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

Research Article

Design And Development Of Bath Bomb

Manisha U. Mishra*, Vedika A. Kumarwar, Vijaya K. Parihar, Urwashi C. Baghele, Vaishnavi D. Thengadi

Manoharbhai Patel Institute of Bachelor of Pharmacy, Kudwa Gondia.

ARTICLE INFO

Received: 07 June 2024
Accepted: 11 June 2024
Published: 22 June 2024

Keywords:
Bath bomb, Sodium Bicarbonate, citric acid, Arrowroot powder, Epsom salt.

DOI:
10.5281/zenodo.12280884

ABSTRACT

Bath bomb is a compacted combination of moist and dry elements molded into numerous Shape and dried. It is typically used for refreshing and enjoyable.

Sodium bicarbonate ($NaHCO_3$) is the simple factor in bath bomb, and different merchandise made to supply fizz and foam. It is usually a white crystalline powder or granule. Arrowroot powder acts as the thickening agent, absorbs extra moisture without drying out the pores and skin. This factor can act as a dry filler that receives jumbled together with the reactive baking soda and citric acid. Epsom salt is a chemical salt combination of magnesium and sulfate ions. Its main use is to manufacturing of serotonin, a hormone that soothes and facilitates to relax. The effectiveness of these product depends on the active ingredients. The antimicrobial activities were proportional to the concentration of the bath bomb. All bath bomb formulation showed satisfactory physical properties with smooth texture, proper size and shape can easily gives refreshing and soothing effect. It is concluded that sodium bicarbonate, citric acid and arrowroot powder has a potential to developed a bath bomb. The zone of inhibition is seen on cup plate method and the reading is compared with a standard. The evaluation is done on the formulation. These studies suggest that the formulation of bath bomb within five batches F2 and F3 are more suitable and stable and it gives the cleaning and refreshing activities.

INTRODUCTION

Cosmetics the word comes from the Greek word "adorn," which refers to adding something ostentatious to someone or something. Cosmetics are defined under the FD&C Act as items that are intended to be applied on the human body in any way by rubbing, pouring, springing, spraying, or otherwise in order to clean, beautify, convey elegance, or alter appearance.[1]

Cosmetics include skin care products for the pores and skin, lotions, powders, perfumes, lipsticks, nail paint, colored contact lenses, hair colors, hair

***Corresponding Author:** Manisha U. Mishra
Address: *Manoharbhai Patel Institute of Bachelor of Pharmacy, Kudwa Gondia*..
Email ✉: manishaumishra@yahoo.in

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.

sprays, toddler products, bathtub oils, bubble baths, bathtub salt, and a wide variety of other products.

Cosmetics are a helpful gift from nature and are becoming more and more popular in the global market. To fit your beauty regimen, a wide range of natural beauty products are available.(1)

Bathbomb

A bath bomb is a compressed mixture of dry and wet ingredients that has been dried and shaped into various forms. It's an instruction that's usually employed for scented, pleasurable, and refreshing tubs.(1)

A bath bomb is a straightforward, delicate concoction of citric acid, sodium bicarbonate, and other lovely elements that can help transform your bath into an enjoyable, relaxing sanctuary.(2)

Sodium Bicarbonate ($NaHCO_3$), is the basic ingredient in bath bombs and other products designed to produce fizz and foam. Usually, it is a granule or powder with white crystals. Other than sodium bicarbonate, sodium bicarbonate is known by several

different names and is used in a variety of contexts. It's also known as baking soda, cooking soda, bread soda, and probably the most common place call.(1)

Arrowroot Powder serves as a thickening agent and absorbs excess moisture without causing the skin or pores to become dry. This ingredient may function as a dry "filler" mixed in with the acidic baking soda and baking soda. (1)

Epsom Saltis a chemical salt containing both magnesium and sulfate ions. Its use helps to change the body's magnesium levels, which is important for the production of serotonin, a hormone

that calms and promotes relaxation.(1)

