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Estimation of Quercetin and Fisetin in Marketed Onion Herbal Shampoos by Planner Chromatographic Method

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ABSTRACT

Hair loss is common problem now a days facing by humans. Any hair-bearing surface may be involved, and different modalities of treatment have been used to induce hair regrowth. Onion shampoo is widely used to treat hair damage problems, for the same so may herbal preparations are available in market to promote hair growth. This study was designed to test the effectiveness of important constitutes of onion, quercetin and Fisetin in different onion shampoo like, mama earth, wow, otrix, khadi and mysticoal brand. Also, evaluation of these shampoo is cried out. Research shows that mamaearth and wow brand onion shampoo has highest concentration of quercetin and Fisetin compared to other three brand.

Keywords: *Quercetin, Fisetin, Onion, Shampoo, evaluation, quantification*

INTRODUCTION

Hair fall is one of the most common concerns that people have these days. Whether it's the increasing pollution or climate change, we're all experiencing hair issues regularly. While some people are worried about thinning of their hair while others are dealing with dandruff on the scalp. No matter what the issue is, hair loss has been reported to be one of the top worries of millennials across the world. Onion is a natural wonder product that shows super quick results in aiding hair problems. Onion plays a vital role in hair care and nourishment. It is a rich source of sulfur, potassium, Vitamin C, B-9, and B-6. It helps in preventing hair loss caused due to external factors. Stunted hair growth and exponential hair loss can be treated with onion as it helps increase blood circulation and facilitates hair growth [1].

Onion shampoos are a rich source of antioxidants. Their antimicrobial nature treats dandruff, irritation, and other scalp problems. The sulfur in the onion helps maintain thick hair, reduce hair loss and boost hair development. The high sulphur levels also help to prevent hair loss and strengthen hair follicles. So many marketed shampoos are available with the goodness of onion extract [2] Onion has plentiful chemical compounds such as allicin, quercetin, fisetin, other sulphurous compounds: diallyl disulphide and diallyl trisulphide.[3] Two flavonoids Quercetin (QUE) and fisetin (FIS) are the choice of constitute for the hair growth. It was thought to quantify the amount of these two constituents in five different brand of Shampoo containing onion extract. Quercetin is chemically 2-(3,4-dihydroxyphenyl)-3,5,7-trihydroxychromen-4-one and Fisetin is 2-(3,4-dihydroxyphenyl)-3,7-dihydroxychromen-4-one figure 1. QUE is promoting hair growth while FIS control hair fall [4,5].

Extensive literature shows that evaluation of different brand shampoo was carried out but evaluation and comparison of different brand onion shampoo is not published yet. [6,7].

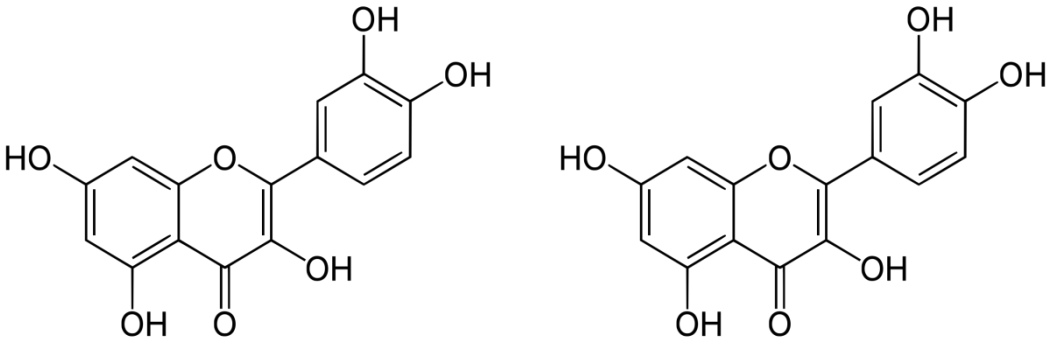

Fig. 1. Quercetin structure and fisetin structure

Present study focus on the evaluation of some selected onion shampoo like, wow, mamaearth, Otrix, Khadi, Mysticoal which claim presence of onion extract. Also quantification of the major constituents QUE and FIS was carried out in different onion shampoo brand.

MATERIALS AND METHODS

Instrument - UV- visible spectroscophotometer**,** Model: shimadzu corp. 80269 Software: lab solution UV visible.

Reagent **-** Methanol and methylene blue were procured from from– Srl Pvt. Ltd., Mumbai India. Herbal chemical marker Quercetin & Fisetin was obtained from the Yucca Enterprise's Wadala (e), Mumbai 400-037.

EVALUATION OF ONION HERBAL SHAMPOO [8]

1. Physical appearance/visual inspection

The formulations were evaluated based on their clarity, color, odor, and texture.

