INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: https://www.ijpsjournal.com

OPEN ACCESS

Research Article

Formulation And Evaluation of Ayurvedic Baby Wipes

Mohit Raut, Dr. Vivek Pete, Vaibhavi Sabale*, Unnati Pote, Tejaswini Agrawal

P. R. Patil Institute of Pharmacy, Talegaon (SP), Dist. Wardha, Maharashtra, India (442201).

ARTICLE INFO

Published: 07 May 2025
Keywords:
Ayurvedic, baby wipes, Natural, Infants, Skin.
DOI:
10.5281/zenodo.15354676

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 undergo a variety of tests to ensure the safety and effectiveness including: Microbial test, pH test, Spreadability test, Sensitivity test, Stability 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. Baby wipes are wet wipes used to cleanse the sensitive skin of infants. These are saturated with solutions anywhere from gentle cleansing ingredients to alcohol-based "cleaners". Baby wipes are typically different pack counts

***Corresponding Author:** Vaibhavi Sabale
Address: P. R. Patil Institute of Pharmacy, Talegaon (SP), Dist. Wardha, Maharashtra, India (442201).
Email ✉: sablevaibhavi53@gmail.com
Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

(ranging up to 80 or more sheets per pack), and come with dispensing mechanisms. The origin of baby wipes most likely came in the mid-1950s as more people were travelling and needed a way to clean up on the go. One of the first companies to produce these was a company called Nice-Pak. They made napkin sized paper cloth saturated with a scented skin cleanser. Baby wipes are pre-moistened, disposable cloths used to clean and care for a baby's skin, particularly during diaper changes, feedings, and bath time. Baby wipes were first introduced in the 1970s as a convenient and hygienic alternative to traditional cloth and water. Since then, they have become an essential item in many parents' baby care routines.

Benefits

1. Convenience: Baby wipes are easy to use and dispose of, making them a convenient option for parents on-the-go.
2. Hygiene: Baby wipes help maintain good hygiene practices, reducing the risk of infection and irritation.
3. Gentle on Skin: Baby wipes are designed to be gentle on a baby's delicate skin, reducing the risk of irritation and allergic reactions.
4. Portable: Baby wipes are lightweight and easy to carry, making them a great option for parents who need to clean their baby while away from home. 1. Gentle and Non-Irritating: Ayurvedic baby wipes are designed to be gentle and non-irritating, making them suitable for sensitive skin.
5. Natural and Chemical-Free: These wipes are free from harsh chemicals, artificial fragrances, and dyes.
6. Promotes Healthy Skin: Ayurvedic baby wipes help promote healthy skin by maintaining the natural skin balance and preventing dryness and irritation.
7. Soothes and Calms: The natural ingredients in these wipes help soothe and calm the skin, reducing redness and inflammation.

Type of baby wipes

1. Antibacterial Baby Wipes

- Contain antibacterial agents that help prevent the growth of bacteria
- May be recommended for babies with diaper rash or other skin infections
- Can help reduce the risk of infection and promote healthy skin

2. Eco-Friendly Baby Wipes

- Made from biodegradable and sustainable materials
- May be compostable or recyclable
- A good option for parents who prioritize environmental sustainability

3. Ayurvedic Baby Wipes

- Inspired by the principles of Ayurveda, a traditional Indian system of medicine
- May contain natural ingredients such as neem, turmeric, and coconut oil
- Can provide a holistic and natural approach to baby care

4. Water-Based Baby Wipes

- Made with water as the primary ingredient
- May be a good option for babies with sensitive skin
- Can be less irritating than wipes with high levels of fragrances or dyes

5. Disposable Baby Wipes

- Designed for single use and disposal
- Convenient and easy to use

- May be a good option for parents who prioritize convenience and portability

6. Reusable Baby Wipes

- Designed for multiple uses and washing
- Can be a cost-effective and eco-friendly option
- May require more effort and maintenance than disposable wipes.