$H_2O + C_6H_80_7 + NaHCO_3 \rightarrow Na_3C_6H_5O_7 + H_2O + CO_2$

Water + Citric acid + Baking soda→ Sodium citrate + Water + Carbon dioxide

In the reaction described above, sodium bicarbonate and citric acid react with water to produce sodium salt, carbon dioxide, and water. The evolution of carbon dioxide causes bubbles to form in the water. Along with the bubbles, the fragrance contained in the components changes, and bureaucracy foam is created by the foaming agent of surfactant. Due to enough ilution in water, the irritation of the pores and skin is no longer caused by citric acid and sodium bicarbonate.(1)

Advantages Of Bath Bomb (3)

- Moisturizes skin – Bath bombs add oils and emollients to your baths water that moisturize and indulge your skin. No matter your skin type, the beneficial ingredients in bath bombs leave it soft, suppleand silky.
- Enhances bath experience –They transform an ordinary bath into a joyful experience with their fizz and dissolve, creating a vibrant and inviting atmosphere that can lift your spirits and provide a cozy retreat.
- Releases relaxing scents – As they dissolve, bath bombs release pleasant fragnances that promote calmness and relaxation. The soothing aromas can help to reduce stress and unwind after a long day.
- Fun and colorful – They come in a variety of fun shapes and colors, turning the water into a fizzy, colorful oasis

Easy to use – Bath bombs are straight forward to use; just drop one into your bath water and watch it fizz there is no need for measuring or mixing, making for a hassle- free, spa-like experience at home.

Benefits Of Bath Bomb(4)

- Bath bombs are a fun addition to any bath time
- They can instantly turn a simple bath into a spa-like bath

- The oils included provide relief for many skin types and are super-effective at moisturizing
- The sodium bicarbonate ingredients provides a detoxifying element to your bath
- They can help with fatigue and tension

Fig No. 1: - Bath Bomb

Ideal Characteristics Of Bath Bomb:[5]

- Bath bomb often contain natural cleaning and detoxifying properties.
- It must be Anti-bacterial and Anti-microbial as well.
- It is used for smooth out dryness for hydrated skin.
- It has smoothing, refreshing and relaxing property.
- Ideal for skin irritation, bug bites and mild rashes

MATERIALS AND INSTRUMENTS

Chemicals –

Table No. 1: - List Of Ingredients With Their Sources

Sr.no	Name of Ingredients	Source
01	Arrowroot powder	Marketed
02	Baking soda	Weikfield company
03	Citric acid	Jack and nick company
04	Epsom salt	Burgoyne Burbidge's and company
05	Lemon oil	Aroma Tique company
06	Carboxy methyl cellulose sodium salt	Burgoyne Burbidge's and company
07	Sodium lauryl sulphate	Burgoyne Burbidge's and company
08	Glycerin	Lobachemie laboratory
09	Sucrose	Himedia laboratory
10	Vegetable oil	Parachute company
11	Food color	Anuja super company
12	Water	Lab prepared

Instruments –

Table No. 2: - List Of Instruments With Their Manufacturer

Sr. no	Name of Instruments	Manufacturer
01	Hot air oven	Metalab Scientific Industries
02	pH meter	Systronics Globe Instrument
03	Magnetic stirrer	Ultrasonic
04	Digital Autoclave	ASI-254
05	BOD Incubator	HMG India

Equipments-

Table No. 3: - List Of Equipment's

Sr. no	Name of Equipment's	Sr. no	Name of Equipment's
01	Petri plate	06	Measuring cylinder
02	Inoculating needle	07	Cotton
03	Mortar and pestle	08	Tissue paper
04	Spherical mold	09	Dropper and pipette

05	Beaker	10	Test tube

Experimental work:-

Procedure –

Firstly, will prepare the solution in two different forms i.e powder mixture and liquid mixture.

Then mix the wet and dry ingredients well with the spoon.

