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Formulation and Evaluation of Herbal Cream Shampoo of Curry Leaves



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ABSTRACT

Nowadays peoples are interested in hair preparation and conditioning preparation such shampoos are product that removes surface grace and dirt from the hair shaft and scalp many shampoos are available in the Indian market under natural or herbal etc. these are formulations are contains detergents and other chemical additives. The herbal cream shampoo prepared formulation was evaluated for its physiochemical properties some physiochemical properties such as Ph foam ability and foam stability and the percent solid content viscosity microbial test was evaluated based on the it can be concluded that the formulation has good quality.



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INTRDOUCTION

A shampoo is a preparation of surfactant (i.e. surface dynamic material) In a appropriate form –which when used under a particular situation will remove surface grase, dirt and skin debris starting hair shaft and scalp without adversely moving the user. However, soap have the separate disadvantages of being the irritating to eyes and incompatible with hard water which mead it leave dull- looking film on the hair In the 1930s the first synthetic detergent shampoo was introduced although it had some disadvantages In 1960s brought the detergents we are using today over the years, many improvements have also been complete to shampoo formulation.

IDEAL CHARACTERISTICS FOR SHAMPOO:

It should be effectively and completely removing dust or soil excessive sebum or other fatty substances and loose corneal cell from the hair.

It should produce a good amount of foam to assure the psychological requirements of the user.

It should be easily removed on rising with water.

It should leave the hair nondry, spongy, lustrous with good manageability and least amount fly away.

It should convey a nice aroma to the hair.

It should not cause any side effects/ irritation to skin or eye

It must not build the hand bumpy and chapped.

Types For Shampoo:

Powder Shampoo:

It is in powder form. It is type of shampoo that reduces hair greasiness without the need of water. Powder shampoo is a prepared when addition of water or other solvent reduces the activity of components, especially in case of medicated shampoo.

Example: Neem powder shampoo.

Liquid Shampoo:

It is a hair care product, typically in the form of a various liquid that is used cleaning hair that is most widely used. Alkanolamides can also be used in this preparation. Some of this shampoo may be transparent.

Examples: Loreal liquid shampoo, TRESemme liquid shampoo.

Lotion Shampoo:

A lotion shampoo calm of anionic surfactant projected for management to the hair or scalp. Are the modification of apparent liquid shampoo solubilizing agent such as magnesium stearate is also used to liquefy the added opacifier.

Example: Redken cream shampoo

Cream Shampoo:

These shampoos have a paste like consistency and are packed in a collapsible tube. They find great use in hair salons. They are also available in jars with wide mouth. The paste consistency is developed by the addition of alkyl sulfates, also Cetyl alcohol is added, which is serves as a builder.

Example: Redken cream shampoo

Jelly Shampoo:

It is a protein-rich substance produced by honey bees and used in shampoo these are great use in hair salons and beauty parlors.

Examples: Garnier shampoo, honey and royal jelly shampoo

Aerosol Shampoo:

Aerosol shampoo contains tiny particles of liquid or solid suspended within the gas they are usually preferred when the hair is greasy. decrease the activity of shampooing ingredients. the bottle opening is provided with a regulator. Shampoo come out as foam when the valve is pushed. Hence also called as foam-type shampoo.

Example: Kerasys aerosol shampoo.

PRODUCT INGREDIENTS:

Surfactants are the main component of shampoo. Mainly anionic surfactants are used.

Principal Surfactants – Provide detergency and form

Example: sodium lauryl sulphate

Secondary Surfactants – Improve detergency, from the hair condition

Example: Dialkyl sulfosuccinates

Other Additives:

Colors

Preservatives

Perfumes



CREAM SHAMPOO:

Cream shampoo are the grounding are used to clean the hair and scalp. Cream shampoo is enriched from of liquid shampoo, thicker and pearlescent proposed to express of the more intensive condition they are planned to provide. The content was wet but not completely dissolve. They would apply faster than solids and dissolved speedily. They are often packaged in jars or tube.

Method of Preparation:

Cream shampoos have a paste-like consistency produced and the past consistency is developed by addition of alkyl sulphates also cetyl alcohol is added, which serves as a builder. Then add perfume and preservatives, mix uniformly. and are packed in a collapsible tube.

