunately, with today's modern laundry products, laundry tasks are becoming easier.

Washing your clothes in water alone – even with agitation provided by hand or by machine – will remove some but not all stains, dirt and particulate soils. Water alone cannot remove soils that are not water soluble, and water does not have the capability to keep removed soils suspended. Therefore, most of us opt to use some type of laundry detergent when washing our clothes.

Laundry Detergents vs. Laundry Soaps

Laundry detergents, or more specifically the detergent surfactant, have the unique ability to remove both water-soluble and nonwater-soluble soils. One end of the surfactant molecule (the lipophilic or oil-loving end) penetrates oily soils, while the opposite end of the molecule (the hydrophilic or water-loving end) loosens the soils and disperses them in the water.

Surfactants and other ingredients in laundry detergent also work to keep the removed soils suspended in the wash water so they don't redeposit onto the cleaned fabrics. By keeping them from reattaching to the fabric, clothes can retain their original color and not turn varying shades of gray. Other ingredients in the laundry detergent, such as enzymes and bleach, work to remove colored stains.

Detergents are an effective means of eliminating germs from your clothing. Sodium hypochlorite, more commonly referred to as chlorine bleach, is one of the most effective agents for sanitizing laundry where there are concerns about germs or bacteria, such as with diapers, illness in the home or everyday germs in socks, underwear and bed or bath linens.

Laundry soaps for laundering have existed for hundreds of years. The basic raw materials are fats and oils and alkali. Despite improvements made over the years in the quality of the product and in the manufacturing process, all soaps have one major drawback: they combine with water hardness minerals to form a lime soap or soap curd – a sticky yellow or white residue that deposits itself on the washer and on the fabrics being washed. When this happens, clothes become dingy-looking over time. As a result, soaps have only limited popularity and only a few brands are available.

Today, there are only two types of laundry soaps: light duty powders and soap bars. The light duty powders are essentially pure soap with perfume and fluorescent whitening agents that are designed for lightly soiled items and delicate fabrics. They are often used for laundering baby clothes and diapers because of their mildness.

Soap bars, on the other hand, are generally made from tallow (another name for animal fat) or a combination of tallow and coconut oil. Borax and builders such as sodium silicate and sodium carbonate are included to improve the bar's performance and help soften the water. While a laundry soap is good for pre-treating heavy soils or stains prior to washing, it is not an ideal cleanser. Other uses for a laundry soap bar include hand washing lingerie and hosiery because it is gentle and easy to use.

Basically, laundry detergents have replaced soaps because they are better performers in various types of waters. But, not all laundry detergents are the same. In fact, they are considerably diverse and can be classified by their general purpose. Also, detergents today come in both powder and liquid forms for consumer convenience.

General Purpose Laundry Detergents

Powders

Suitable for all washable fabrics, from heavily soiled work clothes to lightly soiled lingerie. Some may be used for hand dishwashing and for household cleaning.

Liquids

Used for general laundry purposes but are especially effective in handling oily soils. Pretreating grease spots and stains prior to laundering is convenient and effective.

A new category of detergents will soon be available in the marketplace. They are designed for high-efficiency washers and are specifically formulated for use with lower levels of water. These light-duty detergents will also come in powders and liquids.

Combination Laundry Detergents

One of the most popular items on shelves today are combination laundry detergents. These are detergents combined with a bleach alternative, a color-safe bleach or a fabric softener. They were developed in response to consumers demands for easy-to-use, effective products and may eliminate the need to buy two different products. The detergent-bleach combination uses new technology that has provided a more effective, low-temperature bleaching system for today's lower wash temperatures.

Whatever form detergents may take, they still need to clean. The different additives are designed to enhance a specific performance of the detergent, and each ingredient has a particular purpose.

The **surfactant**, or service active agent, is perhaps the most important ingredient used in every synthetic detergent formula. It has three primary roles: to improve the wetting ability of water, to loosen and remove the soils and to emulsify, suspend or eliminate the soils in the washing solution. Surfactants are organic compounds that wrap themselves around the soil particulates, break them up and then force them away from the surface of the fabric. More importantly, they suspend the soil particles in water, prohibiting them from reattaching to the fabric.

