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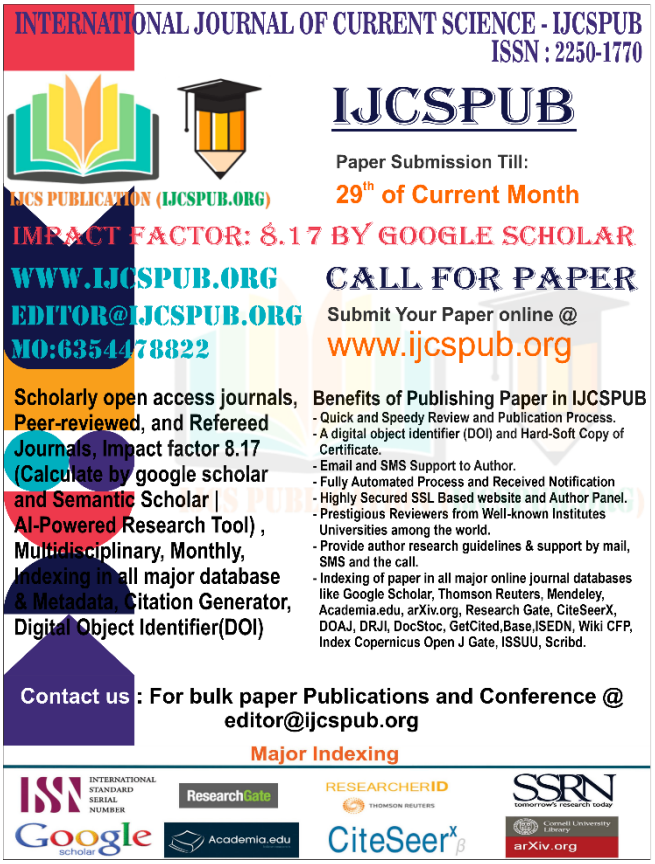

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ANTIFUNGAL ACTIVITY OF SOME PLANT EXTRACTS AGAINST ROOT-BORNE FUNGI OF LIQUORICE (GLYCYRRHIZA GLABRA L.)

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ABSTRACT: Glycyrrhiza glabra is a most important cultivated drug plant grown in India. They are found to be heavily infected with variety of fungi in field and storage. These associated fungi are known to deteriorate the plant parts and its chemical contents. These associated fungi isolated from the roots during storage in gunny bags in store houses .The efficacy of aqueous extracts of some plants was tested against the growth of the fungi. Poisoned food technique was employed. The plant extracts were found to be inhibitory for the growth of the test fungi. Considering this situation the present studies on effect of different plant extracts on liquorice plant used to control fungal infections instead of chemical fungicides.

Key words :Antifungal activity, plant extract,liquorice plant, poisoned food technique

1. INTRODUCTION

Glycyrrhiza glabra is one of the most important drug plant cultivated extensively throughout India.,The roots of liquorice after harvesting they stored in store houses or godowns in gunny bags.They are found to be heavily infested with variety of fungi, these associated fungi are known to deteriorate the root and root contents. The aim of the study was to evaluate the antifungal activity of extracts of different plant species against the pathogenic fungi .The plant were selected on the basis of their ethnomedicinal uses. Different Fungal pathogens present on the liquorice plant have significant threat to parts of the plants that requires use of chemical fungicides. The use of chemical fungicides for drug plants has increasingly, The use of the fungicides is not only expensive, but also hazardous to the environment this in turn has created a need for alternative sourcing of fungicidal agents that can be developed for treatment of fungal diseases. Now days, plants are being used against many plant pathogenic fungi. The plants serve as ecofriendly and economic biocontrol agents. In order to control the diseases of liquorice plants due to fungi, some plant extracts were tested to control the plant diseases. 10% aqueous extracts of fresh leaves of 10 different angiospermic plants specially *Calotropis gigantea (R.Br.), Ocimum sanctum (Linn.), Azadirachta indica (A.Juss.), Withania somnifera (Dunal), Vinca rosea (Linn.), Lantana camera (Linn.), Adathoda vasica (Nees.), Tagetes erecta (Linn.), Vitex negundo (Linn.) Polyalthia longifolia (Benth.and Hook.)*,rhizome and bulbs of 4 different medicinal plants *Curcuma longa, Zingiber officinale, Allium cepa, Allium sativum* and 3 gymnospermic plants *Thuja orientalis, Cupressus sp. ,Araucaria araucariana* were tested against six fungi like *Aspergillus flavus (Link.), A. niger (Tieghem.) Fusarium oxysporum (Schle.), Curvularia lunata (Wakker)Boed, Alternaria alternate (fr.)Keissler. Phytopthora sp.*,these six fungi isolated from liquorice roots during stoaage. Keeping this in view, the present study the efficacy of some plant extracts against the fungi isolated form the roots of liquorice from stored houses and ayurvedic shops.

2. MATERIAL AND METHODS

Fungitoxicity of plant extracts was studied by the poisoned food technique described by Nane and Thapliyal (1997). Rose Bengal Agar medium was prepared in flasks and sterilized. To this medium, was added the requisite quantity of the plant extract to get 1:1 final concentration. The plant extract was thoroughly mixed by stirring. The medium was then poured into petriplates. Small disc (0.7 cm) of the fungus culture grown on Potato Dextrose Agar for 7 days was cut with a sterile cork borer and transferred aseptically in the center of the petridish containing the plant extracts. Suitable checks were kept where the culture discs were grown under the same conditions on Rose Bengal Agar without plant extract. The fungus colony diameter compared with check, was taken as a measure of the fungitoxicity. Per cent inhibition was calculated by using the formula suggested by Bliss, (1934).