MATERIAL AND METHOD

Ingredients

a) Orange Oil: Orange oil, also known as sweet orange oil, is an essential oil extracted from the peel of oranges (Citrus sinensis). It has a sweet, citrusy aroma and is commonly used in aromatherapy, perfumery, and natural remedies.

Fig.1 Orange Oil

Kingdom: Plantae
Order: Sapindales
Family: Rutaceae
Genus: Citrus
Species: Citrus sinensis (Sweet Orange)
Synonyms: Citrus aurantium var. sinensis Citrus decumana

C) Methyl Paraben: Methyl paraben is a chemical preservative commonly used in personal care products, such as cosmetics, skincare, and haircare products. It is also used in some pharmaceuticals and food products.

1. Chemical name: Methyl 4-hydroxybenzoate

2. Molecular formula: C8H8O3

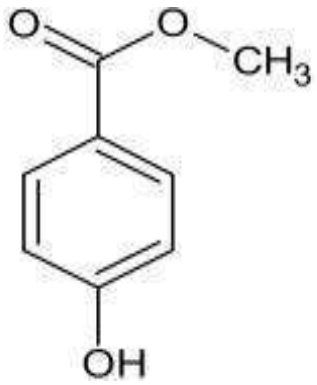

Fig.2 Methyl Paraben

d) Glycerine : Glycerine, also known as glycerin or glycerol, is a natural compound derived from vegetable oils and fats. Glycerine is a polyol compound with the chemical formula C3H8O3. It consists of a three-carbon chain with three hydroxyl groups (-OH) attached .

1.Chemical formula C3H8O3

Fig.3 Glycerin

e) Rose Water: Rose water is a fragrant, clear liquid extracted from rose petals through steam distillation or solvent extraction.

Kingdom: Plantae (Plants)

Family: Rosaceae (Rose family)
Genus: Rosa (Roses)
Order: Rosales (Rose order)

Synonyms

- Rose extract
- Rose distillate
- Rose essence
- Rose infusion

Classification Details

1. Kingdom Plantae: Rose water is derived from plants.
2. Family Rosaceae: Rose water comes from the rose family.
3. Genus Rosa: Rose water is specifically from the Rosa genus.
4. Order Rosales: Rose water is classified under the Rosales order.

Fig.4 Rose Water

Classification Details

1. Kingdom Plantae: Rose water is derived from plants.
2. Family Rosaceae: Rose water comes from the rose family.
3. Genus Rosa: Rose water is specifically from the Rosa genus.
4. Order Rosales: Rose water is classified under the Rosales order.

f) Aloe Vera: Aloe vera is a succulent plant species that has been used for centuries for its medicinal, cosmetic, and culinary purposes. The gel extracted from the leaves of the aloe vera plant is rich in vitamins, minerals, and antioxidants.

1. Soothes Skin Irritations: Aloe vera gel has anti-inflammatory and soothing properties.

2. Hydrates the Skin: Aloe vera gel is rich in vitamins A, C, and E, , which help to hydrate and nourish the skin.

Fig.5 Aleo Vera

Kingdom: Plantae
Order: Asparagales
Family: Asphodelaceae
Genus: Aloe
Species: Aloe vera
Synonyms: Aloe barbadensis Mill. Aloe indica Royle

g) Ethanol: Ethanol, also known as ethyl alcohol, is a colorless, volatile, and flammable liquid with a characteristic odor. It is a widely used solvent, fuel, and ingredient in various industries.

Chemical formula: C2H5OH
Molecular weight: 46.07 g/mol.

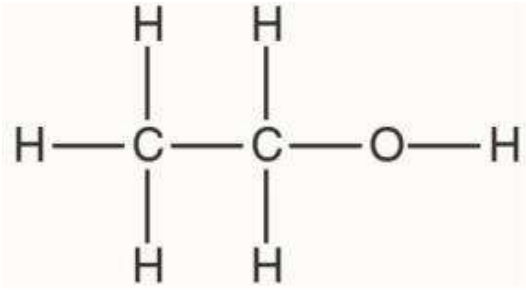

Fig.6 Ethanol

h) Water: Water is a clear, colorless, and odorless liquid compound that is essential for human survival and many industrial processes. It is composed of hydrogen and oxygen atoms, with the

Chemical formula H2O.