Evaluation Parameter of Shampoo:

A) Organoleptic Properties:

Colour, Odour, Texture are observed in a cream shampoo.

B) Physicochemical Properties:

1. Determination of PH:

The pH of 10% shampoo solution in distilled water was determined at PH-meter.

2. Determination percent of solid content:

A clean evaporating dish was weighed and 4 grams of shampoo was weighed. The precise weight of shampoo be designed only and set the evaporating plate shampoo was placed on the boiling plate until the liquid part was evaporated. The weight of the shampoo only after ventilation was calculated.

3. Foaming ability and foaming stability:

Tube shake method be used for formative foamingability. 50ml of the 1% shampoo clarification was placed into a 250 ml graduate cylinder and enclosed the cylinder with hand and shaken for 10 times. The total volume of foam contents after 1 minute shaking was recorded. the foam volume as calculated only. Immediately after shaking the volume of foam at 1-minute intervals, 4 minutes were recorded.

4. Viscosity:

Is determined using the Brookfield viscometer. 50 ml of shampoo taken in a beaker and spindle is dipped in it for about 5 min and then reading is taken.

APPLICATION OF SHAMPOO:

To cleanse the hair and scalp:

Herbal cream shampoo is used mainly for cleaning of hair. the washing of hair by shampoo to clean the hair and scalp.

1. To improve the appearance of the hair:

Herbal cream shampoo is used for improving the appearance of hair.

2. To improve and facilitate the management of the hair:

Herbal cream shampoo is used to improve and facilitate management of the hairs. The becomes a soft and lustrous.

3. To make hair shiny:

Herbal cream shampoo is used to make hair shiny. The hairs become smooth and attractive.

4. To nourish hair:

Herbal cream shampoo is acts as hair nourishing. By using shampoo hairs become a nourished.

PLANT PROFILE

Murraya Koenigii is commonly known as curry leaf or karipatta. The curry tree is tropical to subtropical tree in a family of Rutaceae the plant is distributed and cultivated throughout India. That consist of approximately 150 genera and 1500 species *Murraya koenigii* is found to be native India and Sri Lanka. Additionally, it can found in some other South Asian countries as well. It is a deciduous, small tree or shrub which aromatic in nature and grows up to a height of about 6-9m and up to an altitude of 1500m. It is an important ingredient in Indian curries owing to its fragrance and aroma. The oil of *Murraya koenigii* is reported to possess antibacterial, antifungal, hypolipidemic, hypoglycemic, antioxidant and anti-hypertensive properties. The soap and cosmetics aromatherapy industry utilizes this essential oil as an important part in soap making ingredients, bath oils massage oils, perfume oils, lotions, diffusers, facial steams, towel scenting, air fresheners, incense, body fragrance, scent, aromatherapy products and more curry leaves boiled with coconut oil are reduced to blanked residues that are then used as a powerful hair tonic for retaining and maintaining natural hair tone, hair growth stimulation and prevention of premature growing of hair.



Fig.No.1: Curry leaves

Scientific Classification:

Kingdom : plantae
(unranked) : Angiosperms
Order : Sapindales
Family : Rutaceae
Genus : Murraya
Species : M.Koenigii



DESCRIPTION:

The stem of *M.koenigii* is an aromatic and more or less deciduous shrub or small tree up to 6 meters in height and 15 to 40 cm in diameter¹⁴.the main stem is dark green to brownish. The bark of the stem can be peeled off longitudinally which exposes the white wood underneath. Flowers are small, white fragrant bracteates, calyx deeply five cleft, pubescent. Petals five, free, whitish, glabrous and with dotted glands. Fruits occur in close clusters, small ovide or sub-globose, glandular, thin pericarp enclosing one or two seeds having spinach green color.

CHEMICAL COMPOSITION:

1. The curry leaves are a rich source of many carbazole Alkaloid with a diverse chemical composition.

2. Solvents like ethyl acetate, ethanol, petroleum ether, water and chloroform have been used in researchers to prepare the plant extract. Curry leaves are rich in various source such as proteins, fiber, carbohydrates, minerals, nicotinic acid, vitamin C and carotene.

3. Leaves also contain triterpenoid alkaloids such as cyclomahanimbine and tetrahydromahanimbine.

4. Carbazole alkaloids are important such as girinimbine, murrayacine, koenioline, xynthyletin, murrayazoline, murrayacine and murrayazolidine be the key constituents of the bay.