Percent inhibition was calculated by using the formula.

$$\text{Percent inhibition} = \frac{Control - Treatment}{Control} \times 100$$

3. RESULTS & DISCUSSION

i) Effect of leaf extracts on growth of roots fungi :

Ten fresh angiospermic plant leaf extracts at 10% (aqueous) concentration were tested against six root fungi for inhibiton of growth in solid medium. They were added in the solid medium to get 1:1 final concentration. The fungi were grown on this medium. The medium without plant extract served as control and the result are summarized in Table 01.

Table:01 Effect of leaf extracts on growth of roots fungi:

Plant extract	Diameter of fungal growth (mm)					
	Alternaria alternata	*Aspergillus flavus*	*Curvularia lunata*	*Fusarium oxysporum*	*Phytopthora sp.*	*Rhizoctonia solani*
Calotropis gigantea	35 (48.5)	42 (46.1)	36 (48.5)	34 (47.6)	48 (40.0)	40 (48.0)
Ocimum sanctum	30 (55.8)	38 (51.2)	33 (52.8)	40 (38.4)	36 (55.0)	35 (54.5)
Azadirachta indica	32 (52.9)	30 (61.5)	30 (57.1)	38 (41.5)	35 (56.2)	43 (44.1)
Withania somnifera	31 (54.4)	35 (55.1)	40 (42.8)	36 (44.6)	32 (60.0)	30 (61.0)
Vinca rosea	34 (50.0)	28 (64.1)	29 (58.5)	30 (53.8)	36 (55.0)	28 (63.6)
Lantana camera	37 (45.5)	35 (55.1)	40 (42.8)	45 (30.7)	32 (60.0)	30 (61.0)
Adathoda vasica	36 (47.0)	31 (60.2)	33 (52.8)	30 (53.8)	29 (63.7)	38 (50.6)
Tagetes erecta	28 (58.8)	35 (55.1)	41 (41.4)	29 (55.3)	42 (47.5)	46 (40.2)
Vitex negundo	29 (57.3)	32 (58.9)	37 (47.1)	31 (52.3)	36 (55.0)	42 (45.4)
Polyalthia longifolia	34 (50.0)	32 (58.69)	43 (38.5)	30 (53.8)	29 (63.7)	40 (48.0)
Control	68	78	70	65	80	77

(Figures in parentheses indicate percent inhibiton of mycelial growth over control)

The data given in table 01 reveals that 10% aqueous fresh leaf extracts of *Calotropis gigantea,Ocimum sanctum, Tagetes erecta* and *Vitex negundo* proved inhibitory for the mycelial growth of *Alternaria alternata*. Similarly *Azadirachta indica* for *Aspergillus flavus* and *Curvularia lunata, Withania somnifera* and *Vinca rosea for Rhizoctonia solani, Lantana camera, Adathoda vasica* and *Polyathia longifolia* for *Phytopthora sp*. Were found to inhibit the mycelial growth.

Table:02 Effect of rhizome and bulb extracts on growth of roots fungi:

Fresh rhizome and bulb extracts at 10% (aqueous) concentration were tested for inhibiton of mycelial growth of the six roots fungi in solid medium and results or summarized in Table 02

Table:02 Effect of rhizome and bulb extracts on growth of roots fungi :

Plant extract	Diameter of fungal growth (mm)					
	Alternaria alternata	*Aspergillus flavus*	*Curvularia lunata*	*Fusarium oxysporum*	*Phytopthora sp.*	*Rhizoctonia solani*
Curcuma longa	28 (54.0)	30 (55.8)	25 (61.5)	29 (58.5)	46 (22.0)	35 (53.3)
Zingiber officinale	30 (55.8)	28 (58.8)	46 (29.2)	26 (62.8)	I	40 (46.66)
Allium cepa	46 (24.5)	38 (44.1)	40 (38.4)	50 (28.5)	41 (30.5)	37 (50.6)
Allium sativum	38 (37.7)	41 (39.7)	39 (40.0)	55 (21.4)	40 (32.2)	31 (58.6)
Control	61	68	65	70	59	75

(I-Induction of mycelial growth over control)

It becomes clear from table that, *Zingiber officinale* for *Fusarium oxysporum* and *Aspergillus flavus, Curcuma longa* for all fungi, except, *Phytopthora sp*. , Allium cepa for *Rhizoctonia solani* and *Aspergillus flavus*, *Allium Sativum* for all fungi, except Fusarium *oxysporum* showed strong inhibiton of mycelial growth. However *Zingiber officinale* for *Phytopthora sp.*proved to be stimulatory.