Afterall, preparation of bath bomb processes

Preparation of powder mixture

In one bowl, mix together –

1. 7.5gmcitric acid
2. 15gmbaking soda
3. 15gmarrowroot powder
4. 70gm Epsom salt
5. 10 gm sodium lauryl sulphate
6. 10 gm carboxy methyl cellulose

Mix all dry ingredients with a spoon

Preparation of sucrose solution.

Step 1

Assemble the necessary ingredients include sugar sucrose

water, a spoon, a beaker for solution.

Step 2

Weight 11.4 gm of sucrose and place it into the beaker.

Step 3

Weight 100ml of water and pour it into the beaker of sucrose

Step 4

Stir the solution until the sucrose is dissolved and the liquid is clear. Add vigorously sucrose in beaker upto the solution is thickened. Now our sucrose solution is ready.

Preparation of liquid mixture.

In second bowl, mix together –

1. 5 Drops of glycerine
2. 5 Drops of vegetable oil
3. 30 Drops of lemon oil
4. Quantity sufficient of sucrose solution
5. 5 Drops of food color
6. 10 ml of water

Mix all the wet ingredients with a spoon.

Table No 4: - Ingredients Required For Preparation Of Powder Mixture

Sr. no	Ingredients	Quantity
01	Baking soda	15 gm
02	Citric acid	7.5 gm
03	Arrowroot powder	15 gm
04	Epsom salt	5.70 gm
05	Sodium lauryl sulphate	10 gm
06	Carboxy methyl cellulose sodium salt	10 gm

Table no 5: – Ingredients required for the preparation of liquid Mixture

Sr. no	Ingredients	Quantity
01	Sucrose solution	q. s
02	Glycerin	5 drops
03	Vegetable oil	5 drops
04	Lemon oil	30 drops
05	Food color	5 drops
06	Water	10 ml

Preparation of bath bomb[6]

1. Preheat the oven to 170°f or its lowest setting.
2. Blend both the mixtures wisely i.e powder mixture and liquid mixture.
3. With the medical dropper or pipette, add the wet ingredients to the dry ingredients one drop at a time.
4. Every time you add a drop, quickly press down on the fizzy spot with the back of a spoon to spot the fizziness.
5. Mix the ingredients until the bath bomb mixtures holds its shape when pressed together between your fingers.
6. With a clean medical dropper, add one drop of vegetable oil to the spherical bath bombs molds.
7. Spread the oil all around the mold's surface with your fingers.

8. Fill the molds with the bath bomb mixtures. Compress the mixture in the mold with your hand or spoon.
9. Press the two mold halves together to make a bath bomb spheres.
10. Evenly divide the mixture between all your molds.
11. Turn the preheated oven of and filled mold inside.
12. Let the bath bomb dry inside the oven for about 45 mins. you can also let the bath bombs dry overnight at room temperature.
13. Once, the bath bombs have dried, carefully remove them from the molds.
14. Now, your bath bombs are ready to use.

❖ The secret to their fizziness is active ingredients

- Baking soda a weak base
- Citric acid a weak acid

When mixed together in water, they undergo an acid base reaction.

$NaHCO_3 + C_6H_8O_7 \rightarrow CO_2 + H_2O + Na_3C_6H_5O_7$

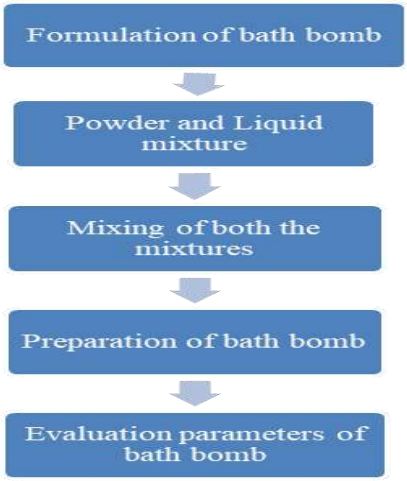
Baking soda citric acid carbon dioxide water trisodium citrate

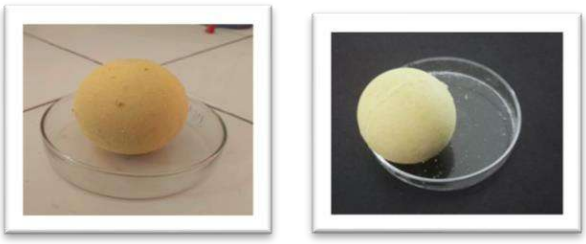
The fizzy bubbles of bath bombs are obtained from the evolution of carbon dioxide gas.

