

Evaluation of Pharmacognostical Properties And Hair Growth Promoting Activity Of *Allium cepa*

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Abstract

The aim of the study was to evaluate the *Allium cepa* for its pharmacognostical properties and for its hair growth promoting activity. Macroscopical study of *Allium cepa* showed that *Allium cepa* having white brown colour, pungent odour, acrid in taste and bulb and roots are angular in shape. The microscopical evaluations of fresh bulb showed that it contains characteristic features of stomata, presence of upper and lower epidermis, vascular tissues such as xylem and phloem, palisade tissue, cork cell, starch grain and calcium co-oxalate crystals. Total Ash value taken to be 8.5 %, acid soluble ash was found to be 2.5 %, water soluble ash taken to be 0.75%. Animal study showed that *Allium cepa* initiates the hair growth on day 6 and showed complete hair growth on day 20, which was compared with the standard drug Minoxidil. The pure juice of *Allium cepa* is found effective as that of standard drug Minoxidil for the hair growth in albino rats.

Keywords: Pharmacognostic evaluation, screening, hair growth, nutraceutical

INTRODUCTION

Ayurvedic scheme of drug and Chinese herbal drug has reported the role of *Allium cepa* (Onion) for its hair growth properties. The likely product is an effective difference for hair growth treatment in the artificial drug. Onion (*Allium cepa*) is single of the mainly significant condiments and vegetable crops grown in almost all parts of India and used throughout the year for varied uses in the kitchen. It has high nutritional as well as medical value and is measured very useful for a human being (Thakur M. et al 2015)

Hair is symptom good looks and connection with character personality since instance immemorials. The great probability is coupled with pharmaceutical hair loss management. Among the immunity of Minoxidil, an artificial drug, is the exactly prove to assist the handling of alopecia. The herbal drug have usually as hair growth support since time in the Ayurveda, Chinese and Unani system of medicine. (S. Nagendra et al, 2015)

Hair is a sickness of massive psychosocial implication. Hair regrowth drug- induce in alopecia an area could be measured very a beauty response 1-2 year achieve. It is the reported animal to successfully treat the patient. Patient feeling in the doctor of medicine family, friend, and others suffer from disease.

PLANT PROFILE

Plant Description

Plant name – *Allium cepa* (Figure 1)

Synonyms- Onion, Onion plant

Different name of Plants (Pohare JG. et al 2017)

Allium salota Dostal

Allium aobanum Araki

Other name – *Allium cepa*

Vernacular name:



Figure 1: *Allium cepa* plant and bulb fruits

Arabic Countries: Basal

Brazile: Onion

China: Hu-tsung

Europe: Onion

France: Cepa

Biological Name:- *Allium cepa*

Family:- Liliaceae

Chemical Structure (Figure 2)

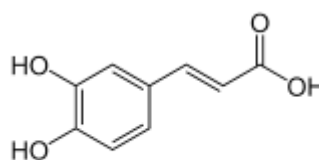


Figure 2: Caffeic Acid

Morphological description

Allium cepa is an enduring plant herb, rough-smell it is firm and is formed bearing 4-5 leaf whereas the underground part has large rootstock. (Anonymous, et al 1999)

Root- Adventitious

Stem- The bulb is uniform in shape, size and skin color.

Leaves- radical, alternate, simple cylindrical, parallel leaves

Inflorescence- The mortal inflorescence from the circle like meristem.

Chemical Constituents (Table 1) (Thakur M. Et Al 2015)

Table 1: Chemical Constituent of *Allium cepa*

Bulb	Abacisic acid, Acetic acid, Adinosine, Allicin, Alliin, Allyl-propyl-disulfide, Cholesterol, Cistine, Calcium oxalate, Ferulic acid, Glutathione, Iso-queretin, Kaempferol, Methionine, Ramnose.
Root	Caffeic acid, Ferulic acid.
Leaf & Flower	A sheet & flower, steam cleansing yield the crucial lubricate (0.006%). (Anonymous, 2003).
Skins	Dry onion bulb skin are the best natural supply at the quercetin. It contains stigmasterol, cholesterol kaempferol

Essential oil of Onion (Table 2)

Table 2: Essential Oil of *Allium cepa*

Monosulphides Dimethyl sulfide, Allyl methyl	Thiophene Derivatives dihydrothiophen3,4-Dimethylthiophene
Oxygen compounds Propanal, Dimethylfuron, Trident-2-one	Trisulphide Allyl methyl trisulphide, Diallyl trisulphide, Isopropyl propyl trisulphide

Properties and Health Benefits

Onions are having Antioxidant, Cytotoxic and Antibacterial properties. It also possess health benefits in Bleeding Piles and Anemia. (Kumar S., et al 2010)

Medicinal uses of onion

Onion is used internally and externally. The anti-inflammatory activities in onion reduces the symptoms and used for appetite loss. It is also useful in diabetes, heart disease, asthma and bronchitis. Onion is used for curing cough, immune modulation, wound healing and prostate cancer. (Kumar S., et al 2010)

Pharmacological uses:

Allium cepa is identified for various pharmacological activities including Analgesic activity, Antifungal activity, Antiasthmatic activity, Antiascaris activity, Antibacterial activity, Anticonvulsant activity, Antihyperglycemic activity, Antihistamine activity, Antifilarial activity, Antiedema activity etc.