Table:03 Effect of gymnospermic plants on growth of roots fungi :

Fresh gymnospermic leaf extracts at 10% (aqueous concentration were tested for their effect on mycelial growth of root fungi in solid medium and results are summarized in Table 03

Table:03 Effect of gymnospermic plants on growth of medicinal plant parts fungi :

Plant extract	Diameter of fungal growth (mm)					
	Alternaria alternata	*Aspergillus flavus*	*Curvularia lunata*	*Fusarium oxysporum*	*Phytopthora sp.*	*Rhizoctonia solani*
Thuja orientalis	I	48 (17.2)	52 (25.7)	I	46 (23.3)	58 (25.6)
Cupressus sp.	40 (31.0)	49 (26.8)	52 (25.7)	60 (11.7)	43 (28.3)	65 (16.6)
Araucaria araucariana	47 (18.9)	51 (23.8)	49 (30.0)	52 (23.5	51 (15.0)	53 (32.0)
Control	58	67	70	68	60	78

(Figures in parentheses indicate percent inhibiton of mycelial growth over control)

(I-Induction of mycelial growth over control)

It is clear from the results that gymnospermic leaf extracts were less inhibitory than that of angiospemic leaf extracts. *Thuja orientalis* for *Aspergillus flavus, Curvularia lunata, Phytopthora* sp.and *Rhizoctonia solani*, *Cupressus sp*. For all fungi, except *Fusarium oxysporum* and *Rhizoctonia solani,Araucaria araucariana* for all fungi were inhibitory for mycelial growth. *Thuja orientalis* for *Alternaria alternata,Fusarium oxysporum* proved stimulatory for mycelial growth.

In the present investigation studies were carried out to understand the qualitative and quantitative pathogenic and non pathogenic fungi on liquorice plants during their developmental stages in field and also during storage and transport of drug plants to market. The findings are mainly on I) Isolation of fungi from different medicinal plants in field and under storage condition, II) Biodeterioration of medicinal plant parts during pathogenesis due to artificially infested fungi

In order to control the diseses of liquorice plant due to fungi, some plant extracts were tested to control the plant disease. 10% aqueous extracts of fresh leaves of 10 different angiospermic plants and 4 fresh gymnospermic leaf extracts were used. All these extracts were found to be inhibitory for the mycelial growth of all the tested fungi. Among these plant extracts, gymnospermic leaf extracts were less effective than angiospermic plants. This study reveals that, these plant extracts offer much scope for further exploitation as a promising material for use in plant disease control. In the present study, growth of some fungi was found to be stimulatory by some of the plant extracts. Much work has been done on the use of plant extracts against plant pathogenic fungi. Advesh Narain and Satapathy (1977) observed that root, stem, leaves and flower extract of two varieties of *vinca rosea* effective against *Fusarium oxysporum, Aspergillus niger.Allium cepa, Allium sativum,Azadirachta indica, Calotropis procera, Ocimum sanctum, Polyathia longifolia ,Datura stamoniumVinca rosea,Tagetes erecta* and *Withania sominifera* showed fungicidal properly against *Fusarium oxysporum* and *Rhizoctonia solani* (Shivpuri et al, 1997). *Azadirachta indica,Ocimum basillicum* and *Lantana camera* against *Fusarium oxysporum* (Bansal et al, 2000). Abraham and Prakasan (2001) noted that ten percent concentrations of *Azadirachta indica*, *Ocimum sanctum* and *Vite xnegundo* were inhibitory for *Fusarium solani,Cladosporium oxysporum* and *Geotrichum candidum.*

5. CONCLUSION

All 10% aqueous extracts of angiospermic leaves, rhizome,bulb and gymonospermic leaves were found to be inhibitory for mycelial growth of all the fungi. While, *Zingiber officinale* for *Phytopthora sp.* and gymnospermic plant *Thuja orientalis* for *Alternaria alternata* and *Fusarium oxysporum* proved non inhibitory.

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RESIDENTIAL WATERFOWL DIVERSITY OF YAVATMAL DISTRICT, AHARASHTRA, INDIA.

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Abstract : Over the last eleven years of bird watching, continuous study of 16 main reservoirs in 06 Taluka around Yavatmal has so far recorded a total of 51 local waterfowl of 4 orders and 19 families. Of the 51 local waterfowl records, 44 Least Concern, 06 Near Threaten, include River Lapwing, Great Thick-Knee, River Tern, Oriental Darter, Painted Stork, Black Headed Ibis and 01 Vulnerable which is Woolly Necked Stork. Out of 19 families, the Ardeidae family is dominant with 13 species. These species have some important records such as River Lapwing, Western reef heron and Ruddy breasted crake. Birds such as Stork Bill Kingfisher, Ruddy Breasted Crake , River Lapwing, Indian Cormorant and Yellow Bittern are rarely seen. Importantly, these are likely to appear in his particular habitat for viewing Nilona Dam, Borgaon Dam, Bembla Dam, Goki Dam, Pathrad Gole and Khateshwar Lake are some of the places where local waterfowl can be easily seen. Nilona and Bembla dams have the highest number of records. These records are crucial for the future as reservoir problems continue to grow and habitats are threatened. Proper conservation of habitat if done then only It is hoped that in the near future, local waterfowl records will be increased by regular visits to reservoirs in other Taluka of Yavatmal district.

Index Terms : Residential Waterfowl, Diversity, Yavatmal District, Maharashtra State .