Table no. 6: -Preparation Of Formulation F1, F2, F3, F4, F5

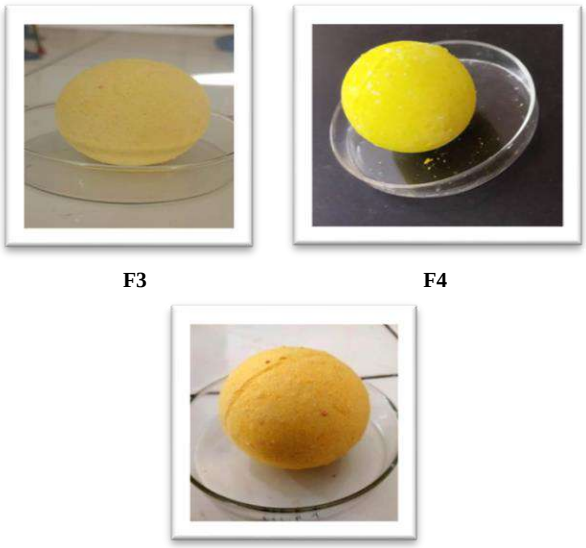
Sr. no	Ingredients	F1	F2	F3	F4	F5
01	Sodium bicarbonate	10 gm	12 gm	15 gm	17 gm	20 gm
02	Citric acid	5.70 gm	10 gm	7.5 gm	10 gm	12 gm
03	Arrowroot powder	12 gm	15 gm	15 gm	15 gm	20 gm
04	Epsom salt	3 gm	5.70 gm	7.5 gm	10 gm	12 gm
05	Water	q. s	q. s	q. s	q. s	q. s

Flow Chart Of Bomb Preparation





F1 **F2**



F3 F4

F5

Fig. No.2: - Preparation Of Formulation F1, F2, F3, F4, F5

Evaluation Of Bath Bomb

- ❖ Physical evaluation [1]
  - color
  - odor
  - state
  - shape
  - texture
- ❖ Effervescent time determination [1]

Taking a specific amount of the bath bomb is positioned in a beaker containing 500 ml of distilled water at room temperature. Whenever a clean blend without effervescence is acquired, bubbling time has completed.

The average of 5 size of every formulations must be reported.

- ❖ Skin Irritation test [1]

Apply the bath bomb paste sample at the wrist of the human volunteer. Mark the reason with black marker. Observe for at least 24 hours. Note incase any reaction occurred.

- ❖ Clarity test [7]

The clarity of all the three batches was determined by visual inspection.

- ❖ Measurement of pH [8]

The pH of bath bomb was determined by using digital pH meter. Take 1 gm of powder and dissolved in 10 ml of distilled water and take apart for two hours. Then the measurement of pH of formulation was done by dipping the glass electrode completely into the solution three times and the average values are reported.

- ❖ Determination of Dissolution Rate[1]

Place the dissolution medium into the vessel free from dissolved air. Assemble the apparatus and warm the dissolution medium to 36.5^{o}C to 37.5^{o}C. place one dosage until in the apparatus. Allow the bath bomb to sink to the bottom of the vessel prior to the reaction. Operate the apparatus immediately at the speed of rotation specified.

- ❖ Foaming test [9]

Approximately 1 gm of bath bomb solution was taken and dissolved in distilled in water (about 50 ml) in a 100 ml graduated measuring cylinder to determine the bath bomb solution's ability to produce foam. It was shaken for roughly 10 min in the measuring cylinder. After 10 min, the foam height was measured. The mean was calculated after recording the observations.