Formula for Formulation of Baby Wipes

Ingredients	Quantity (%)	Uses
Orange Oil	0.3 %	Antimicrobial
Methyl Paraben	1 %	Preservative
Glycerin	5 %	Humectant
Rose Water	40 %	Soothes irritated skin
Aloe vera	10 %	Anti - inflammatory
Ethanol	4 %	Organic Solvent
Water	Volume upto q.s	

Procedure

Glassware: Beakers, Stirrer, Measuring cylinder, funnel, water bath, etc.

Ingredients: Orange oil, Methyl paraben, Aloe vera gel, Ethanol, Glycerine, Rose water, Marketed wipes.

Sterilization of Wipes:

Step 1: Preparation

1. Inspect packaging for autoclave compatibility.

2. Remove wipes from non-autoclavable packaging using sterile gloves.

3. Transfer wipes to autoclave-safe container if necessary.

Step 2: Loading Autoclave

1. Place wipes or container in autoclave.

2. Avoid overloading.

Step 3: Autoclave Settings

1. Set temperature: 120°C.

2. Set pressure: 15 psi.

3. Sterilization time: 15-20 minutes.

Step 4: Post-Sterilization

1. Open door when temperature drops below 80°C.

2. Remove wipes using sterilized forceps or tongs.

Step 5: Storage

1. Transfer sterilized wipes to sterile container.

Fig.8 Oven

Fig.9 Wipes sterilized in oven

Aloe Vera Gel Preparation

1. Select fresh aloe vera leaves: Choose healthy leaves.

2. Cut and extract gel: Cut leaves and scoop out gel.

3. Blend gel: Blend gel to a smooth consistency.

Melting Methyl Paraben

1. Take methyl paraben: Place methyl paraben in a beaker.

2. Apply heat: Heat the methyl paraben until it melts and dissolves completely.