2. Determination of pH

The pH levels of the different shampoos tested in 1% and 10% water solutions were evaluated using a pH meter at a room temperature of 25 ± 2 °C. Most shampoos are neutral or slightly acidic. Acidic solutions cause the cuticle (outer layer) of the hair to shrink and lie flatter on the hair shaft. Basic solutions cause the cuticle to swell and open up. Acidic solutions make the hair smoother, while basic solutions make the hair frizzier.

Neutral pH = 7 Acidic pH < 7 Basic pH >7

3. Foaming Ability and Foam Stability

The cylinder shake method is the most widely used method for determining foaming ability At room temperature, 1% of 50 mL of the shampoo solution was put into a 250-mL graduated cylinder, which was then covered by hand and shaken ten times. The total volume of the foam content after 1.0 min of shaking was recorded. The height of the foam generated was measured immediately. To evaluate foam stability, the same procedure was performed and the foam volume after 20 min was measured.

4. Dirt Dispersion

A one percentage (1%) solution of each shampoo (1 g of sample in 100 mL of water) was taken and one drop of India ink was added; the test tube was stoppered and shaken ten times. The amount of ink in the foam was estimated as none, light, moderate, or heavy. Shampoos

that cause the ink to concentrate in the foam are considered poor quality. The dirt should remain in the water portion. Dirt that remains in the foam will be difficult to rinse away and will be redeposited on the hair.

5. Percentage of Solid Content

A clean dry evaporating dish was weighed and 4 g of shampoo was added to it. The dish and the shampoo were weighed together. The exact weight of the shampoo was calculated and the evaporating dish with the shampoo was placed on a hot plate until the liquid portion evaporated. The weight of the shampoo (solids) after drying was calculated.

If a shampoo has too many solids, it will be difficult to work it into the hair or to wash out. If it does not have enough solids, it will be too watery and will wash away quickly. A good shampoo has 20–30% of solids.

6. Surface Tension

Surface tension measurements were carried out using a solution of 10% shampoo diluted in distilled water at room temperature using a dropper The dropper was thoroughly cleaned using chronic acid and purified water since surface tension is highly affected by grease or other lubricants. Surface tension was calculated by the following equation:

$$R_2=(W_3-W_1)n_1(W_2-W_1)n_2xR_1$$

Where, W_1 is the weight of the empty beaker
W_2 is weight of the beaker with distilled water;
W_3 is the weight of the beaker with the shampoo solution;
n_1 is the number of drops of distilled water
n_2 is number of drops of the shampoo solution.
R_1 is the surface tension of distilled water at room temperature
R_2 is the surface tension of the shampoo solution.

ESTIMATION OF ONION HERBAL SHAMPOO

UV Visible Spectroscopy Method [9]

Preparation of Stock Solution of Fisetin

Weighed accurately 10mg of QUE and FIS powder separately and transfer to different 10 ml volumetric flask and make up the volume up to 10ml with methanol. withdraw 1ml from each flask and transfer it into another 10 ml volumetric flask and make up the volume up to 10ml with methanol so that both the marker contain100µg/ml final concentration

***Preparation of Stock Solution of Shampoo*:**

Weighed 10mg of Shampoo in volumetric flask and add 10ml methanol to it. Shake well.

Selection of Wavelength

In a 10ml volumetric flask, pipette out 1ml of prepared stock solution and dilute it up to the mark with the solvent(methanol). Scanning it between 200 to 800nm. QUE found to be 255.5nm and 247.5nm. wavelength was selected for QUE and FIS respectively.

Calibration Curve of QUE and FIS

6 different concentrations (2-12µg/ml) were prepared from the stock solutions by taking aliquot froth the range 0.2-1.2 ml and volume was made up to 10 ml.

Calibration curve of SHAMPOO

Weighed 10mg of Shampoo in volumetric flask and add 10ml methanol to it which will make 1000ug/ml. Shake well. Then withdraw 5ml from 1000µg/ml of Shampoo in a 10ml volumetric flask and makeup with methanol which is 500µg/ml. Then withdraw 5ml from 500µg/ml of Shampoo in a 10ml volumetric flask and makeup with methanol which is 50µg/ml.

RESULT

Evaluation of Onion Herbal Shampoo

Different parameters like Physical appearance (color, odor, texture), pH determination, Dirt dispersion, Surface tension, foaming ability and Foam stability, % solid content etc. were checked in all five selected onion herbal shampoos as shown in table 1. Figure of Dirt dispersion, Foam stability and % solid content as shown in figure 2,3,4 respectively.