INTRODUCTION

We call waterfowl the birds that get their food from the aquatic ecosystem and their habitats in and around the source of fresh water reservoir. As many as 120 waterfowl have been recorded on Yavatmal water bodies till date, out of which 70 waterfowl are foreign visitors who come to Yavatmal dam or lake to spend some time during seasonal migration. Although waterfowl rely mainly on water for their needs, some waterfowl take refuge in the plains around the reservoir. These waterfowl have adaptations to them such as wedding feets, long pointed beaks, long legs, as well as some of them are good swimmers and divers. Waterfowl mainly include Duck, Goose, Kingfisher, Crake, Water hen, Coot, Snipe, Jacana, Curlew, Thick-knee, Lapwing, Courser, Pratincole, Tern, Grebe, Darter, Cormorant, Egret, Heron, Bittern, Ibis and Stork. The purpose of this study is to obtain records of the local waterfowl found on the Yavatmal reservoir, as well as

to find out the habitat problems of the inhabitants and suggest appropriate solutions to the government and the general public.

RESEARCH METHODOLOGY

Yavatmal is located at this location in Central Maharashtra in India (N 20 ° 23 '60 ", E 78 ° 7' 48"). During the eleven years of bird watching, six other talukas around Yavatmal and adjoining talukas including Babhulgaon Ner Kalamb Ralegaon Ghatanji and Darvha. During his visit to over 20 major reservoirs in his area, records of many migratory and local waterfowl were taken. From the beginning of bird watching, since 2010, regular visits to local waterfowl habitats, such as dams, lakes, rivers and streams, continued, Till January 2021, numerous visits were made to this domicile around Yavatmal. The habitat was reached by 6:30 am for bird watching, along with Nikon Ocular 10x40 binoculars, lens camera record book and pen and up to 9:30 am. I used to know about bird watching and habitat problems. The study is based on records of local waterfowl. Information on each local waterfowl recorded, such as classification, including Order, Family, Common English Name, Latin Name and IUCN Status. we have also taken great photos. Book of Indian Birds by Salim Ali and Birds of the Indian Subcontinent by Grimmett, Inskipp and Inskipp were used for to Identification of birds and also as field guides and for preparing check list.

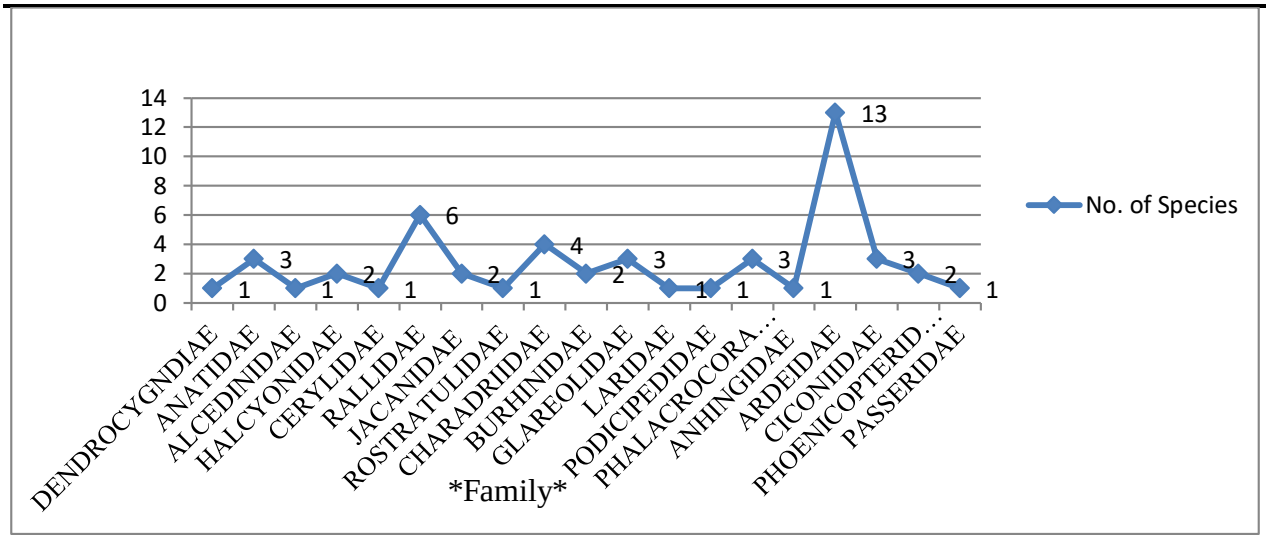
RESULT AND DISCUSSION

Since the year 2010, regular visits have been started on 16 main dams in seven other Taluka adjoining Yavatmal Taluka for bird watching. These include Nilona, Borgaon, Jamwadi Bembla, Chapadoh, Goki, Pathradgole, Waghadi, Takli, Kapra, Zola, Tembhurni, Singhandov, Arjuna, Mandev, Dattapur, Ghoti, Eklara and Echori Dam. According to the classification, to date, there are records of 51 local waterfowl belonging to 4 orders and 19 families. According to IUCN, 01 of the 51 waterfowl are recorded in the Vulnerable, 06 Near Threaten, 44 Least Concern categories. (Table-01)

