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Review Article

A Review on Baby Wet Wipes

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ABSTRACT

Wet baby wipes are pre-moistened cloths commonly used for cleaning and hygienic purposes, particularly for infants. These wipes are designed to provide an efficient, convenient solution for cleaning babies' delicate skin, offering an alternative to traditional methods like water and soap. Typically made from a combination of nonwoven fabrics and various soothing ingredients, such as terminalia Arjuna, papaya seed powder and vitamins, wet baby wipes are formulated to be gentle and safe for sensitive skin. The wipes are soaked in a mild cleaning solution containing water, surfactants, preservatives, and moisturizing agents to cleanse, hydrate, and protect the skin. They offer a practical solution for on-the-go diaper changes, quick clean-ups, and even in cases where water access is limited. The widespread use of wet baby wipes has raised concerns about their environmental impact, particularly in relation to their disposal, as many contain non-biodegradable materials. Consequently, the industry is increasingly focusing on developing more sustainable alternatives, such as biodegradable wipes, to address these concerns while maintaining their practical benefits.

INTRODUCTION

Using diapers can be beneficial for babies' hygiene and comfort, but it also comes with potential risks. One common issue is skin irritation and rashes, which can occur when babies' skin is exposed to moisture, urine, or stool for extended periods. This can lead to redness, soreness, and discomfort. Some disposable diapers may contain harsh chemicals like chlorine, dyes, and fragrances that can irritate sensitive skin or trigger allergic reactions. When choosing baby wipes, it's essential to consider factors like safety, effectiveness, and comfort. Baby wipes are designed to be gentle and safe for infants' delicate skin. The science behind their composition and function is based on skin care principles, microbiology, and chemistry. Diaper dermatitis is a common issue in infancy, peaking at 9-12 months. Skin irritation can worsen this condition, increasing discomfort and suffering. Using skinsafe products and keeping the diaper region dry and clean will help reduce the baby's chance of

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developing dermatitis while also making them more comfortable.

Merits Of Using Baby Wet Wipe:

- \cdot They can be used anywhere
- They are easily transported
- . No water is needed
- ·They are effective at cleaning

•They are available for a wide range of uses and to suit different Preferences.

2. A Baby Wipe's Nature:

Three essential parts make up a disposable baby wipe: the liquid composition, the base material, and the container. The three variants of the base material, which is the visible cloth-like portion of the wipe, varies in composition, which in turn affects thickness, absorbency, and tactile softness. Although the materials utilized, such as wood pulp, polyester, and polypropylene, are somewhat common, these variations may affect how well a cleaning is done. With an emphasis on eliminating potentially irritating substances, baby wipes have seen tremendous developments in recent years. Clinical investigations have shown that contemporary baby wipes are preferable to the conventional water and cloth approaches for cleansing diapered skin. According to expert recommendations, such as those published by the

European Roundtable Meeting on Best Practice Healthy Infant Skin Care, baby wipes should preserve the pH balance of the skin, stay away from any irritants, and use mild preservatives to guarantee the best possible skin health.

3. Formulation Of Baby Wipes:

Creating a baby wipe that is gentle, safe, and effective is a complex task. The formulation must adhere to strict regulatory, safety, and performance standards while also being visually appealing. Ideally, baby wipes should have a highwater content. However, water alone is insufficient for removing stubborn residue and maintaining skin health. To address this, baby wipes typically contain a mild cleansing agent to facilitate cleaning, a preservation system to prevent microbial growth, and a pH balancing system to maintain a skin-friendly pH . Additionally, some wipes may include ingredients that provide skin benefits, such as restoring skin lipids and decreasing friction. The idea that baby wipes contain strong alcohols like ethanol and isopropanol is a prevalent misconception. While these ingredients are found in some sanitizing wipes, reputable branded baby wipes do not contain them.





