College of Pharmacy

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Preparation of Sidr Shampoo from the Leaves and Evaluation of antibacterial studies (Project for 5th year students)

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Abstract

The aim of this study was to evaluate the antibacterial activity of aqueous extract of the plant leaves against Staphylococcus aureus and Escherichia coli species.*as well as*to formulate a pure herbal shampoo and compare its physicochemical properties with the marketed synthetic and herbal shampoos. Ziziphus spina Christi known as Christi's thorn jujube and commonly known Sider.it is a multipurpose tree. It hold medicinal benefits and is used for attractive purpose, all plant part hold medicinal value which contian 4 unique saponin glycosides. Saponin help to absorb excess sebum and it is because of high concentration of saponin in the leaves of this plant. it is been used as a soap substitute for washing hair and skin for many centuries. It is also antiseptic, antifungal and anti-inflammatory making, it is excellent for treating dermatitis, eczema,psoriasis and dandruff also it is rich with vit. E which helps to repair damaged hair, improve scalp health and add shine.

Introduction

Shampoos are probably the most widely used cosmetic products for cleaning hairs and body in our daily life and is basically asolution of adetergent containing suitable additives for other benefits such as hair-

Conditioning ,enhancement ,lubrication and medication etc.. It is like any other cosmetic preparation should have good appealing physical appearance[1].*Ziziphus spina-christi* is an evergreen tree or plant is commonly known as sidr all plant part hold medicinal values .Leaves possess antielthminthic and antidiarrhetic and also used for remove dandruff,

lice,thickening and elongation of hair. The roots used for treat headache and the fruits are help to reduce Abscess and boils. Sadr is excellent and delicate natural cleanser alternative to traditional shampoos for whoever has allergies, and not just for them .it can be used both as a washing and purifying skin mask and as a moisturizing volumizing hair mask and it can used to make herbal hair color stay longer on your hair. It is excellent for the skin because it has purifying and astringent properties. It is rich in mucilage, so it gives moisturization and shine to your hair without hair down. A shampoo is a preparation of a surfactant (i.e. surface active material) in a suitable form liquid, solid or powder which when used under the specified conditions will effectively remove surface grease, dirt, and skin debris from the hair shaft and other fatty substances and loose corneal cells from the hair and should be easily removed on rinsing with water as well as **leave the hair non dry, soft, lustrous with good manageability and minimum fly away**. No **cause any side effects irritation to skin or eye. Added to which should not make the hand rough and chapped.**

also there some evidence which show Zizyphus spina Christi leaves decrease the serum glucose level in control and diabetic rats . Zizyphus spina Christi leaves may potentially be safe for use an antidiabetic agent (4). by increasing in insulin secretion which may be due to both saponin and polyphenol content .also the saponin content have hypolipidimic effect by decreasing total cholesterol ,triglyceride and LDL-C in hyperlipidemic rats (10)

PRODUCTINGREDIENTS

Surfactants are the main components of shampoo mainly anionic surfactants are used. The raw materials used in the manufacture of shampoos are principle surfactants which Provide detergency and foam and secondary surfactants which improve detergency, foam and hair condition as well as other additives can be used to enhancement the products such as smelling solubility and PH adjustment. The surfactant consists of two part one hydrophilic (water loving) while the other is hydrophobic in nature.

ADDITIVES

1. **Conditioning agents: Lanolin, mineral oil, herbal extracts, egg derivatives.**
2. **Foam builders: Lauroyl monoethanolamide, sarcosinates**
3. **Viscosity modifiers: ™ Electrolytes NH4Cl, NaCl Natural gums Gum Karaya, Cellulose derivatives, Hydroxy ethyl cellulose, methyl cellulose Carboxy vinyl polymers, Carbopol 934 others PVP and phosphate esters.**
4. **Sequestering agents: EDTA**
5. **Opacifying agents:Alkanol amides of higher fatty acids, propylene glycol, Mg, Ca and Zn salts of stearic acid, spermaceti, etc.**
6. **Clarifying agents: Solubilizing alcohols, ethanol, isopropanol ™ Phosphates™Non-ionic solubilizers, polyethoxyated alcohols and esters.**
7. **Perfumes: Herbal, fruity or floral fragnances**
8. **Preservatives: Methyl and propyl paraben, formaldehyde (most effective)**
9. **Anti-dandruff agents: The shampoos contain small amount of these actives, which are in contact with the scalp for only a short time. In order to be effective the active ingredient must work in the oilwater environment of**

the scalp and must be readily applicable to the scalp for continuing activity Such as Selenium sulfide, salicylic acid