The study was performed to screen and evaluate bulbs the *Allium cepa* for treating human ailments like hair loss. The bulbs of *Allium cepa* could be used in the treatment of different problems associated with the immune system. The stone of *Allium cepa* enhance warm & urinary illness. Onion is a supplement of vitamin thiamine. Herbal medicines are widely available and often used by the people for benefits, extra clinical safety and efficacy. *Allium cepa* possesses activities like anticonvulsant, antianxiety, antiviral, etc. based on the review, the study undertaken for estimation of hair growth-promoting activity.

MATERIAL AND METHODS

Plant Material

Allium cepa plant includes leaves, flowers, bulbs and some other parts. The plant collect from the local area of Lucknow Uttar Pradesh India. The plant material identified and authenticated by CSIR – National Botanical Research Institute (NBRI), Lucknow. Authentication No. (LWG) 104616.

Preparation of Extract

The *Allium cepa* bulbs were washed with distilled water and dried for 1 day. The onion was cut properly with knife. The chopped onion placed into the mixer to obtain fresh *Allium cepa* juice.

Drug and Chemicals

Minoxidil Topical solution USP (Figure 3) with Mfg. Lic. No. : MNB/15/895&MB/15/896 and Marketed by Leeford Healthcare Ltd.203, Mangalam, kulupwadi, Borivali (E), Mumbai-400066, was procured from local medical shop.

Other chemicals like Mayers reagent, Dragendroffs reagent, Alkaline reagent, Molish reagent, ethyl acetate, chloroform, methanol, ethanol, glycerine are used.

Minoxidil

Minoxidil is a synthetic drug. It is used as a vasodilator in the treatment of hypertension and topically used the lotion to promote hair growth.

Molecular formula- $C_9H_{15}N_5O$

Molecular weight – 209.2g/mol

Melting point – 2480 C

Solubility- soluble in water



Figure 3: Minoxidil

Experimental Animals

Albino rats (SD) were procured for Laboratory Animal Facility of Central Drug Research Institute, Lucknow. The animal was acclimatized for at least 7 days to the laboratory conditions previous to examination. The investigational procedure were approved by the Institutional Animal Ethical Committee wide. (ICH Guidelines, 2003).

RESULTS

PHARMACOGNOSTICAL ANALYSIS OF PLANT EXTRACT

Macroscopical Study

The macroscopical characters (color, odor, taste etc.) of the roots were observed & the results were compared with the standard method. (Table 3)

Table 3: Macroscopic Description of *Allium cepa*

Characters	Observation
Part	Bulb & root
Color	White, brown red
Odor	Pungent
Taste	Acrid
Size	2.7 cm length, 1.6 cm wide
Shape	Angular

Microscopical Study

The microscopical evaluation of fresh bulb fruit *Allium cepa* showed that it contains characteristic features of stomata, presence of upper and lower epidermis, vascular tissue such as xylem and phloem, palisade tissue, cork cell, starch grain and calcium co-oxalate crystals. (Figure 4)

Powder Microscopy

The powder microscopy involves histological study for types & arrangement of tissues. (Table 4) Presence of characteristic feature as the trichome, and starch grain by using magnifying microscope. The presence of xylem fibers & simple isolated starch grains were observed by using magnifying microscope. (Figure 5)

Table 4: Powder Microscopy of *Allium cepa*

Parameters	Range of variation
Stomatal index (inner)	12.55
Stomatal index (outer)	21.6

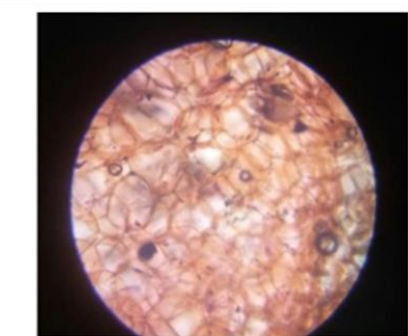
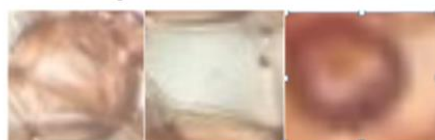