S.N.	Common English Name	Binomial Name	IUCN Status
Order : ANSERIFORMES Family : DENDROCYGNDIAE			
1	Lesser Whistling-Duck	*Dendrocygna javanica*	Least Concern
Family : ANATIDAE			
2	Knob-Billed Duck	*Sarkidiornis melanotos*	Least Concern
3	Cotton Pygmy-Goose	*Nettapus coromandelianus*	Least Concern
4	Indian Spot-Billed Duck	*Anas poecilorhyncha*	Least Concern
Order : UPEPIFORMES Family : ALCEDINIDAE			
5	Common Kingfisher	*Alcedo atthis*	Least Concern
Family : HALCYONIDAE			
6	White-Throated Kingfisher	*Halcyon smyrnensis*	Least Concern
7	Stork-Billed Kingfisher	*Pelargopsis capensis*	Least Concern
Family : CERYLIDAE			
8	Pied Kingfisher	*Ceryle rudis*	Least Concern
Order : GRUIFORMES Family : RALLIDAE			
9	Brown Crake	*Porzana akool*	Least Concern
10	Ruddy-Breasted Crake	*Porzana fusca*	Least Concern
11	White-Breasted Waterhen	*Mourornis phoenicurus*	Least Concern
12	Purple Swamphen	*Porphyrio poliocephalus*	Least Concern
13	Common Moorhen	*Gallinula chloropus*	Least Concern
14	Eurasian Coot	*Fulica atra*	Least Concern
Family : JACANIDAE			
15	Pheasant-Tailed Jacana	*Hydrophasianus chirugrus*	Least Concern

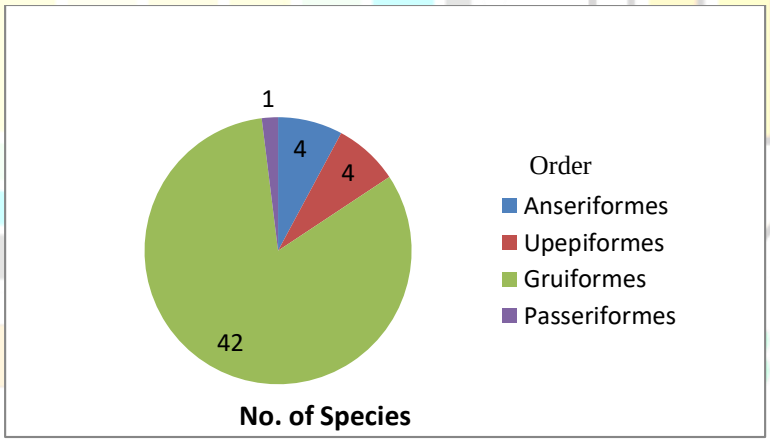
16	Bronze-Winged Jacana	*Metopidius indicus*	Least Concern
Family : ROSTRATULIDAE			
17	Greater Painted Snipe	*Rostratula benghalensis*	Least Concern
Family : CHARADRIIDAE			
18	Little Ringed Plover	*Charadrius dubius*	Least Concern
19	Yellow-Wattled Lapwing	*Vanellus malabaricus*	Least Concern
20	Red-Wattled Lapwing	*Vanellus indicus*	Least Concern
21	River Lapwing	*Vanellus duvaucelli*	Near Threaten
Family : BURHINIDAE			
22	Indian Stone Curlew	*Burhinus indicus*	Least Concern
23	Great Thick-Knee	*Esacus recurvirostris*	Near Threaten
Family : GLAREOLIDAE			
24	Small Pratincole	*Glareola lactea*	Least Concern
25	Oriental Pratincole	*Glareola maldivarum*	Least Concern
26	Indian Courser	*Cursorius coromandelicus*	Least Concern
Family : LARIDAE			
27	River Tern	*Sterna aurantia*	Near Threaten
Family : PODICIPEDIDAE			
28	Little Grebe	*Tachybaptus ruficollis*	Least Concern
Family : PHALACROCORACIDAE			
29	Little Cormorant	*Microcarbo niger*	Least Concern
30	Indian Cormorant	*Phalacrocorax fuscicollis*	Least Concern
31	Great Cormorant	*Phalacrocorax carbo*	Least Concern
32	Oriental Darter	*Anhinga melanogaster*	Near Threaten
33	Little Egret	*Egretta garzetta*	Least Concern
34	Great Egret	*Egretta alba*	Least Concern
35	Intermediate Egret	*Egretta intermedia*	Least Concern
36	Cattle Egret	*Bubulcus coromandus*	Least Concern
37	Indian Pond-heron	*Ardeola grayii*	Least Concern
38	Striated Heron	*Butorides striata*	Least Concern
39	Black-crowned Night heron	*Nycticorax nycticorax*	Least Concern
40	Grey Heron	*Ardea cinerea*	Least Concern
41	Purple Heron	*Ardea purpurea*	Least Concern
42	Western Reef-heron	*Egretta gularis*	Least Concern
43	Yellow Bittern	*Ixobrychus sinensis*	Least Concern
44	Cinnamon Bittern	*Ixobrychus cinnamomeus*	Least Concern
45	Black Bittern	*Dupetor flavicollis*	Least Concern
46	Painted Stork	*Mycteria leucocephala*	Near Threaten
47	Asian Openbill (Stork)	*Anastomus oscitans*	Least Concern
48	Wolly-necked Stork	*Ciconia episcopus*	Vulnerable
49	Indian Black (Red-naped) Ibis	*Pseudibis papillosa*	Least Concern
50	Black-headed (White) Ibis	*Threskiornis melanocephalus*	Near Threaten
51	White-browed Wagtail	*Motacilla maderaspatensis*	Least Concern

Table: 1 Classification of Local Waterfowl diversity of Yavatmal.



