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## Review Article

# Ayurvedic Baby Wipes: A Natural Approach to Infant Care

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### ABSTRACT

In infants diapered area, the continuous exposure to moisture and irritants from urine and feces weakens the stratum corneum layer, making the skin more susceptible to irritation. Baby wipes undergoes a variety of tests to ensure the safety and effectiveness including: In vitro eye irritation test, on skin wiping test, Antibacterial test Microbiological test, Human patch test. Ensuring effective removal of residues from urine and feces, maintaining gentle contact with skin, using products that are free from potential irritants and contaminants and that can support the acid mantle of the skin can help promote skin health. As a safer and more environmentally friendly alternative to conventional baby wipes, Ayurvedic baby wipes are an excellent choice for parents seeking a natural and holistic approach to baby care. While disposable baby wipes have been shown to be effective and smooth at cleaning infant skin, even the skin of premature infants, there is growing public concern regarding their safety and tolerability. Not all products are made the same, as differences exist in manufacturing processes, ingredients, materials, safety, and quality testing. Therefore, it is important that healthcare professionals have accessible evidenced-based information on the safety and tolerability of common ingredients found in baby wipes to optimally educate their patients and families. Herein, we provide a review on best practices for ingredient selection, safety, and efficacy of baby wipes.

### INTRODUCTION

A baby wipes is a small moistened piece of plastic or cloth that often comes folded and individually wrapped for convenience, wet wipes are used for cleaning purposes like personal hygiene and household cleaning. The material is moistened

with water or other liquids depend on the applications. The finished wet wipes are folded and put in pocket size package. Pre- moistened, disposable or reuseable cloth use for cleaning and caring for a baby skin.

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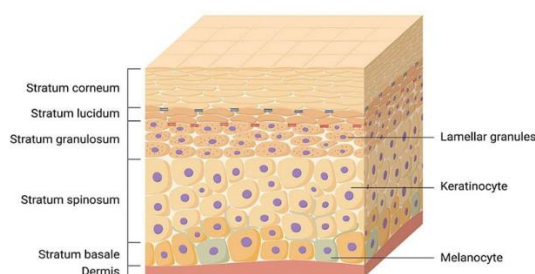
**Fig. No. 1: Marketed formulation of baby wipes**

Skin:

In Ayurveda the word “TWACHA” or “CHARMA” is used for skin. Twacha is derived from ‘Twach-Savarne’ Dhatu meaning the covering of body. The development of skin follows the fertilization of Shukra & Shonita. In foetal stage (garbha) different layers of the skin are formed & this formation is caused by all the three doshas and particularly by Pitta. The formation of skin layers is just similar to the formation of layers,

on the upper or outer surface of boiled milk. Just as the santanika formed in layers & gradually increase in thickness, all the layers formed in the developmental stage of the embryo of foetus join together to become the skin on the outer surface of the fully developed foetus. The six layers of the Twak are formed from the Mamsa Dhatu or Rakta dhatu. After the Paka of Rakta by its Agni, it gets dried up to form the skin, like the deposition of cream on the surface of boiling milk.

## Epidermis



**Fig. No. 2: Anatomy of Skin**

Skin irritation in the diapered region (commonly referred as diaper dermatitis) is one of the most common skin disorders found in infancy, with the highest incidence at 9 -12 months of as age. Overhydration and prolonged expose to urine and feaces are known to be the main contribution to skin irritation in the diapered area. However, an infant’s diet, medications, underlying skin condition, certain product ingredient, caretaker behavior, and practice such infrequent diaper change or ineffective cleaning can also influence the occurrence of diaper dermatitis. It has been reported that the diapering process can be stressfull event for an infant

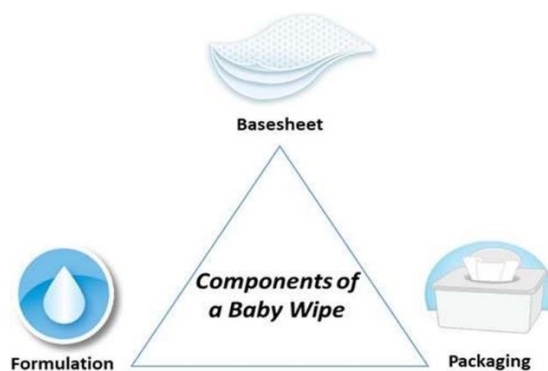
They can have different mechanism, for example