Figure 4: T.S. of bulb onion



Cell wall Epidermal cell Nucleolus

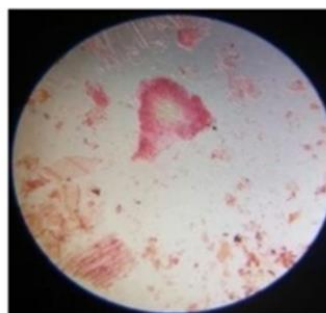


Figure 5: Powder Microscopy of *Allium cepa*



Starch grains Ca-Oxalate crystal Cork cell

PHYSICOCHEMICAL ANALYSIS

The extract of *Allium cepa* was screened for the determination of physicochemical parameters using standard procedure in WHO Guidelines (Table 5)

Table 5: Physicochemical Analysis of *Allium cepa*

Parameters	(w/w%)
Total Ash value	8.5
Acid insoluble ash	2.5
Water soluble ash	0.75

TLC PROFILE

TLC of *Allium cepa* was performed and intense spot was detected by ninhydrin reagent. (Table 6)

Table 6: TLC profile of *Allium cepa*

S.No.	Solvent system (cm)	Solvent run(cm)	Solute run (cm)	Rf value
1.	Chloform: methanol	9.1	5.5	0.60
2.	Toluene: acetone: ethyl acetate	9.4	6.2	0.66

PRE-PHYTOCHEMICAL ANALYSIS

The extract was screened the present alkaloid, flavanoids, carbohydrate, proteins, starch, amino acid, glycoside, tannins & saponins using simple chemical test as reported in standard reference book.

PHARMACOLOGICAL SCREENING

Hair growth activity

The hair growth pattern were observed for the group I, group II and group III. For group I hair increase start were observe on day 10, for group II hair increase start was pragmatic on day 6 and for group III hair increase start was observe on day 5. Full hair growth were observed on day 24, day 20, day 18 for group I, group II, group III respectively. Hair increase activity for the *Allium cepa* was found comparably efficient than the marketed formulation of Minoxidil.(Table 7)

Table 7 : Visual Observation of Hair Growth in Albino Rats

S.No.	Group	No. of rats	Growth initiation time (day)	Growth completion time (days)
1	Control	4	10	24
2	Test (<i>Allium cepa</i>)	4	6	20
3	Standard (Minoxidil)	4	5	18

Hair follicle density (Table 8)

Table 8: Hair Follicular Density

S. no.	Group	Hair follicular density No./mm ²
1.	Control	3.73±0.18
2	Test (<i>Allium cepa</i>)	3.63±0.5
3	Standard (Minoxidil)	4.23±0.04



Figure 6: Visual observation of hair growth in albino rats

CONCLUSION

Traditionally *Allium cepa* bulb fruits have been in use for many diseases and have reported pharmacological activities. *Allium cepa* is used for treating a variety of disarray, but is not evident information of its hair growth action. It is reported on the chemical constituent of the plant and their pharmacological actions suggest that the bulb fruits containing alkaloids, glycosides flavonoids, saponins, and tannins possess activity. Bulb fruits of *Allium cepa* are simple, 2.7cm long, 1.6cm width, color white, brown-red, part-bulb root, odor pungent, and acrid test. Microscopic features of the bulb root show, cell wall, epidermal cell, nucleous of bulb *Allium cepa*. Powder microscopic observation shows a fragment of starch grains, cork cell, Ca-oxalate crystal it involves histological study of type arrange tissue, presence of attributefacial appearance such as starch grain. It is the juice of *Allium cepa* bulb fruits was screened for the presence of Alkaloid was confirmed by chemical tests such as Wagner test, Hager's test and Mayer test. Carbohydrates was confirmed by Molish test. Glycoside was confirmed by chemical test Keller Killian test. Flavonoids was confirmed by Lead acetate test and Protein and Amino acid was confirmed by Millon's test using simple chemical tests as reported in the standard reference book.

DISCUSSION

To summarize this work states that topically bases apply of *Allium cepa* was found to possess hair growth-promoting activity. In accordance to the present study, it has been observed the juice *Allium cepa* may show more pronounced hair growth-promoting activity compared to the extract with all group in rats apply for the drug. The hair growth pattern was observed for the group I, group II and group III. For group I hair increase start observed at day 10, for group II hair increase start observed on day 6 and for group III hair increase start observed on day 5. Total hair growth observation on day 24, day 20, day 18 for group I, group II, group III respectively. Hair growth activity for the *Allium cepa* was found comparatively similar efficient than the marketed formulation of Minoxidil.

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