Table 1: Evalution of Onion Herbal Shampoos

Sr no.	Parameters	Mamaearth	Wow	Otrix	Mysticoal	Khadi
1	Physical appearance					
	Colour	White shiny	White shiny	Faint pink	Pink	purpal
	Texture	Smooth	Smooth	Smooth	Smooth	Smooth
	Odour	Sweet odour	Sweet odour	Sweet odour	Sweet odour	Onion like smell
2	Determination of pH	7.2	6	7	6	6.5
3	Dirt dispersion	None	None	None	None	none
4	Surface tension measurement	27.99	24.11	28.28	23	32
5	Foaming ability and Foam stability	25	25	50	17	50
6	Determination % of solid content	1.58	1.57	1.53	1.67	1.59

Fig 2: Determination % of solid content

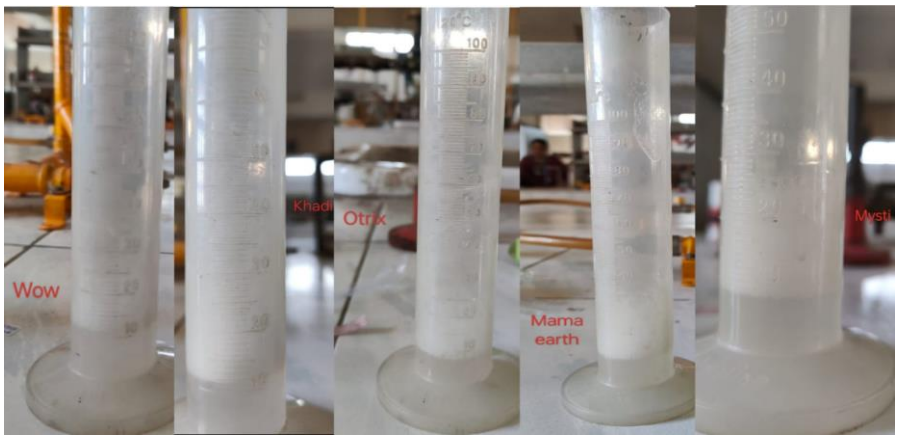

Fig 3: Foaming ability and stability

Fig 4: Dirt dispersion

QUANTIFICATION OF ONION MARKER BY UV –VISIBLE SPECTROSCOPY

Selection of Detection Wavelength

The solution was applied in the form of band in concentration 10 µg/ml for both quercetin and fisetin individually was prepared in methanol. The solution was applied in UV instrument and scan over the UV range 200-400 nm. The spectra showed the maximum drug absorbance at 255.5 nm for QUE and 247.5 for FIS. The spectra of QUE and FIS were shown in figure 4.

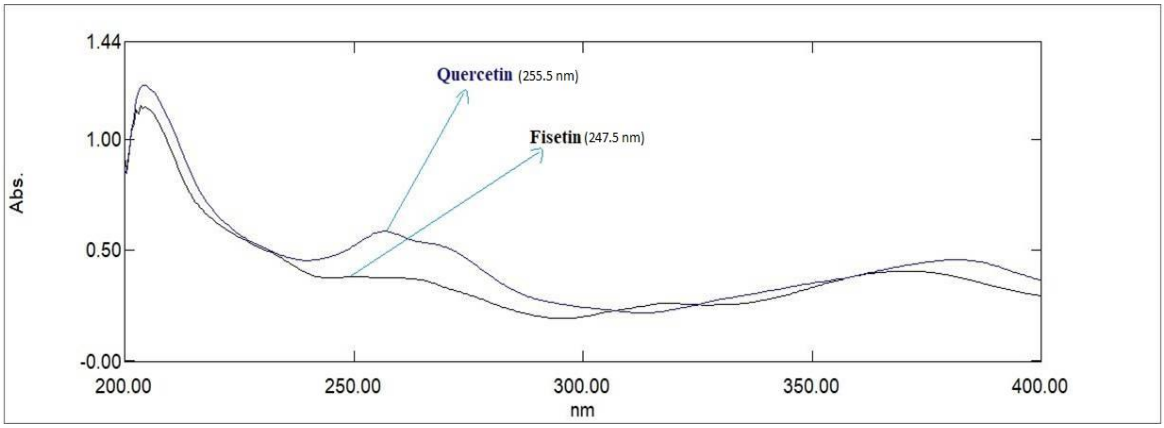

Fig. 4: Overlay UV spectra of Quercetin and Fisetin at 10µg/ml

Quantification of QUE and FIS in Various Extract

Calibration curve of QUE and FIS were prepared in the concentration range 2 – 12 µg/ml. overlay spectra of different hair shampoos were shown in figure 5. calibration curve was plotted which shows linear response for both QUE and FIS (figure 6). Data was shown in table 2.