- Dispensing Mechanism
- Material Mechanism
- Moisture Mechanism
- Texture Mechanism
- Innovation Mechanism

### 1. Anatomy Of Baby Wipes

A disposable baby wipes consists of three main components the base sheet (the cloth that makes the wipes) the formulation (the ingredients in the solution that make the wipe wet and help with cleaning), and package, as shown in fig. The packaging (not discussed here) and the base sheet

are the most physically obvious component of a wipe. There are three types of base sheet with difference in composition which translate into difference in thickness and soft to touch.



**Fig. No. 3: Composition of Baby Wipes**

Disposable baby wipes have been used in the care and hygiene of diapered baby skin for decades. Aside from portability and convenience, the most important product benefits are the ability to clean thoroughly while being gentle to baby skin. Caregivers find them convenient and effective for cleaning during diaper changes and quick cleanup on baby's hands and face. Since we introduced a disposable wipe in 1996, design and formulation improvements have been incorporated to better meet the needs of babies, parents, and caregivers. Continuous innovations in the sheet, or substrate, have produced a soft and flexible wipe that effectively removes and absorbs soil. The substrate is wetted with a water-based cleaning and skin care formulation called "lotion" herein that not only aids in emulsifying and removing soil, but also helps maintain a natural skin surface pH.

### Baby Wipe Design

Baby wipes consist of a substrate and lotion. The current substrate is a non-woven sheet made of regenerated cellulose and polypropylene/polyester. Our fibres, which are blended to be soft and flexible with a cloth-like feel. The regenerated cellulose component provides absorptive and cleaning properties and the polypropylene/polyester adds softness and flexibility. A hydroentangled blend of fibres with different shapes serves to increase loft and

softness, improve skin surface contact, and increase absorptive void space. The attributes above make the substrate more effective in physically removing soil and absorbing fluid while protecting the caregiver's hands. The components of the substrate may be modified or rebalanced to achieve the desired.

### Benefits and Uses of Wet Wipes

1. **Personal Hygiene:** Wet wipes are synonymous with personal hygiene. They provide a quick and efficient way to clean hands when soap and water are not readily available. .
2. **Baby Care:** These gentle wipes are ideal for diaper changes, wiping messy hands and faces, and cleaning baby's sensitive areas.
3. **Makeup Removal:** They provide a convenient way to remove cosmetics at the end of the day or for quick touch-ups on the go. Makeup wipes are often infused with gentle cleansers and moisturisers to leave your skin feeling refreshed.
4. **Skincare:** Some specialty wipes are designed to cleanse and nourish the skin, offering benefits like exfoliation, hydration, and anti-aging properties.
5. **Outdoor Adventures:** Whether you're camping, hiking, or simply enjoying a picnic in the park, wet wipes are a must-have for outdoor enthusiasts. They can serve as impromptu

shower replacements, help clean cooking utensils.

## 2.Literature Review

### 1.John M Boyce *American Journal of Infection Control* 49 (1), 104-114, 2021

Despite a plethora of wipes available for use in health care facilities, there is a paucity of articles describing wipe composition, potential interactions between wipes and disinfectants, the manner in which wipes are used, and their relative efficacy. The purpose of this article is to provide an in-depth review of wipes used for disinfection of hard surfaces in health care settings.

### 2.Emma Mactaggart, David Orchard, Mei Mui Tam *Australasian Journal of Dermatology* 62 (4), 470-477, 2021

Baby wipes are a commonly used cleansing method for infants. A literature review has been performed to assess if using baby wipes is beneficial or harmful compared to water and cloth in terms of nappy rash. This includes a detailed analysis of baby wipe ingredients, as many skin irritants as well as allergens are identified. Baby wipes are deemed as superior to water and cloth in the majority of the literature. However, no definitive conclusion can be drawn as many studies are also industry funded. The most notable allergens identified are fragrances, such as linalool, cocamidopropyl betaine (surfactant), formaldehyde-releasing preservatives and other preservatives, including methylisothiazolinone and methylchloroisothiazolinone.