The water utilized in baby wipes undergoes rigorous purification, often meeting or exceeding reverse osmosis standards. This meticulous



treatment process effectively removes impurities, including minerals like calcium and magnesium carbonate, which can contribute to water hardness and serve as nutrients for microorganisms. To ensure sterility, water treatment systems often incorporate ozone and ultraviolet (UV) light processing. Furthermore, Advanced filtration methods eliminate total dissolved solids and microbial contaminants, resulting in water of exceptional quality. In fact, the water used in baby wipes often surpasses the quality of standard drinking water and even some types of distilled water, thanks to these intentional purification processes.

4.2 pH adjustment:

At birth, a newborn's skin has a neutral pH, but within days, the skin's natural barrier, known as the acid mantle, develops, and the pH level shifts to a slightly acidic range of 5-5.5. Maintaining this delicate acid mantle is crucial for preserving the skin's barrier function and inhibiting the growth of microorganisms. Formulating baby wipes with a slightly acidic pH serves two vital purposes: it helps maintain the skin's natural pH balance and prevents the proliferation of microorganisms within the product. Research has shown that using baby wipes with a pH level close to that of the skin can effectively maintain healthy skin pH levels and is generally well-tolerated, outperforming traditional water and cloth methods.

5. Physiology Of Skin:

The skin, the biggest organ in the body, accounts for more than 15% of the body weight. Along with preventing excessive water loss from the body and aiding in thermoregulation, it also offers protection against external physical, chemical, and biological hazards.

The skin composed of 3 layers:

- 1) Epidermis
- 2) Dermis
- 3) Subcutaneous gland

5.1 Epidermis: The epidermis represents the outermost layer of the skin, serving as a delicate yet protective barrier made up of epithelial cells. This layer plays a crucial role in safeguarding the body against external elements such as moisture loss, temperature fluctuations, and harmful pathogens. It undergoes a continuous process of renewal through the mechanisms of cell division and shedding.

5.2 Dermis: This layer is elastic like a Collagen and elastic fibres are interwoven in the matrix, which is made of connective tissue. Pregnancy and obesity may cause persistent ridges, or stretch marks, which are caused by the rupture of elastic fibres in the skin.

5.3 Sub-cutaneous gland: The sub-cutaneous layer, referred to as the hypodermis, constitutes the deepest layer of the skin. It is primarily made up of adipose tissue, which consists of fat cells, along with connective tissue. This layer plays a crucial role in regulating body temperature, storing energy, and providing protection to the muscles and bones situated beneath it. The thickness of the subcutaneous layer can differ significantly, with greater fat accumulation observed in specific regions such as the buttocks and thighs. Additionally, this layer houses blood vessels, nerve ending.¹¹





Subcutaneo

Figure 1. Skin Figure

6. Fungal Infection:

Definition: The condition known as mycosis, or fungal infection, is brought on by an overabundance of fungi, such molds or yeasts, on the skin, inside the body, or on internal organs. Fungal infections, also known as mycoses, are a growing concern worldwide. They can affect anyone, but those have use immunosuppressive treatment patients suffers mostly.

6.1 Types of fungal infection:

Superficial Fungal Infections: These infections affect the outer layers of the skin, hair, and nails. Examples include:

Ringworm, Jock itch, Nail fungus

Deep Fungal Infections:

These infections penetrate the inner tissues and organs of the body.

Examples include:

Pneumonia (lung infection), Meningitis (infection of the brain), Bloodstream infections - Organ infections (such as those affecting the kidneys or liver.



Figure 2: Fungal Infection of Skin



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6. Overview Of Fungal Skin Infections:

Fungi typically inhabit moist areas such as the vaginal region, beneath the breasts, and the area between the toes where the skin surfaces touch. Fungal skin infections are often caused by dermatophytes (like Epidermophyton) or yeasts (like Candida or Malassezia furfur). Many of these fungi are found exclusively in the stratum corneum, the outermost layer of the epidermis. Because they have more skinfolds than typical, obese people are more prone to these conditions, particularly if the skin inside a skinfold deteriorates and becomes inflammatory (intertrigo). Fungal infections are also more common in people with diabetes. It's odd that rashes on healthy portions of the body can result from fungal infections in other areas.