Preparation of Baby Wipes Formulation

Mixing Ingredients

1. Combine ingredients: Mix orange oil, aloe vera, glycerin, methyl paraben, and ethanol in a beaker.

2. Blend well: Use a blender to ensure thorough mixing.

Preparation Time

1. Allow formulation to settle: Let the mixture sit for 15-20 minutes to allow ingredients to blend and stabilize.

Saturating Wipes

1. Prepare petri plate: Pour the formulation into a petri plate.

2. Saturate wipes: Place wipes in the formulation and let them absorb the liquid.

Drying Wipes

1. Remove excess formulation: Once wipes are saturated, remove them from the formulation.

2. Dry at room temperature: Allow wipes to air dry at room temperature, ensuring they don't dry out completely.

Packaging

1. Pack wipes: Place the prepared wipes in a package, ensuring they remain moist and ready for use.

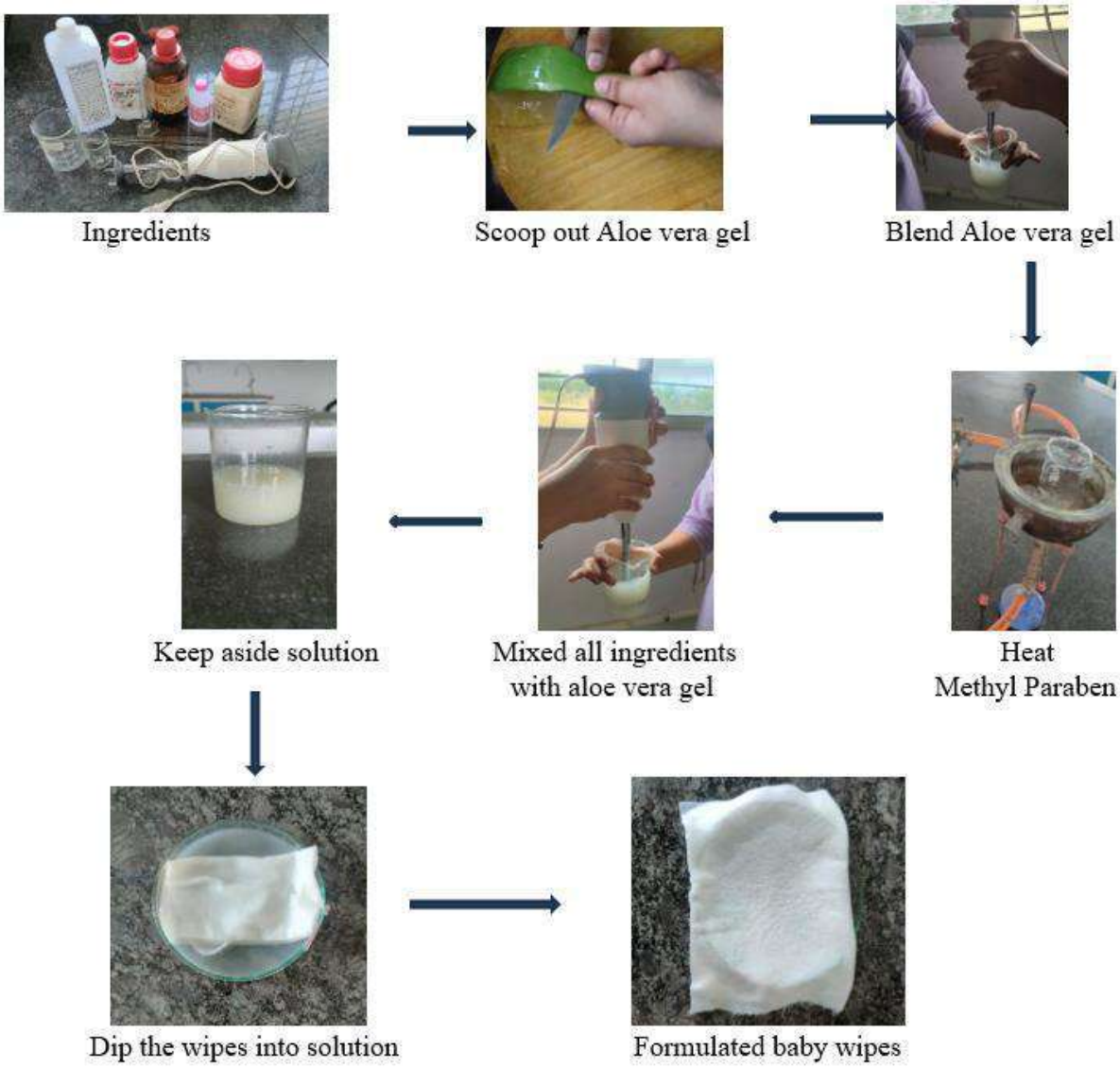

Fig. 10 Procedure of formulation

Evaluation Test

1 pH Test
2 Microbial Test
3 Sensitivity Test
4 Spreadability Test
5 Stability Test

pH Test

1. Sample collection: Collect a representative sample of the baby wipe.
2. pH measurement: Use a pH meter or pH paper to measure the pH level of the wipe's solution.
3. Calibration: Ensure the pH meter is calibrated before use.
4. Testing: Dip the pH meter probe or pH paper into the wipe's solution.
5. Reading: Record the pH reading.

Purpose: To ensure the baby wipes pH level is compatible with a baby's sensitive skin, typically within a slightly acidic to neutral range (pH 4.5-6.5).