### 3.Rim Cheriaa, Jaouachi Boubaker *Journal of Industrial Textiles* 51 (2\_suppl), 2124S-2147S, 2022.

A wet wipe is a commercial product made of a fibrous substrate impregnated with a lotion that often comes folded and individually wrapped for convenience. The present work relates to wet wipes' composition to clean the baby's body. Wet wipes were produced from two spunlace nonwoven fabrics consisting of polyester/viscose

and a wetting solution. Objective performance evaluation was carried out to determine the efficiency of the wipes for manufacturing and end uses. The lotion formula comprising surfactants, a solubilizer, preservative compounds, perfumes, and mainly purified water is selected to deliver the intended benefits of a baby wet wipe.

### 1. Tamara Petrović, Jelena Poljarević, Stefan Nikolić, Jelena Stoiković-Filipović. *Liliana F*

*International Journal of Dermatology*, 2024 The skin of newborns is classified as sensitive, with a higher risk of skin barrier disruption and irritation of a diapered area. Despite dermatologist recommendations to use only water and a cloth for cleaning, most of the population still relies on the comforts of modern parenting, which includes intensive daily usage of baby wet wipes. Novel baby formulations are designed following the concept of infant skin health, containing a gentle cleanser, suitable emollient, and buffer system enabling a slightly acidic pH value and they are free of ethyl alcohol. Thus, it is important to understand the chemical background of such a complex liquid formulation.

### 2. Md Monir Hossain, Jennifer M Jones, Swatee Dey, Gregory J Carr, Marty O Visscher

*Food and Chemical Toxicology* 84, 106-114, 2015 Exposure to topically applied substances occurs routinely in premature and hospitalized infant care. Safety determinations are most accurate when exposures are based on appropriately designed studies to capture variations in practice patterns and population heterogeneity. Current safety assessments may not reflect actual practice resulting in overly conservative or understated default assumptions for toxicological determinations. We quantified the amount of baby wipes lotion transferred to premature and term neonatal skin as grams/kg body weight/day.



3. **Nicole Gerber, Shweta Iyer, Didier Murillo Parra, Lori Legano, Michael Tunik Pediatric emergency care 36 (7), e397-e398, 2020**

Abusive suffocation with foreign bodies is an uncommon form of child abuse. We present the case of a 2-month-old infant with colic who was forcibly suffocated with a baby wipe by a female babysitter. He presented to the emergency department in respiratory distress, and the foreign body was removed in the operating room by otorhinolaryngology. He was found to have intraoral lacerations and a left diaphyseal humeral fracture. To our knowledge, there is only 1 other

collection of case reports of abusive suffocation with baby wipes.

**2. Aim & Objectives**

**Aim:** Ayurvedic baby wipes: A Natural Approach to Infant Care

**Objectives:**

1. Clean and hygienically wipes baby skin
2. Provide gentle and soothing care for delicate skin.
3. Effectively remove dirt, feces and urine
4. Provide long-lasting comfort and protection

**4.METHOD & MATERIALS**

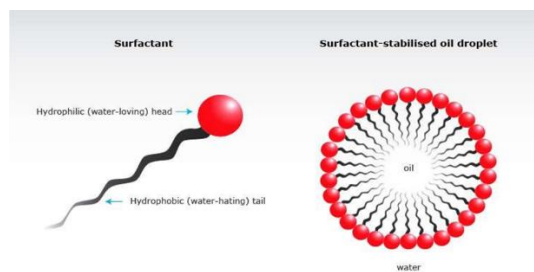
**Ingredients Classification and Function**

**1.Water**



**Fig. No. 4: Water**

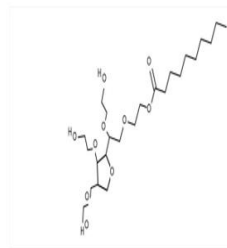
**1. Surfactants**



**Fig. No. 5: Surfactant**

Surfactants are the molecules within the formulation that provide cleaning action. Surfactants contain hydrophilic moieties attached to hydrophobic end chains. It is the hydrophobic

end chains that bind to oily residue on the skin surface and help remove it. For baby wipes, it is important to use a surfactant that can adequately remove.