Surfactants

Anionic surfactants are mostly used (good foaming properties). The hydrophilic portion carries a negative charge which results in superior foaming, cleaning and end result attributes. Non-ionic surfactants have good cleansing properties but do not have sufficient foaming power. Cationic surfactants are toxic and are hence not used. However, they may be used in low concentration in hair conditioners.Ampholytics, being expensive, are generally not used. They are mainly used as secondary surfactants and good hairconditioners.

NON-IONIC SURFACTANTS		
CLASS	**EXAMPLE**	**COMMENTS**
Fatty acid alkanolamides (should not be used > 15%)	Lauric monoethanolamide	Improves solubility of SLS
	Stearic ethanolamide	Pearlescent thickener
	Oleic ethanolamides	Hair conditioning agents
Polyalkoxylated derivatives	Ethoxylated fatty alcohols	Stable in wide range of pH; stabilizing emulsifying and opacifying properties
	Block polymers (pluronics)	Good rinsability, can be used in high %
	Sorbitol esters (TWEENS)	Solubilizers and emulsifiers, used in baby shampoos
Amine oxides	Coconut and dodecyl dimethyl amine oxides	Foam booster and anti-static agents

AMPHOTERIC SURFACTANTS		
N-alkyl aminoacids	β – aminoacid derivatives	Foaming agents
	Aspargine derivatives	Compatible with both anionic and cationic surfactants
Betains	Amido betains	High foaming properties, mild.
Alkyl imidazoline	MIRANOL™	Baby shampoos

ANIONIC SURFACTANTS		
CLASS	EXAMPLE	COMMENT
Alkyl benzene sulfonates	Sodium dodecyl benzene sulfonate	Tend to yield an "airy" or low density foam and often are drying to the hair
Primary alkyl sulfates	Lauric acid, stearic acid and their salts	Good lathering effect in hard water, free from rancidity, easy to wash.
Secondary alcohol sulfates	Sodium *sec*-lauryl sulfate	Low cost, dispersing and emulsifying action, **dissapointing** as detergets and shampoo components
Alkyl benzene polyoxyethylene sulfonates	Triton X200	Stable in acid or alkaline solution, excellent emulsifier, detergent and wetting agent; extremely stable at pH of skin
Sulfated monoglycerides	Lauric monoglyceride ammonium sulfate	Stable in hard water
Alkyl ether sulfates	Derivatives of lauryl alcohol ether with PEG	Good cleansers, act as solvents for non polar additives
Sarcosines	Lauroyl and cocoyl sarcosines	Excellent foaming and conditioning action
Sulfosuccinates	Aerosol OT	Less irritating to skin and eye (baby shampoo)

Evaluation of Shampoos

Performance characteristics are Foam and foam stability ,detergency and cleaning action ,effect of water hardness ,surface tension and wetting, surfactant content and analysis, rinsing conditioning action, softness luster ,lubricity body, texture and set retention, irritation and toxicity, dandruff control, microbiological assay ,eye irritancy test ,product appearances, product representative, perfume, colors and reliability

The manufacturing process

After a shampoo formula is developed, it is tested to ensure that its qualities will minimally change over time. This type of testing **called stability testing is primarily used to detect physical changes in such things as color, odor, and thickness. It can also provide information about other changes, like microbial contamination and performance differences. This testing is done to ensure that the bottle of shampoo that is on the store shelves will perform just like the bottle created in the laboratory. The manufacturing process can be broken down into two steps. First a large batch of shampoo is made, and then the batch is packaged in individual.**

Material and Methods[1]:

50 g of *Ziziphus spina-christi* leaves were collected from the garden in Basrah City in March 2018 and washed under running water to remove foreign substances, dried for few days and grinding until form powder, homogenized and boiled in hot water for 5h. The aqueous extract was filtered and concentrated to obtain semi solid layer, it was extracted from ethyl alcohol then were added to aqueous solution of one ml of garlic juice, one mixedegg,2 ml lemon juice, 50ml of distilled water and 5ml of olives oil. Herbal extracts were added to 5% gelatin solution and were mixed by shaking for 10 min. with stirring. Finally the pH of the solution was adjusted by adding sufficient quantity of 1% citric acid solution.