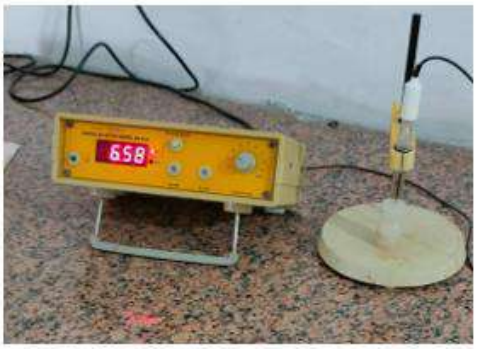

Fig.11 pH Test on pH meter

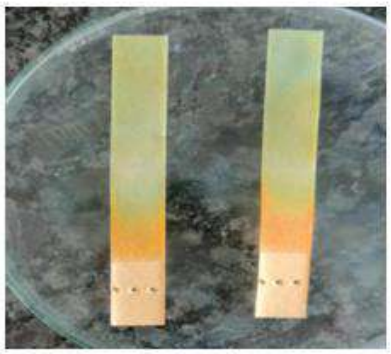
Fig.12 pH Test on pH paper

Microbial Test

1. Agar Medium Preparation: Prepared agar medium.

2. Petri Plate Preparation: Poured agar medium into three petri plates.

3. Inoculation:

- Plate 1: Inoculated with tap water.
- Plate 2: Inoculated with standard (std) solution.
- Plate 3: Inoculated with test formulation.

Incubation and Observation

1. Incubation: Kept petri plates in incubator.

2. Growth observation:

- Plate 1 (tap water): Microbial growth observed.
- Plate 2 (std solution): No growth observed.
- Plate 3 (test formulation): No growth observed.

CONCLUSION

The test formulation and standard solution showed antimicrobial activity, inhibiting microbial growth, whereas tap water did not.

Tests performed:

Fig.13 Microbial Growth Test

Sensitivity Test

1. Apply baby wipe: Applied a small piece of baby wipe to the skin.
2. Allow to remain: Allowed the baby wipe to remain on the skin for 24 hours.
3. Observe test area: Observed the test area for signs of irritation.
4. Remove baby wipe: Removed the baby wipe from the test area.

Results

1. No Redness: No redness.
2. No Itching: No itching.
3. No Swelling: No swelling.

Conclusion: The baby wipes did not cause any skin irritation, including redness, itching, or swelling, when applied to the skin for 24 hours. This suggests that the baby wipes are gentle and suitable for use on sensitive skin.

Spreadability Test

To evaluate the Spreadability of baby wipes, assessing their ability to evenly distribute formulation on skin. This test helps ensure baby wipes effectively clean and are comfortable to use.

1. Gently apply baby wipe to hands.
2. Observe distribution of formulation on hands.
3. Note areas with consistent formulation coverage.
4. The baby wipe formulation covered an area of 9.8 cm^2 on the skin.
5. The coverage area indicates the Spreadability and effectiveness of the formulation.

Fig.14 Spreadability Test

Stability Test

Stability Test of Baby Wipes: Laboratory Scale

Test Conditions

1. Temperature: 40°C ± 2°C
2. Moisture Content:

Moisture Content (%) = ((Initial Weight - Dried Weight) / Initial Weight) x 100

Example

Initial Weight: 5g
Dried Weight: 3g
Moisture Content: ((5g – 3g) / 5g) x 100 = 40%

3.Physical Evaluation

Texture
Absorbency
Linting

RESULT AND DISCUSSION:

The baby wipes demonstrated satisfactory physical characteristics, performance, and sterility, making them suitable for use on sensitive skin. The results inform product development, quality assurance.

Physical Evaluation:

Texture	Softness, smoothness
Absorbency	Liquid absorption capacity.
Linting	Fiber shedding.

Chemical Evaluation:

pH Analysis:

Batch 1	Batch 2	Batch 3
5	6.2	6.5

Microbial Evaluation:

Petri Plate	1	2	3
Inoculation	Tap water	Standard solution	Test solution
Result	Microbial growth	No growth	No growth

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. Ayurvedic baby wipes are essential item in baby care, providing. These wipes are infused with ayurvedic herbs and ingredient that promote healthy skin development, soothe irritated skin and protect against environmental stressors. Ayurvedic baby wipes are essential item in baby care, providing convenience, effectiveness and gentle care for baby delicate skin.