5. The volatile oil that is present in fresh leaves is a rich source of vitamin A

Traditional Use:

Fresh leaves, dried leaf powder, and essential oil are widely used for flavoring soups and meat dishes, egg dishes, traditional curry powder blends, seasoning and ready-to-use other food preparations. the essential oil is also utilized by soap and cosmetics aromatherapy industry. 16 curry plants are boiled with coconut oil cultivate they are compact to blanked residue which is then used as a superb hair tonic for retain natural hair tone and inspiring hair enlargement. It is traditionally used as a whole or in parts as an antiemetic, antidiarrheal, febrifuge, blood purifier, antifungal, depressant, anti-inflammatory, body aches, for kidney pain, and vomiting.

NEED OF PRESENT INVESTIGATION

Dandruff (also referred as “pityriasis simplex”) is a common embarrassing disorder, which affects 5% of the population. Dandruff is characterized by scaling of the scalp and is frequently associated with seborrhea, and seborrhea is the precursor of seborrheic dermatitis. The yeast, *pityrosporum ovale* is the causative microorganism of dandruff. Dandruff is known to be controlled by fungistatic ingredients in anti-dandruff shampoo.

Scalp infection is controlled by bacteriostatic ingredients in a shampoo formulation. use of zinc pyrithione, salicylic acid, imidazole derivatives, glycolic acid, steroids, and Sulphur and coal tar derivatives adverse effect of this drug are the skin /scalp irritation, allergic reaction, abnormal hair loss and burning of skin. Herbal Formulation have rising command in the humanity advertise. natural remedies are more acceptable in market because its safe and

fewer side effect antidandruff and scalp infection shampoo. hence the herbal cream shampoo of curry plant prepared.

OBJECTIVES

1. To know the concept of herbal cream shampoo.
2. To know how the extraction of plant taken place.
3. To formulate formula for herbal cream shampoo of curry leaves
4. To evaluate formulated herbal cream shampoo of curry leaves.

REVIEW OF LITERATURE

1. Diana pearline *et.al* (2015):

They studied that *Murraya koenigii* is a traditional multipotential plant which has tremendous use in pharmacology. All parts of the plant such as leaf, stem, root, fruits and seed have medicinal properties and are used to cure various ailments like hair growth, hair nourishing and as an antidandruff agent. they believed that natural derived compounds are safer than synthetic compound. In addition to that they studied leaves of this plant are used externally for application onto bruises, burns eruption and treatment of bites of poisonous animals. Internally, they are used to cure dysentery. For the treatment of diabetes mellitus, *Murraya koenigii* is currently being used as a stimulant and antimesenteric, an infusion of the toasted leaves is used as an antiemetic.

2. Vandana jain *et.al* (2012):

They studied that the essential oil is also utilized by soap and cosmetics aromatherapy industry. 16 curry grass are boil with coconut oil cultivate they are compact to blanked rest which is next used as an brilliant hair boost for retain ordinary hair tone and interesting hair growth. Ta is traditionally used as a whole or in parts as antiemetics, antidiarrheal, febrifuge, blood purifier, antifungal, depressant, anti-inflammatory, body aches, for kidney pain and vomiting.

3. Jaya preethi *et.al.*(2013)

They studied that the shampoo is the most common form of hair treatment. Shampoo are primary been products aimed at cleansing the hair and scalp. In the nearby situation, it seem unbelievable that herbal shampoo, even though better in presentation and safer than the imitation ones, will be admired with the customer. A more radical approach in popularizing herbal shampoo would be to change to consumers expectations from shampoo, with emphasis on safety and efficacy. the present paper on composition, type, method of evaluation, also a brief review on herbal shampoo formulations.

4. Hemant dhongade *et.al* (2013)

The *Murraya koenigi* has vast number of therapeutics application such as in bronchial disorder, piles, vomiting, skin disease etc. the leaves have been screened for pharmacological activities and found to possess anti- diabetic cholesterol-reducing property, anti-diarrhoea, cytotoxic, antioxidant, antimicrobial, antibacterial potential and many more useful medicinal property.