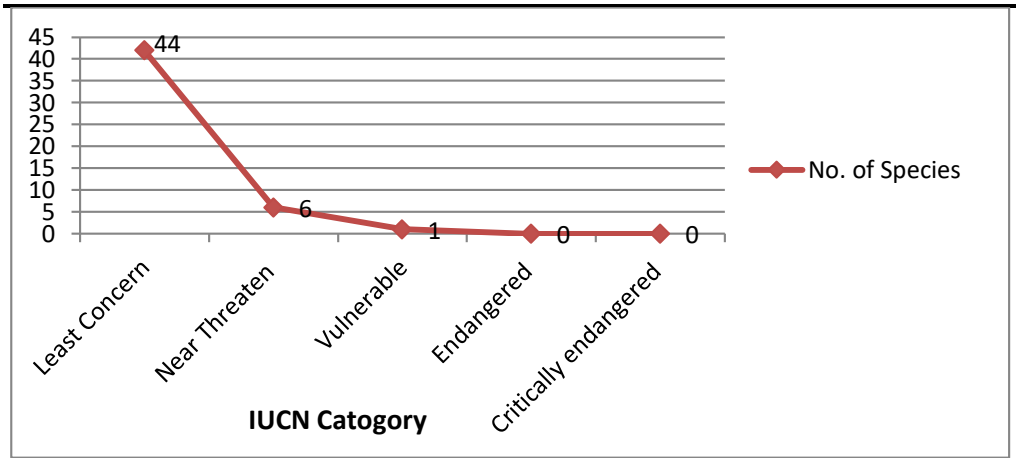
Graph-1 Family wise number of species

Maximum 13 species under Family Ardeidae followed by Rallidae of 06, Charadriidae of 04, Anatidae, Glareolidae, Phalacrocoracidae, Ciconiidae each 3 species, Halcyonidae, Jacanidae, Burhinidae, Phoenicopteridae of 02 species each in the family , Dendrocygndiae, Alcedinidae, Cerylidae, Rostratulidae, Laridae, Podicipedidae, Anhingidae, Passeridae all these families have 1 species each. Anseriformes and Upepiformes having 04 species each order Gruiformes having 42 and Passeriformes has only 01 species.(Graph-01 and Graph-02)



Graph-2 Order wise number of species

According to the IUCN Red Data List, out of 51 residential waterfowl, the Woolly neck Stork falls into the Vulnerable category. The other 06 waterfowl include River Lapwing, Great Thick-knee, River Tern, Oriental Darter, Painted Stork and Black-headed Ibis in the Near Threaten category. The remaining 44 waterfowl fall into the Least Concern category. (Graph-03)



Graph-3 Distribution of species in the different IUCN Category

Of the 51 waterfowl entries River Lapwing, Western Reef Egret, Ruddy Breasted Crake, Stork Bill Kingfisher, Yellow Bittern were rarely recorded. Important dams from bird watching point of view such as Nilona, Borgaon, Bembala, Goki, Pathrad and Khateshwar and these rare birds were recorded on these reservoirs. Visits to other reservoirs in Yavatmal district are being started to increase the number of records from future continuous monitoring of local waterfowl. Today the reservoirs are plagued with numerous problems. In the future these habitats are not safe so today's records are very important. These local waterfowl will be safe only if positive efforts are made for habitat conservation otherwise it will not take long for them to become extinct.

Conclusion :

Eleven years of bird watching focused on important water sources in seven other talukas adjoining Yavatmal taluka, including dam, lake, nala and streams . According to classification total 51 local waterfowl were recorded which are belonging 04 orders and 19 families. Records of 06 Near Threaton 01 Vulnerable species are important as per IUCN. Many species are on the verge of extinction in the future due to potential threats to water resources. Neglect of local birds is also an important reason for today's need for habitat conservation, which is expected to automatically increase the number of local waterfowl.

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INTERNATIONAL JOURNAL OF CURRENT SCIENCE (IJCSPUB)

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THE PASTE OF ARJUNA BARK FORMULATION EFFICACY FOR RECOVERING BURNED SKIN

Ware Renuka Bhanudas **Prof. Miss. Nakhate. S. T .** **Dr . L. D. Hingane**

Abstract

Terminalia Arjuna Bark is commonly known as Arjuna Bark. The Paste of Arjuna Bark has a good safety Outline when used in burned skin condition. This studies are most important to expose the current Culture. Purpose: The purpose of this study is to assess the efficacy of Arjuna Bark Paste as compared to Non- herbal paste. The approach is to make use of naturally available herbs such as Aloe Vera, Tulasi (Ocimum Tenuiflorum) and Turmeric etc to make paste by using Arjuna Bark. Result/ conclusion: The conclusion is that the Paste of Arjuna Bark is more efficient in maintenance of Burned skin as compared to other paste.

Keywords: Bark of Terminalia Arjuna, Aloe Vera , Tulsi, Turmeric.

Introduction Classical Name

Terminalia Arjuna is known by it's various classical names such as Arjuna, Dhavala, Kaubha, Nadisaraja and Veeravriksha.

Botanical Description

Terminalia Arjuna is a large evergreen deciduous tree (commonly known as Arjuna) found throughout India growing to a height of 20-25 m it commonly grows on banks of Rivers, streams and dry Watercourses and distributed throughout the greater part of Indian sub- continent, Himalayan track of Uttar Pradesh, Chota Nagpur, Orissa, West Bengal, Panjab. The bark of Terminalia Arjuna is soft and thick with Gray in colour on outer surface and tinge easily Flakes off in flat large pieces inside. Leaves of Terminalia Arjuna are simple borne opposite shortly acute or obtuse at the Apex, glabrous 4-6 Inch long and 2-3 inch wide, there are two glands near the base of the petiole. There is a morphological Difference in leaf traits of this plant. It has pale yellow flowers with short auxillary spikes or terminal Panicle arrangement which appear between March and June; it's glabrous 2.5-5 cm fibrous Woody fruit With smooth skinned divided into five hard wings appears between September and November.