Symptoms:

1) Alterations in the skin may manifest as redness, along with potential cracking or peeling.

2) Itching Causes of fungi skin infection:

Imbalance of bacteria is due to following reasons:

- ► excessive use of antibiotics
- ► Hormonal changes/imbalance
- \blacktriangleright loss of appetite

Diagnosis-:

- 1. **Visual inspection:** Examination of the affected skin area for characteristic signs such as redness, itching, and scaling.
- 2. **Medical history:** Assessment of the patient's medical history, including previous fungal infections, allergies, and medications.

3. Treatment -:

Antifungal drugs

Fungal infections are generally managed with antifungal medications. These medications are often administered topically to the infected region, utilizing forms such as creams, gels, lotions, solutions, or shampoos. In certain instances, antifungal agents may be prescribed for oral consumption. Alongside pharmacological treatment, maintaining dryness in the affected area through the use of powders or opting for open-toed footwear can prove beneficial.¹³

Antifungal wet wipes: Antifungal agents are offered in various topical formulations on the market, including creams, ointments, and powders designed for dermatological treatment.

Concept of Antifungal wet wipes:

Antifungal wet wipes are topical preparations that inhibit fungal growth, treating fungal skin infections like Tinea pedis, ring root, and Moniliasis. They: -

Relieve symptoms like itching, burning, and redness - Prevent recurrence by creating an environment unfavourable to fungal growth.

- Contain active ingredients like azoles, allylamines, and polyenes that inhibit fungal cell membrane synthesis or function.¹²

7. Skin Benefit Agents:

This group of ingredients for baby wipes includes a variety of additions designed to improve the product's sensory qualities, lessen skin friction, and offer moisturizing advantages. Glycerin, alcohol, xanthan gum, and butoxy PEG-4 PGamodimethicone are typical components. Additionally, various botanical extracts like aloe vera, chamomile, and vitamin E derivatives are often incorporated to provide soothing and nourishing properties. It's essential to note that these botanical ingredients can be complex mixtures of chemicals, and their composition may vary depending on factors like harvesting season. Therefore, careful monitoring of their presence in

baby wipes is crucial to ensure consistency and safety.

8. Safety Testing of Baby Wipes:

Both the product as a whole and its individual constituents should be listed in baby wipe safety profiles. Both allergic and irritating responses can occur in the skin. It's important to consider the possibility of eye discomfort because baby wipes are frequently used around the face as well. Animal test models, non-animal in vitro test models, and clinical human subject testing are currently available methods for doing safety testing. When suitable, the latter two choices have become more popular. Testing on human subjects happens when the formulation is evaluated and it is concluded that there are no potential safety hazards. To show tolerance and validate their alleged usage, tests of this kind are often conducted under the supervision of Good Clinical Practices (GCPs). It should be emphasized that human subject testing is done to verify the safety of cosmetic products, not to identify potential risks. Since baby wipes are used to clean the skin, eye irritation, dermal irritation, and allergic responses are the main concerns. Participants with sensitive skin may be enrolled in products made for sensitive skin. The scientific literature served as the foundation for the design of these tests, even though the testing labs and study sponsors will specify the protocols. The participants used for the studies might change depending on the goals and design of the research because they are tests on human people.¹⁴

9. CONCLUSION:

Baby wet wipes have become as essential hygiene product for due to there convenience, effectiveness and ease of use. Their formulation has evolved over the years, incorporating safer ingredient, hypoallergenic properties, and skin-friendly additive to minimize irritation and allergies. However, concern remain regarding the presence of certain preservatives, fragrance and chemicals that may cause skin reaction in sensitive infant. While biodegradable and eco-friendly options are gaining popularity, their overall environmental impact remains a challenge due to disposal concerns. Present are encouraged to choose dermatologically tested, fragrance-free and alcohol-free wipes to ensure the safety of there baby's delicate skin. Future advancements in baby wipes should focus on sustainability, improved biodegradability and the eliminations of potentially harmful ingredients while maintaining their effectiveness. Further research on their longterm effects and alternative formulations will help create safer and more environmentally responsible options.

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