5. Satish chand saini: (2015)

Murraya koenigii having board type of characteristics such as antibacterial activity, antifungal activity. The medicinal utilitites have been described especially for leaf, stem, bark, and oil.

6. Shah rajesh kumar *et. al* (2013)

Murraya koenigii belongs to family Rutaceae which can be used as medicines to cure various ailments. This plant is a multi-potential medicinal plant. Almost every part of plant numerous medical applications.

7. V.shivaram Bharadwaj (2011)

The cram experiential a significant reduction in the mean scores are itching and white scales of dandruff. The slanted evaluation revealed remarkable indicative and clinical growth in two weeks stage. The outstanding antidandruff battle of “Anti-dandruff shampoo” strength have be due to the synergistic antifungal, anti-inflammatory and local immunostimulatory events of its ingredients.

8. Vishal Deshmukh: (2013)

The *Murraya koenigi* has vast number of therapeutic application such as in bronchial disorder, piles, vomiting, skin disease etc. The leaves have been screened for pharmacological activities and found to possess anti-diabetic, cholesterol reducing property, anti-diarrhoeal, Cytotoxic antioxidants, antimicrobial potential and much more useful medicinal property. it cures various ailments.

9. Wani Snehal (2013):

This study observed on composition, types, methods of evaluations, also a review on herbal shampoo formulations. An additional fundamental advance in popularizing herbal shampoo would be to modify the user prospect from a shampoo, using importance on safety and worth.

EXPERIMENTAL MATERIAL AND EQUIPMENT:

Table No.1: Materials used for Herbal Cream Shampoo

Sr. No.	DRUG	MANUFACTURER
1.	Sodium lauryl sulfate	S D LAB
2.	Cetyl alcohol	S D LAB
3.	Perfume	S D LAB
4.	Preservatives	S D LAB

Table No.2: Equipment used for herbal cream shampoo of curry leaves

Sr. No.	EVALUATION TEST	EQUIPMENT
1.	pH	pH –meter
2.	Viscosity	Brookfield viscometer
3.	Microbial test	Incubator

EXPERIMENTAL WORK:

1. Collection of Plant Material:

The curry plant leaves were collected from market at Satara.

2. Authentication:

The curry plant authentication is carried out at Botany Department of Lal Bahadur Shastri College of Satara

3. EXTRACTION

Ethanol Extraction

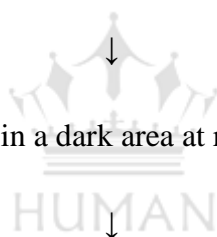
The ethanol extract was made by take in 25 grams of curry leaves powder



Dissolved in 200 ml ethanol and 50 ml distilled water



Covered with filter paper and aluminium foil



kept for 24 hours in a dark area at room temperature.

The filtered supernatant was collected



The solvent was evaporated



By incubating at room temperature for 48 hours



The dry product was collected.

4. FORMULATION OF HERBAL CREAM SHAMPOO

Table No. 3: Formula of Herbal Cream Shampoo

Sr. No.	INGREDIENT	QUANTITY
1.	Curry extract	4 gm
2.	Sodium lauryl sulphate	7.6gm
3.	Cetyl alcohol	1.4 gm
4.	Perfume	q. s
5.	Preservative	q. s
6.	Water	Up to 20 ml

Procedure:

1. Weigh all the solid ingredients.
2. Heat cetyl alcohol and half quantity of water.
3. In beaker take sodium lauryl sulfate.
4. Add aqueous phase into beaker with continuous stirring.
5. Cool with stirring to room temperature.
6. Add perfume and preservative, mix uniformly.
7. Transfer cream shampoo to the container.

EVALUATION OF HERBAL CREAM SHAMPOO

A. ORGANOLEPTIC PROPERTIES

Table No.4: Organoleptic Properties:

Sr. No.	Organoleptic Properties	Observations
1.	Colour	Faint green
2.	Odour	Characteristic
3.	Texture	Fine and Smooth

B. PHYSICOCHEMICAL PROPERTY:

1. Determination of pH:

The pH of 10% shampoo solution in distilled water was determined at PH-meter.

2. Determination Percent of Solid Content:

A clean dry evaporating dish was weighed and 5grams of shampoo was weighed. The exact weight of the shampoo was calculated only and put the evaporating dish. placed on the warm protect awaiting the liquor part was evaporated. The weight of the shampoo just after drying was calculated.