Terminalia Arjuna Bark is extensively used in Ayurvedic medicine this comprehensive research provides Various aspects of it's clinical significance to burned skin recovery condition. This research highlights the Uses of Arjuna Bark for the burned skin recovery which plays an essential role in health care. Still most of The people choose Arjuna Bark for certain uses they expanded attention due to their effectiveness. After a burned injury the area of burned skin may appear red and inflamed. This redness gradually Decreases with the help of this Paste of Arjuna

Bark. It generally takes few days to finish healing and for Skin to fade to a near normal colour. Treatment of burns depends on the cause of the burned.

How deep it is and how much of the body it Covered. **Plant Profile**

Kingdom. :- Plantae

Division. :- Magnoliophyta

Class. :- Magnoliopsida

Order. :- Myrtales

Family. :- Combretaceae

Genus. :- Terminalia

Species. :- Terminalia Arjuna

Storage condition

The condition of storage of the Paste of Arjuna Bark are important to ensure that the conditions are Maintained within the specified range up to 12 months. The paste of Arjuna Bark produces desired results on Burned Skin conditions.

Benefits

1. Promotes better skin functioning
2. Stress Buster
3. Helps to reduce pain
4. Promotes healthy cell growth.

Table

Product Description	Arjuna Bark powder
Botanical Name	Terminalia Arjuna
Family	combretaceae
Appearance	free flowing powder
Colour	Brown coloured powder
Taste	characteristic
Odour	characteristi
Plant	Bark
Other Names	T. Arjuna, Arjuna Tree

Significance Statement

This study efforts to give every aspect of literature such as pharmacognosy, phytochemistry, pharmacological, Ayurvedic traditional and clinical studies on plants and updating available research data. It can be beneficial for the new researchers and students to collect the informative knowledge of plant in comprehensive form

Herbal cosmetics are prepared by the association of bioactive ingredients and pharmaceutical products. The presence of number of phytochemicals and botanical in the herbal products have dual significance, one that they are used as Cosmetics for body care and another that phytochemicals improve the biological Functions of human body naturally results in healthy skin . As the name Suggests the herbal extracts means the extracts of herbs. It is an ancient methodology because its origin was discovered from the holy Vedas and in Unani scriptures. As the realization said that the chemical medicines are not Always work as magic bullets and they may have side effects. The current trend Moves toward the herbalism and use of natural products. Indian herbs are the richest source to be used in cosmetic industries .

Herbal cosmetics were gaining tremendous demand

In the world market. There is a wide range of herbal cosmetic products used as beauty regime to satisfy the purpose of beautification Adding herbs in cosmetics is safer for our skin. Herbal skin care cream were serving the purpose of skin treatment . Herbal skin care cream not only moisturizes skin but also reverses dryness and conditions.

Method and materials 1) Plant Material Collection:-

The Bark of Terminalia Arjuna was collected from University road and nearby District area and Aloe Vera and Tulsi are found in Aditya college campus.

2) Preparation:-

The collected Terminalia Arjuna Barks were cut into small pieces.

The plant parts were dried in an incubator for 7 days at 40°C . crushed in an electrical grinder and then the powder was separated.

The Paste of Arjuna Bark was prepared by using bark powdered, Aloe Vera hand made gel(by using Pulp), Tulsi (Ocimum Tenuiflorum) and Turmeric (Curcuma Long a).

1) Aloe Vera Scientific classification

Kingdom :- Plantae

Clade :- Tracheophytes

Clade :- Angiosperms

Clade :- Manocots

Order :- Asparagales

Family :- Asphodelaceae

Subfamily :- Asphodeloideae

Genus :- Aloe

Species :- Aloe Vera.

Uses :-

Aloe gel typically is used to make topical medications for skin conditions such as burns wounds. Aloe Vera has a cooling property which helps to recover burned skin.

2) Tulsi Scientific Classification

Kingdom :- Plantae

Clade :- Tracheophytes

Clade :- Angiosperms

Clade :- Eudicots Clade :- Asterids

Order :- lamiales

Family :- lamiaceae

Genus :- Ocimum

Species :- Ocimum Tenuiflorum

Uses :-

Tulsi has proved to be highly effective in protecting our body from various infections. So, Tulsi is rightly called the queen of herbs. Tulsi acts as a sweetening agent

3) Turmeric Scientific classification

Kingdom :- Plantae

Clade :- Tracheophytes

Clade :- Angiosperms

Clade :- Manocots

Clade :- Commelinids

Order :- zingiberales

Family :- Zingiberaceae

Genus :- Curcuma

Species :- C.Longa

Uses :-

The anti-inflammatory qualities that target your pores and calm the skin Turmeric is also known to reduce

scarring A mixture of Aloe Vera gel and Turmeric can soothe burns and provide relief by healing them

Evaluation :-

To evaluate the quality of prepared formulation, several quality tests were performed

1) colour

The colour of the Paste of Arjuna Bark was checked by visually.

2) odour

The formulation was evaluated for its odour by smelling it.