- ❖ Anti-microbial activity [10,11]

Prepare nutrient agar medium and sterilise by autoclave at 121°c for 15 min. prepare the agar plate and label with the name of microorganisms inoculated using sterile technique, inoculate agar plate with there respective test microorganisms by swap streak method or spread plate method. Allow all the culture plate to dry about 5 min. using the sensi disc dispenser. Apply the antibiotic discs by placing the dispenser over the agar surface. If dispenser are not available, distribute the individual discs at equal distance with sterile forceps. Gently press each discs down with the wooden end of a cotton swap or sterile forceps to ensure that the discs adhere to the surface of the agar. Incubate all plates in an inverted position at 37°C for 24 -48 hours.

- Stability study [1]

Samples of bath bombs became stored beneath room temperature for 2 months and the modifications acquired if any are noted.

Result And Discussion

Physical Evaluation

Table no.7: Physical evaluation

Sr. no	Tests	Formulation					Marketed Formulation
		F1	F2	F3	F4	F5	
1.	Color	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
2	Odor	Pleasant	Pleasant	Pleasant	Unpleasant	Unpleasant	Pleasant
3	State	Solid	Solid	Solid	Solid	Solid	Solid
4	Texture	Rough	Sandy like	Sandy like	Sandy like	Sandy like	Sandy like
5	Shape	Spherical	Spherical	Spherical	Spherical	Spherical	Spherical

Effervescent Time

Table no.8:-Effervescent time

Formulation	F1	F2	F3	F4	F5	Marketed Formulation
Time	40sec	25sec	18sec	30 sec	40 sec	20 sec

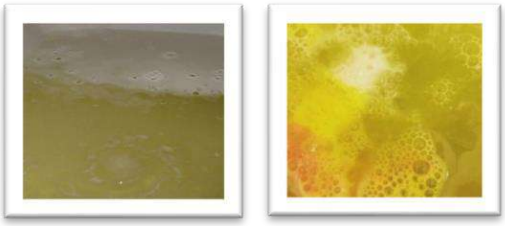


Fig No. 3 :- Determination Of Effervescent Time

Skin Irritation Test

Table no.9:-Skin irritation test

Formulation	F1	F2	F3	F4	F5	Marketed Formulation
Time	30 min	1 hour	2 hours	3 hours	4 hours	24 hours
Interpretation	No reaction	No reaction	No reaction	No reaction	No reaction	No reaction

Fig No. 4 :- Determination For Skin Irritation Test of F1, F2, F3. F4, F5

Ph Evaluation

Tableno.10:-pH Evaluation

Formulation					Marketed Formulation
F1	F2	F3	F4	F5	
8.70	5.48	6.51	4.10	3.91	7.40

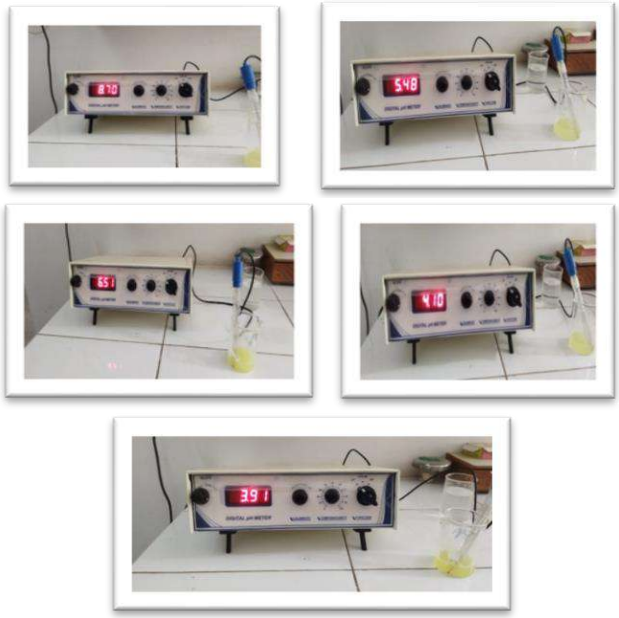


Fig No. 5 :- Measurement For Ph Of F1, F2, F3, F4, F5

- **Determination Of Dissolution Rate**

Table no.11:-Determination of dissolution rate

Formulation					Marketed Formulation
F1	F2	F3	F4	F5	
30 sec	22 sec	15 sec	25 sec	35 sec	20 sec