3. Foaming Ability and Foaming Stability:

tube tremble technique be used for formative foaming skill. 50ml of the 1% shampoo resolution was place into a 250 ml graduate cylinder and enclosed the tube with hand and surprised for 10 times quantity of foam filling after 1 minute of shaking was recorded. the foam volume as calculated only. Immediately after shaking the volume of foam at 1 minute intervals, 4 minutes were recorded.

4. Viscosity:

Is determined using a Brookefield viscometer. 50 ml of shampoo taken in a beaker and spindle is dipped in it for about 5 min and then a reading is taken.

5. Antibacterial test:

The antimicrobial activity of herbal cream shampoo using different solvents against strains of aerobic and anaerobic micro-organisms was evaluated by standard cup plate method. For theses standard cup plate method the nutrient agar medium is used as a culture medium. To performed antimicrobial test the pre sterilize petri plate was used. to pre sterilize, the petri plate was incubate for 24hrs at 37⁰c.then next to these the agar culture media is pour on the petri plate uniformly in aseptic condition. After spreading the agar medium is covered with another petri plate and kept aside for 24hrs in the refrigerator to solidify the agar medium. After these the plate was removed and on these plate, the cup was formed. On two particular plate the standard solution which contains microorganism strains *Bacillus subtilis* were uniformly spread in aseptic condition. Now in the cup which are created on two petri plate

the standard which is pure Patanjali herbal shampoo 1ml is poured by the pipette and in next cup the formulated herbal cream shampoo is poured in aseptic condition. Then these two plate were kept for incubation for 24hrs at 37⁰C. After the incubation period the inhibition was found on petri plate.

Composition agar medium

Table No.5: Composition agar medium.

Sr. No.	Ingredient	Quantities (gm)
1	Peptic digest of animal tissue	5.00
2	Sodium chloride	5.00
3	Beef extract	1.50
4	Yeast extract	1.50
5	Agar	8.5

The petri plate shows zone of inhibition. on petri plate the zone of inhibition of herbal cream shampoo and pure form of patanjali herbal shampoo and Bacillus the zone of inhibition is appears.

Result of antimicrobial test of herbal shampoo against Patanjali herbal shampoo is measured in mm by scale.

RESULT AND DISCUSSION

From the evaluation of herbal cream shampoo the result were obtained as follows:

A. ORGANOLEPTIC EVALUTION:

The Organoleptic evaluation of herbal cream shampoo was found to be:

Table No. 6: Organoleptic Evaluation.

Sr. No.	Organoleptic Evaluation	Observations
1	Colour	Green colour
2	Odour	Characteristic
3	Texture	Fine and smooth

B. PHYSICOCHEMICAL PARAMETERS

1. Determination of pH of 10% shampoo solution in distilled water was determined pH meter. The pH of herbal cream shampoo is found to be 6 which is equal to standard shampoo.

2. A clean dry evaporating dish was weighed and 5 gram of shampoo was weighed. The precise burden of shampoo was intended only and put the evaporating plate shampoo was located on the warm plate until the liquor part was evaporated. The weight of the shampoo only after drying was calculated.

Weight of empty evaporating dish = 74.34

Weight of evaporating dish with shampoo = 76.43

Weight of shampoo = 5 gm

Weight of shampoo after drying = 1.92gm

Formula =

$$\% \text{ solid content} = \frac{\text{Initial weight} - \text{Final weight}}{\text{Initial weight}} \times 100$$

$$= \frac{5 - 1.92}{5} \times 100$$

% Solid Content = 61.6 %

3. Foaming Ability and Foaming Stability:

Tube tremble technique was used for formative foaming ability. 50 ml of the 1% shampoo resolution was put into a 250 ml graduated cylinder with hand and shaken for 10 times. The total volume of foam content after 1minute of shaking was recorded. The foam volume was calculated only. straight away after trembling the volume of foam at 1 minute interval for 4 minutes was record. the foaming capability and foaming stability is fine.

4. Viscosity:

The viscosity of the shampoo was determined by using Brookfield viscometer by setting spindle speeds from 0.3rpm and range of cps obtained was 1236.