**Fig. No. 6: Polysorbate-20**

**IUPAC Name:** Polyoxyethylene (20) sorbitan monolaurate

**Molar Mass:** 1,227.54 gm/mol

**Chemical Formula:** C<sub>58</sub>H<sub>114</sub>O<sub>26</sub> **Density:** 1.1gm/cm<sup>3</sup>

**Boiling point:** 695.8

**Uses:** It used as washing agent.

**Preservatives:**

**1. Orange Oil**



**Fig. No.: 7: Orange Oil**

**Synonym:** sweet orange oil, oil of orange peel

**Biological source:** Orange Oil is the volatile oil obtained by expression from the fresh peel of the ripe fruit of *Citrus sinensis* (sweet orange) belonging to family (Rutaceae) Chemical Constituents: Limonene, citronellal, citral

**Geographical Source:** -

It is indigenous to India but cultivated commercially in South Spain(Seville), Caribbean

Islands, U.S.A, Morocco & Sicily. In India, it is grown in Maharashtra, Karnataka, Punjab, Kashmir.

**Uses: 1. Skin soothing and calming**

1. Diaper rash prevention and treatment
2. Wound healing and minor cut care nene, citronellal, citral.

**2. Aloe Vera**



**Fig. No: 8: Aloe vera**

**Synonyms – aloe**

**Biological source:** Aloes is obtained from the dried juice of the leaves of • *Aloe barbadensis* Miller, known as Curacao aloes,

**Geographical Source:** Indigenous to East and South Africa, West Indies and tropical countries.

**Family** - liliaceae

**Uses** - Hydrating and moisturizing delicate skin. Anti-inflammatory properties reduce redness

### 3. Rose Oil



**Fig. No. 9: Rose Oil**

#### **Biological Source:**

Rose oil is extracted from the flowers of *Rosa damascena*.

**Family:** Rosaceae

*Chemical constituents:*

Rose oil contains citronellol, geraniol, nerol, linalool, phenyl ethyl alcohol, pinene, limonene and p-cymene.

**Used** in the preparation of soaps, body lotions, face cream etc. used as moisturizer.

### 4. Neem Oil



**Fig. No. 10: Neem Oil**

**Synonyms** - *Azadirachta indica*

**Biological Source:** Neem consists of the fresh or dried leaves and seed oil of *Azadirachta indica*.

**Family** - meliaceae

**Chemical Constituents:** The most important active constituent is azadirachtin and the others are nimbolinin, nimbin, nimbidin, nimbidol .

**Geographical source:** India, Myanmar, Tropical countries

**Uses** -1. Antimicrobial properties: reduces bacterial and fungal growth 2. Anti-inflammatory properties: soothes irritated skin.

#### **Evaluation Test**

**1. Baby wipes undergo a variety of tests to ensure their safety and effectiveness, including:** irritation using a 9-point scale.

**2. In vitro eye irritation testing:** The wipe is tested to ensure it is not irritating to the eyes.

**On-skin wiping tests:** The wipe is tested on adult skin models to ensure it is compatible with skin.

**1. In-use studies:** The wipe is tested in babies to ensure it is compatible with skin.

**2. Antibacterial tests:** The wipe is tested against pathogenic germs like *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Escherichia Coli*, and *Candida albican*.

**3. Microbiological testing:** To ensure that wipes do not contain harmful microbes or high levels

of microbes after manufacturing, and that they can control the growth of microbes during use

**4. Safety testing:** To evaluate the safety of the individual ingredients and the whole product, including the potential for irritant or allergic dermal reactions

**5. Eye irritation testing:** To confirm the wipe's compatibility with the eyes

**6. Human patch tests:** To confirm the wipe's compatibility with the skin



**Fig. No. 11: Microbiological test**

## CONCLUSION:

Ensuring effective removal of residues from urine and feces, maintaining gentle contact with skin, using products that are free from potential irritants and contaminants and that can support the acid mantle of the skin can help promote skin health. In recent years, significant advances have been made to the development of baby wipes, including removal of ingredients with irritation or allergenicity potential. This rigorous approach to safety assurance, tailored to the specific product type and conditions of use, provides confidence that our baby wipes are safe under intended and reasonably foreseeable product use conditions and help maintain natural skin surface pH, an indicator of skin maturation and health in babies.

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