Result and discussion:

First part of the results are clean shampoo were formulated by mixing aqueous/alcoholic extracts of Sidr powder leaves and mixture of olives oil, water, egg and lemons juice .A good shampoo must have adequate viscosity to facilitate removal from the bottle but must not drip down from the hair during use. We used 5%gelatin solution for this purpose. Citric acid was added to adjust the pH .Lemon juice (1ml)was also added as natural antioxidant .The PH was found to be nearly neutral about 6.8 in which most shampoos either neutral or slightly alkaline. However ,antibacterial activity and some other measurement, should be measured in near future to complete this study.

The second part of this study which concern the antibacterial study is not finish edyet but similar study was done using Sidr Leaves from Dubia Pharmacy in 2012 extracted solutions were down and the results indicated that the diameters of inhibition zone of the active extract were comparable with the standard antibiotic used as a positive control, reported that Escherichia coli was resistant to carbenicillin, penicillin, methicillin, Vancomycin, oxacillin and tetracycline, while S. aureus was resistant to penicillin novobiocin, methicillin, vancomycin, oxacillin and tetracycline[2]

Conclusion:

It is possible to formulate a natural herbal shampoo by using sidr extract which has antimicrobial and antifungal activity that is better approach with respect to various shampoo having synthetic chemicals as antimicrobial agent, from the above study it was concluded that all these preliminary physiochemical and stability studies suggested for utility of herbal shampoo with economy and consumers complication.

References:

1. Khaloud Al Badi, Shah A. Khan, ScienceDirect,2014

2.Ali Heyam Saad, Shehab Naglaa Ahmed,El-alaj B. Mohamed.,INTERNATIONAL RESEARCH JOURNAL OF PHARMACY., 4 (6), 2013

3. Balsam, S.M., Gershon, S.D., Rieger, M.M., Sagarin, E. and Strianse, S.J.,cosmetics– Science and Technology, 2nd edition, Vol. 2, John Wiley India, New Delhi, 2008

4.bdel-Zaher AO , Salim SY , Assaf MH ,bdel - Hady RH. Antidiabetic activity and toxicity of Zizyphus spina-christi leaves . Journal of ethnopharmacology 2005;101(1):129-38.

5. Barel, A.O., Paye, M. and Maibach, H.I., Handbook of Cosmetic Science and Technology, 3rd Edition, Informa Healthcare, New York

6. Sharma, P.P.,cosmeticsFormulation, Manufacturing and Quality Control, 4th Edition, Vandana Publishers Pvt. Ltd., New Delhi, March 1998.

7. Butler, H.,Poucher's Perfumes, Cosmetics & Soaps, 10th Edition, Springer, Cockermouth, Cumbria, USA, 2000.

8. Salador, A. and Chisvert, A., Analysis of cosmetic products, Elsevier, New York, 2006.

9. Ross, J., and Miles, G.D.: An application for comparison of foaming properties of soaps and detergents, Oil and Soap, 1941.

10. Mittal, A Handbook of Cosmetics.

11.Zhang XM, Qu SC , Sui DY , YU XF , Lv ZZ. [Effects of ginsenoside-RB on blood lipid metabolism and anti-oxidantion in hyperlipidemia rats] . Zhongguo Zhong yao za zhi = Zhongguo zhongyao zazhi=china journal of chinese materia medica 2004 ;29(11):1085-8

12. Fredell, W.G. and Powers, D.H., Factors attributing to the performance of shampoos and to consumer acceptance, Proc. Sci. Sec., 1955.

13.Rajkumar, K. J., Invitro evaluation of shampoos.