5. Antibacterial Activity:

Result of antimicrobial test of herbal cream shampoo against standard of pure patanjali herbal shampoo is measured in mm by scale. In these particular evaluation test the anti microbial activity of herbal cream shampoo is found and based on this information we can say that the herbal cream shampoo shows somewhat near than patanjali herbal shampoo But defiantly the formulated herbal shampoo has antimicrobial activity against bacterial specis *bacillus subtilis*.

In a result showing the bacillus is show in zone of inhibition 14mm against pure Patanjali herbal shampoo show in zone of inhibition of 16mm.



Fig.No.2 Bacillus subtilis

Physicochemical Properties:

Table no. 7: Physicochemical Properties.

Sr. No.	Physicochemical Properties	Observation
1	pH	6
2	Wash ability	Easily washable
3	Solubility	Soluble
4	Foaming capacity	Good foaming
5	Moisture content	61.6 %
6	Viscosity	1236 cps

The prepared formulation of herbal cream shampoo were show of good effect on bacterial strain like *Bacillus subtilis*. The prepared formulation of curry leaves which are having wide range of medicinal uses. They also have antimicrobial, and antibacterial effects. The herbal cream shampoo was evaluated for its organoleptic properties, physical properties and microbiological test. It was found that the formulation were green in colour with creamy consistency and smooth texture. In the prepared formulation the ethanol is also used along with extract to get better result they having good foaming and easily washable curry leaves shampoo are more effective against bacteria than any form of washing the hairs. They are 61.1 % of the solid content. and good antibacterial activity showing the curry leaves herbal cream shampoo.

CONCLUSION

In this project, the processing of curry leaves extract was carried out and prepared extract of curry leaves was incorporated into the formulation of herbal cream shampoo. Curry leaves is having antidandruff, hair tonic, scalp infection, hair conditioning property which helps in maintaining hair shiny. the current examination was conceded out to make the herbal cream shampoo training based upon conventional information and to expand few parameters for the quality and purity of herbal cream shampoo. From the above tests performed and results obtained it has been finished that these revises present a plant drug with proven high

effectiveness to be used in hair care formulation the stability at room temperature has assured the shelf life and every ingredient thus implicating its efficacy and safety.

FUTURE PERSPECTIVES

The field of cosmetics is moving forward as consumers demand. The herbal cream shampoo is a cosmetics product whose purpose is to prevent dandruff, scalp infection and make hairs shiny and soft. Herbal cream shampoo which helps to maintains the attractiveness of hairs. So, it is useful for human being. herbal cream shampoo is mostly used as compare to synthetic shampoo because a few significant differences between both shampoos.

The curry leaves oil possesses antibacterial, antifungal, hypolipidemic, antioxidant, and hypoglycemic properties.

The other roles of curry leaves in preparation of soap, bath oils, massage oils, perfumes, lotions, and body fragrance.

REFERENCES

1. Nandita Kamat, Diana Pearline, and Padama Thiagarajan Muraya koenigii (L.) A traditional Indian plant. *Research Journal of Pharmaceutical, Biological and Chemical Science* (2015) 692
2. Vandana Jain, Munira Momin 1, Kirti Laddha Murraya Koenigii : An Updated Review, *International Journal Of Ayurvedic And Herbal Medicine* 2:4 (2012)
3. Prabhat Desai, Shiny Phatarperkar, "Formulation and evaluation of Herbal Shampoo formulations and to compare formulated shampoo with Marketed Shampoos" *World journal of pharmaceutical sciences*, vol. 5 issue 9 pg. 1467-1477, 2016.
4. Lam KS. New aspects of natural products in drug discovery. *Trends Microbiol.* 2007;15:279–89. .
5. Towers GH, Lopez Hudson JB. Antiviral and antimicrobial activities of medicinal plants. *J Ethnopharmacol.* 2001;77:189–96.
6. Harshish k Handral, Anup Pandit and Shruthi S D, A review on Murraya Koenigii Mutipotentia medicinal plant . *Asian journal of pharmaceutical and clinical research.*(2012)
7. Suman Singh, P.k. More and Sandhya Madan, Curry leaves – A Miracale plant ,(2014)
8. Raj Mukesh Bhuvu, Yogini Manohr Dixit, Extration and isolation of curry plant leaves, *International Research Journal Of Pharmacy* (2015)