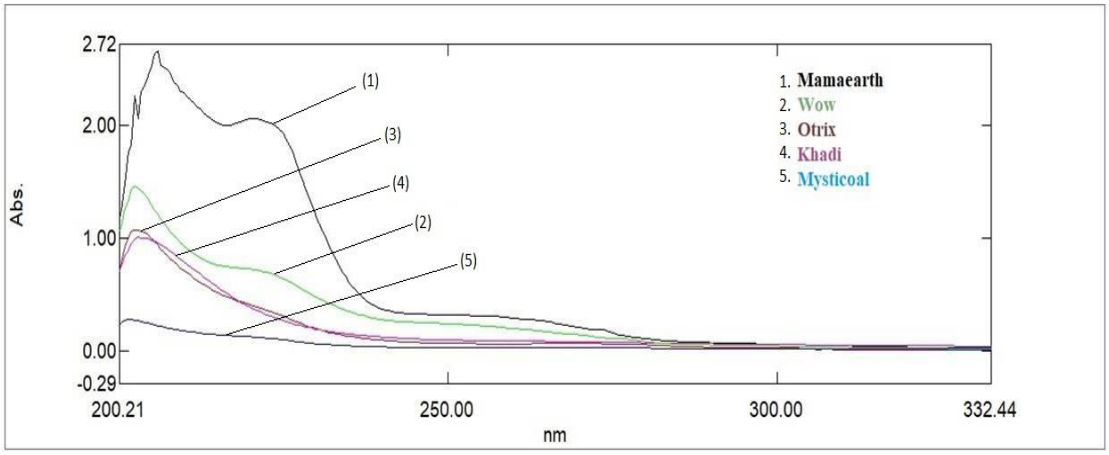

Fig. 5. Overley spectra of different herbal shampoo

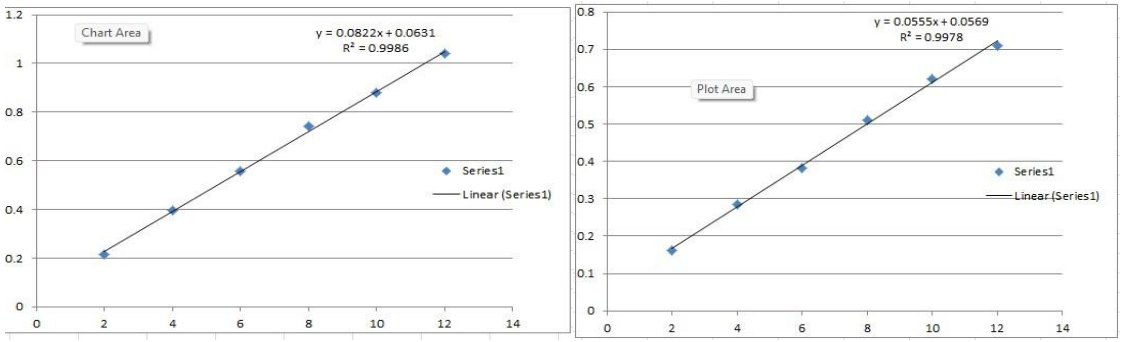

Fig. 6. Calibration curve of QUE and FIS

Concentration(µg/ml)	Absorbance (n=5±S.D)	
	QUE	FIS
2	0.217± 0.004	0.162±0.0015
4	0.396±0.020	0.285±0.0019
6	0.556±0.004	0.381±0.0013
8	0.741±0.005	0.511±0.0015
10	0.880±0.049	0.621±0.0011
12	1.040±0.053	0.711±0.0019

Table 2: Calibration Data

Name of shampoo	Absorbance (n=5±S.D)	Concentration of Quercetin (µg/ml)	Concentration of Fisetin (µg/ml)
Mamaearth	0.320±	4.8	3.76
Otrix	0.067±	0.2	0.47
Mysticoal	0.025±	-0.56	-0.46
Wow	0.244±	3.41	2.20
Khadi	0.098±	0.76	0.42

CONCLUSION OF EVALUATION

Shampoo evaluation tests refer to studies and experiments. In this study, five shampoo brands were evaluated in terms of their pH levels, foam stability, surface tension, and dirt dispersion to assess the quality of these shampoos. The results obtained were compared with national standards (reference). The results indicate that all the tested shampoos met the requirements of the standards, which means that they are chemically sound. However, there were slight differences between brands due to their various manufacturing processes, laboratory conditions, and other reasons.

Quantification of Quercetine and fisitin in shampoo gives promising data which indicates in Mamaearth and Wow onion hair shampoo which gives promising concentration of Quercetin and Fisitin found in onion than other 3 shampoo Otrix, Mysticoal and Khadi.

CONFLICT OF INTEREST

The authors have no conflicts of interest regarding this investigation**.**

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