Fig No. 6 :- Determination Of Dissolution Time

❖ **Foaming Test**

Table no. 12 :- Determination of foaming test

Formulation	Avg foam height	Marketed Formulation
F1	62 cm	75 cm
F2	74 cm	
F3	80 cm	
F4	55cm	
F5	60 cm	

FIG. NO. 7 :- Determination of foaming test

❖ **Anti-Bacterial Activity Of Bath Bomb Formulations**

Table no.13:- Antibacterial Activity of Bathbomb Formulations

Evaluation parameter	Standard	Formulation			Marketed Formulation
Antibacterial activity	(Ampicillin)	F1	F2	F3	
Zone of inhibition (mm)	For E. Coli				
	12mm	8.2mm	8.6mm	10.3mm	11.2 mm
	For S. aureus				
	14mm	10.0mm	10.2mm	12.4mm	12.4 mm

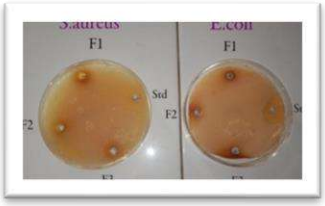


Fig No. 8 :- Growth Of Culture On Petri Plate

DISCUSSION

In the present work sodium bicarbonate, citric acid and arrowroot powder which gives antimicrobial and antibacterial activity. The formulation F2 and F3 showed the best result, may be because of constituents present in sodium bicarbonate, citric acid, arrowroot powder and Epsom salt. Arrowroot powder is known for its antibacterial properties that may aid in infections and small quantities of sodium bicarbonate have inhibitory effect on bacteria. Up to date, numerous product such as soaps, body washes, shower gels are available for showering and refreshing but bath bomb shows all the properties of above products. At present it emerge as very convenient product for cleaning and refreshing our body with some therapeutic uses. Once dissolved in water, bath bombs release citric acid which fizzes up and helps loosen damaged layers of skin. The oils in bath bombs also tend to be super moisturizing, and basking in

a tub of hydrating oils will leave your skin feeling soft and supple. Now a days people use bath bomb because calming nerves and softening skin while entertaining bathers with fantastic fizz, soothing scents, and captivating colors. Another important issue that deserve, attention towards the safety of these bath bomb as there were no reported adverse effect. Based on the findings of the present study, the relevance of sodium bicarbonate, citric acid, Epsom salt and arrowroot powder are safe and effective for relaxing, soothing, smoothing and relieving activity is clearly reported. For our research study we have formulated five batches from which F1, F2, F3, poses good quality of ideal bath bomb which helps them to perform further studies. Formulation F4&F5 did not pass the common evaluation test such as odor and cracks. Later on, formulation F1, F2, F3 are kept under observation for time period of a week. Every day it was watched whether they were stable or not. Generally, cracks on bath bomb leads to the failure of the formulation. Cracks on F4 & F5 were noticed after overnight observation were bath bombs divided into two parts and the formulation F1, F2, F3 are found to be in proper condition after one week observation without any cracks.

Anyhow the evaluation testing for the formulation F4 & F5 is done on the cracked bath bombs. Although the major test which is anti-microbial activity fails to accept the formulation. Later on, we have discarded the batches F4 & F5 and for more studies we have taken our superior batches for further evaluation studies.

After the completion of one-week observation they were kept under observation for two months to evaluate their stability.

As we discussed in previous discussion about the different quality, activity and evaluation test of our prepared formulation. As such the same for the marketed formulation to obtained the proper comparative studies on both of them to check the activity of the formulated and marketed one.

The evaluation studied which was done on formulated preparation was same performed on the marketed formulation as well to check the effectiveness of both the products.

We will study whether the formulated product provide a proper activity or is there any advantage over the marketed product.