REFERENCES

1. Gregorio J, Rodriguez K. Diaper dermatitis in infant skin: causes and mitigation. Neonatal Intensive Care. 2017; 30:38-40.
2. Comaru T, Miura E. Postural support improves distress and pain du Comaru T, Miura E. Postural support improves distress and pain during diaper change in preterm infants. J Perinatol. 2009; 29:504-507.
3. Andersen FA. Annual review of cosmetic ingredient safety assessments: 2007–2010. Int J Toxicol. 2011;30(5_suppl):73S-127S.
4. Grand View Research. Baby Wipes Market Size, Share & Trends Analysis Report by Product (Dry Wipes, Wet Wipes), Report by Distribution Channel (Hypermarkets & Supermarkets, E-Commerce), by Region, and Segment Forecasts, 2020-2027. Report no: GVR-4-68038- 838-1, 2020, August.
5. Sternberg C. The Global Market for Baby Care: Where is it Currently and where is it Going, 2019, https://www.nonwovens-industry.com (accessed 1 March 2020),
6. Cabrera A and Garcia R. The environmental & economic costs of single-use menstrual products, baby nappies & wet wipes, Investigating the impact of these single-use items across Europe, By zero waste Europe. Report, 2019, November. 5. Kaplan S, Pulan S and Ulusoy S.
7. Adam, R. (2008). Skin care of the diaper area. Pediatric Dermatology, 25, 427–433. doi:10.1111/j.1525-1470.2008.00725.
8. Adam, R., Schnetz, B., Mathey, P., Pericol, M., & de Prost, Y. (2009). Clinical demonstration of skin mildness and suitability for sensitive infant skin of a new baby wipe. Pediatric Dermatology, 26, 506–513. doi:10.1111/j.1525-1470.2008.00804.
9. Atherton, D. (2004). A review if the pathophysiology, prevention and treatment of irritant diaper dermatitis. Current Medical Research and Opinions, 20, 645–649.

10. Visscher MO, Chatterjee R, Munson KA, Pickens WL, Hoath SB. Changes in diapered and non diapered infant skin over the first month of life. Pediatr Dermatol. 2000; 17: 45-51.
11. Ehretsmann C, Schaefer P, Adam R. Cutaneous tolerance of baby wipes by infants with atopic dermatitis, and comparison of the mildness of baby wipe and water in infant skin. J Eur Acad Dermatology Venereol. 2001; 15(Supplement 1): 16-21.
12. Priestley GC, Me Vittie E, Aldridge RD. Changes in skin pH after the use of baby wipes. Pediatr Dermatol. 1996; 13: 14-17
13. Vongsa R, Rodriguez K, Koenig D, Cunningham C. Benefits of using an appropriately formulated wipe to clean diapered skin of preterm infants. Glob Pediatr Health. 2019; 6: 1–6.
14. Berg RW. Etiology and pathophysiology of diaper dermatitis. Adv Dermatol 1988; 3: 75–98
15. Visscher MO, Hoath SB. Diaper dermatitis. In: H Maibach, ed. Handbook of irritant dermatitis. Berlin: Springer, 2006: 37–51.
16. Kosemund K, Schlatter H, Ochsenhirt JL, Krause EL, Marsman DS, Erasala GN. Safety evaluation of superabsorbent baby diapers. Regul Toxicol Pharmacol. 2009;53:81-89.
17. Ward DB, Fleischer AB Jr, Feldman SR et al. Characterization of diaper dermatitis in the United States. Arch Pediatr Adolesc Med 2000;
18. Atherton D. Maintaining healthy skin in infancy using prevention of irritant napkin dermatitis as a model. Community Pract 2005
19. Shin HT. Diaper dermatitis that does not quit. Dermatol Ther 2005
20. Rowe J, McCall E, Kent B. Clinical effectiveness of barrier preparations in the prevention and treatment of nappy dermatitis in infants and preschool children of nappy age. Int J Evid Based Health 2008.

HOW TO CITE: Mohit Raut*, Dr. Vivek Pete, Vaibhavi Sabale*, Unnati Pote, Tejaswini Agrawal, Formulation and Evaluation of Ayurvedic Baby Wipes, Int. J. of Pharm. Sci., 2025, Vol 3, Issue 5, 1105-1115 https://doi.org/10.5281/zenodo.15354676