Builders are the second most important ingredient in detergent because they enhance or "build" the cleaning efficiency of the surfactant. They are used in general purpose laundry powders and liquids but not in light-duty detergents. Builders are designed to do the following: soften water by binding the hard water minerals, prevent water hardness ions and help surfactants concentrate on removing soil from fabrics, increase the efficiency of the surfactant, provide a desirable level of alkaline to aid in the cleaning process and disperse and suspend soils so they cannot redeposit themselves on the clothing.

Other additional ingredients and their purpose include:

Antiredeposition agents aid in preventing loosened soil from redepositing on cleaned fabrics.

Corrosion inhibitor helps protect washer parts from corrosion.

Fluorescent whitening agents adhere to fabrics to help maintain whiteness or brightness.

Processing aids provide the right physical properties for the detergent, such as keeping liquid detergents from separating and powder detergents from clumping.

Colorants contribute to product performance and help keep whites white.

Fragrances cover the chemical odor of the detergent and other ingredients and add a pleasant scent to the fabrics. (**Note**: Persons with sensitive skin or allergies may opt to purchase fragrance-free or unscented versions.)

Opacifiers provide a rich, creamy opaque appearance to liquid products.

Oxygen bleach provides detergents with an all-fabric bleaching agent for stain and soil removal and may be particularly effective if care labels specify not to use chlorine bleach.

Enzymes aid in breaking down complex soils, especially proteins such as blood and grass, so they can be more easily removed from fabrics.

Suds control agents help control the level of suds in the washing process.

Fabric softening agents help control static cling and add softness to fabrics.

Other ingredients added to laundry detergent as needed to provide a specialized outcome or as a convenience to consumers.

In recent years, most of us have become more concerned about the **biodegradability** of products, such as soaps and detergents. The surfactant makes up the largest percentage of the organic compounds found in household laundry detergents, and the surfactants are biodegradable. Biodegradability is not a factor with inorganic ingredients such as soap because they are already in their natural state.

Product Packaging

The issue of solid waste is an ongoing concern with both consumers and manufacturers. Most soap and detergent manufacturers have reduced the size of their packaging and decreased the amount of energy and natural resources used in manufacturing and transporting the products.

When selecting soaps or detergents to use at home, check to see if they are packaged to help reduce solid waste. Factors to consider include:

- ❑ Concentrated products that use less packaging.
- ❑ Refills for liquid and powder laundry products because they use less packaging material than primary containers.
- ❑ Lightweight plastic bottles that remain strong but use less plastic than heavyweight bottles.
- ❑ Use of recycled plastics to manufacture all or part of the plastic packaging.
- ❑ Use of recycled paper for cartons made of paper.

Care of laundry detergents is needed to preserve their effectiveness and to maintain the life of the product. This process includes:

- ❑ Opening packages according to directions.
- ❑ Reclosing packages after each use to preserve the product, prevent spills and minimize absorption of moisture by the product.
- ❑ Storing all products in a cool, dry place and out of reach of children.
- ❑ Keeping all products in their original packaging.
- ❑ Not reusing empty containers.

Determining the Amount to Use

The instructions on most detergent packages recommend the amount of detergent to use for optimum cleaning results. The recommendations are based on an "average" wash load and may vary from home to home and load to load. The amount you use may need to be adjusted based on the:

- **Type of soil** – sand and dust are probably easier to remove than heavy grease stains.
- **Amount of soil** – heavily soiled items may require more detergent than lightly soiled items.
- **Size of the load** – smaller loads of laundry tend to require less detergent than larger loads.
- **Water conditions** – hard water may require more detergent than soft water; also the temperature of the water may impact the amount needed.
- **Water volume** – compact or small size washing machines use less water than larger models and require less detergent; top loading washers use more water than front loaders or high-efficiency washers and require more detergent; check your manufacturer's instructions for the recommended amount of detergent to use.

If you read and follow package directions carefully and choose the right product before you start, you are certain to have cleaner clothes and fewer damaged fabrics.

References

"Facts About Laundry," The Soap and Detergent Association <http://www.sdahq.org>

"Bleaches" and "Detergent Cleaners," Do-It-Yourself .Com <http://www.doityourself.com>

Acknowledgment to Sue Lynn Sasser, Ph.D., Family Economics Specialist, Texas Agricultural Extension Service, for the original manuscript.

Prepared by Laura J. Connerly, Instructor - Family Resource Management, University of Arkansas Division of Agriculture, lconnerly@uaex.edu.

University of Arkansas, United States Department of Agriculture, and County Governments Cooperating