From the above cited study, it was found that the formulation F2 & F3 Were superior and F3 was found to be optimum batch

among of them the other formulations.

CONCLUSION

From the study it can be concluded that prepared bath bomb formulation F3 using sodium bicarbonate, citric acid, Epsom salt and arrowroot powder is suitable for the relaxing, soothing, smoothing and relieves effect and shows better anti-microbial activities.

From the comparative study, it is concluded that the formulated preparation shows better activities as compare to that of marketed product.

Hence , the formulated product reduces the side effect of bath bomb preparation and it does not show any harmful effect on our body.

SOURCE OF FUNDING

None

CONFLICT OF INTEREST

None

REFERENCE

1. Thasni K. S. et.al “A review on Formulation and Evaluation of herbal derived bath bomb” published by International Journal of Creative Research Thoughts ISSN 2320- 2882 volume 10 issue April 2022 pg.no. d273 to d280
2. https://www.lush.com/us/en_us/a/breaking-down-the-bath-bomb-the-ultimate-faq-guide
3. https://aspiringyouths.com/advantages-diadvantages/bathbombs/

4. https://www.bathrooms.com/list/rest-and-relaxation/the-fascinating-history-of-the-bath-bomb
5. https://en.m.wikipedia.org
6. Chetan S. Darne et.al "Formulation and Evaluation Of Antifungal And Muscle Relaxant Herbal Bath Bomb Containing Cinnamon Oil" published by International journal in pharmaceutical science in 2023 volume 1 pg. no. 355 to 360.
7. Richa Singh et.al " Formulation and Evaluation of Herbal Oral Gel for Mouth Ulcer" published by 'International Journal of Drug Development and Research' Vol.12 , 2020 page no.1 to 8.
8. Kanchan Upadhye et.al "Formulation and Evaluation of herbal gel for management of mouth ulcers" published by 'Indian Journal of pharmacy and Pharm pharmacology' volume 8, 2021 page no.26-230.
9. Mrs. Blessy Jacob et.al "Formulation and Evaluation of a poly herbal shower gel'' published by international journal of pharmacy & pharmaceutical research in 2023 volume 29 pg. no 69 to 70.
10. Dr. Chandrakant Kokare "Preparation and sterilization of Nutrient Broth" published by 'Currier Publication ' Third edition 2010, pg. no. 68.
11. Dr. Chandrakant Kokare "To Evaluate antibiotic sensitivity of microorganisms by multi disc technique" published by 'Currier Publication' Third edition pg. no. 145.
12. Priya.Jugaleet.al "Preparation and Evaluation of anti-fungal bath bomb of ethanolic extract of betel leaves'' published by SGVU journal of pharmaceutical research and education in 2020 volume 1 pg. no 467 to 469.
13. Gana Manjusha K et.al "formulation and evaluation of herbal bath soap containing methanolic extracts of three ayurvedic varnya herbs'' published by Asian journal of pharmaceutical and clinical research in 2019 volume 12 pg. no 214.
14. Nisha Makkar et.al "comparative evaluation of antifungal activity of piper betel leaf oil, Origanum vulgare essential oil and fluconazole suspension on candida albicans'' published journal of Indian association of public health dentistry in 2017 volume 15 pg. no 90.
15. A text book of cosmetic science by Dr. Aijaz A. Sheikh, Dr. Subhash V. Deshmane, Dr. Kailash R. Biyani, Dr. Md. Rageeb Md. Usman.
16. Sadik Almekhlafiet.al "Anti microbial activity of Yemeni myrrh mouthwash" published by 'Journal of Chemical and Pharmaceutical Research' Volume 6,2014 page no.1006- 1013
17. C. Kokate et.al "Pharmacognosy Of Lemon peel" published by 'Nirali Prakashan' 1st edition pg.no. 14.53-14.54.
18. Ms. Vani Madaan et.al MS "Journal of Fundamental & Comparative Research" Vol. VIII, 2022 page no.: 2277-7067
19. Baking soda for bath bomb – makeyourown.buzz posted by MH on Aug 6th 2017
20. www.researchgate.net
21. https://en.m.wikipedia.org/wiki/sodium_bicarbonate
22. https://en.m.wikipedia.org/wiki/citric_acid
23. https://www.pharmacy180.com/article/lemon-peel-229/#:~:text=Biological%20Source,(C%20medico%20var
24. https://en.m.wikipedia.org/wiki/Lemon#:~:text=The%20lemon%20(Citrus%20%C3%97%20limon,%2C%20Northern%20Myanmar%2C%20and%20China
25. https://tsammalex.clld.org/parameters/citrus_limon

26. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7020168/#:~:text=limon%20is%20determined%20by%20its,%2Dpinene%2C%20%CE%B3%2Dterpinene
27. https://www.rxlist.com/supplements/lemon.htm
28. https://www.kennedyclubs.com/2018/05/top-10-health-benefits-of-lemons-and-limes/
29. M M Sarhan A N K Abu Shahla. Effects of Cymbopogon citratus L. essential oil on the growth, morphogenesis and aflatoxin production of Aspergillus flavus ML2 strain.Published by "Journal Of Basic Microbiology''. February 2007, 47(1):5-15.
30. P.P. Joy, Ancy Joscph Lemongrass: THE FAME OF COCHIN Aromatic and Medicinal Plants Research Station Odakkali, Asamannoor-683 549, Emakulam, Kerala. February 2006.
31. Abhijcet A. Aher. Pradeep K. Nimasc. Formulation and Evaluation of Herbal Lipstick from Color Pigments of Bixa Orellana (Bixaceae) Seeds. Published by International Journal of Pharmacy and Pharmaceutical Sciences. September 2012, 357- 359.
32. https://www.essentialoil.in/lemon-oil.html
33. https://www.drugfuture.com/Pharmacopoeia/USP32/pub/data/v32270/usp32nf27s0_m44470.html#google_vignette
34. https://images.app.goo.gl/upZPV58n5Jb8eJcS6
35. https://tsammalex.clld.org/parameters/citruslimon#:~:text=%2D%2D%20class%3A%20Magnoliopsida,%2D%2D%2D%20species%3A%20Citrus%20limon
36. https://www.sciencedirect.com/unsupported_browser#:~:text=Constituents,about%201%25%20geranyl%20acetate)
37. https://www.doterra.com/US/en/blog/spotlight-lemon-oil#:~:text=Lemon%20essential%20oil%20is%20extracted,to%20produce%20lemon%20essential%20oil
38. https://www.essentialoil.in/lemon-oil.html
39. Vidya Sing h N. Ebibeni. Antimicrobial activity of lemongrass (Cymbopogon citratus) oil against microbes of environmental, clinical and food origin. Published by International Research of Pharmacy and Pharmacology. November 2011, 1(9): 228-236.
40. Monika Yadav, Roopal Dhar. Comparative study of antimicrobial activity of lemongrass (Cymbopogon citratus). Clove (Syzygium Aromaticum) and Tulsi (Ocimum) Essential oils against foodborne pathogens. Published by Asian Journal of Pharmaceutical and Clinical Research. January 2019, 12(4): 230-234.
41. Patel, Salim &Siddaiah, M. (2018). Formulation and evaluation of effervescent tablets: a review. Published by Journal of Drug Delivery and Therapeutics. 8. 296-303.10.22270/2021
42. https://easternblot.net/2017/05/02/science-bath-bombs/
43. https://www.researchgate.net/publication/330428706_evaluation_pH_of_bathing_soaps_and_shampoos_for_skin_and_hair_care
44. https://www.sciencebuddies.org

HOW TO CITE: Manisha U. Mishra*, Vedika A. Kumarwar, Vijaya K. Parihar, Urwashi C. Baghele, Vaishnavi D. Thengadi, Design And Development Of Bath Bomb, Int. J. of Pharm. Sci., 2024, Vol 2, Issue 6, 1063-1074. https://doi.org/10.5281/zenodo.12280884