3) Consistency

It was determined manually

4) pH

pH of the formulation was measured by using a calibrated digital pH meter at constant temperature.

5) Washability

Formulation were applied on the skin easily remove by washing with water were checked manually.

6) Spreadability

The spread ability of the Paste was found manually by applying on the skin.

7) Rheological study

The viscosity of the developed Paste formulation was determined.

8) sensitivity

The formulated preparation applied on human volunteers (on Burned Skin) and observe for any side effects.

Formulation table of the Paste of Arjuna Bark

Common name	Botanical name	Parts used	Quantity
Arjuna tree	Terminalia arjuna	Bark	10gm
Aloe vera	Aloe vera	Pulp	8gm
Tulsi	Ocimum tenuihlorum	Leaves extract	5gm
Turmeric	Curcuma longa	Powder	2gm

Result :- Colour :- Blackish **Odour :-** Pleasant **Consistency :-** Good

pH :- pH of formulation was found to be 4.2

Washability :- formulation easily removed by washing with water

Rheological study :- Viscosity of formulation was found to be 505cp to 20rpm.

Sensitivity :- no any irritation, itching and redness occurs when applied on the human skin.

Conclusion

The paste was prepared by using various crude drug powders and then evaluated by various parameters which report prepared formulation have good consistency better results and does not have side effects.from the given study it can be concluded that prepared herbal formulation exhibited satisfactory results.

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PREPARATION AND EVALUATION OF SKIN CARE HERBAL CREAM

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ABSTRACT

This herbal skin care was formulated by using various herbs such as Aloe vera, Saffron, Multani Soil, Sandal wood powder, rose water, Raw honey, Bee wax, turmeric, glycerin and Vitamin E . The Ayurvedic cosmetics are very helpful and it is less prone any side effects. Ayurvedic cosmetics are also known as herbal cosmetics. All herbal ingredients are easily available in market

This herbal skin care cream used in treatment of common skin problems like dark spots, wrinkles , dry skin ,allergies, black heads, acne and unclogs pores.

All the herbal ingredients used in formulation provide essential nutrients such as vitamins, antioxidant, protein and many essential oils.

Procedure for oil preparation is divided into two parts 1) Grinding of ingredients and 2) cream preparation.

Excellent results in prevention of skin related were seen in formulation prepared by the above mentioned procedure.

Formulated herbal skin care cream was evaluated for various parameters such as Homogeneity, viscosity, pH ,irritation , After Feel, removal, spread ability, penetration and skin whitening tests in general herbal formulations provides good blend of vitamins , antioxidants , and essential oils. All the values in the evaluation of finished product showed that they are within the acceptable limits. hence, it is concluded that the skin care cream is beneficial in maintaining glowing skin, prevents skin from drying, removes dark spots, prevents wrinkles, acnes , providing protection from sunlight and results in healthy skin.

INTRODUCTION

Herbal cosmetics are prepared by the association of bioactive ingredients and pharmaceutical products. The presence of number of phytochemicals and botanical in the herbal products have dual significance, one that they are used as Cosmetics for body care and another that phytochemicals improve the biological Functions of human body naturally results in healthy skin . As the name Suggests the herbal extracts means the extracts of herbs. It is an ancient methodology because its origin was discovered from the holy Vedas and in Unani scriptures. As the realization said that the chemical medicines are not Always work as magic bullets and they may have side effects. The current trend Moves toward the herbalism and use of natural products. Indian herbs are the richest source to be used in cosmetic industries .

Herbal cosmetics were gaining tremendous demand In the world market. There is a wide range of herbal cosmetic products used as beauty regime to satisfy the purpose of beautification Adding herbs in cosmetics is safer for our skin. Herbal skin care cream were serving the purpose of skin treatment . Herbal skin care cream not only moisturizes skin but also reverses dryness and conditions . It provides numerous essential nutrients required to maintain healthy skin

Materials used :-

Common name	**Part used**		**Figure**
Aloe vera	Aloe vera pulp		
Sandal Wood	Sandal wood powder		
Rose water	Rose water		

Vitamin E	Vitamin E tablet		

Common name	Part used		Figure
Glycerin	Glycerin		
Turmeric	Turmeric powder		
Saffron	Saffron		
Multani soil	Multani soil		
Raw honey	Honey		
Beeswax	Whole Beeswax		

All the materials used in this preparation were purchased and collected from local market and botanical garden.

e vera has cooling properties and is anti-
inflammatory. Hence, it is one of the most natural remedies for sunburn or burn skin.
Applying this gel helps with a protective layer for the
skin, and it also helps to retain moisture. It is rich in antioxidants and minerals that boost the healing process. Era pulp-Hydrating aloe vera juice may help reduce the frequency and appearance of acne.
It may also help reduce skin conditions like psoriasis
and dermatitis. Aloe vera is a rich source of antioxidants and vitamins that may help protect your s

Biological source:-cape aloe **Synonym:** Barbadense mill

2) **Sandalwood**:-

The astringent and antiseptic properties of Sandalwood clear the skin of excess moisture and acne, making it a key ingredient to look for in skin care products for oily skin.

The Truffula Anti-Aging Cream has aloe, saffron and
sandalwood and can be used during day or night on mature skin to work on dry patches, fine lines, wrinkles and crow's feet. ... The Old Tree Sandalwood Essential Oil can be added to a carrier oil to massage into dry skin.

Biological source:-Roots of Santalum album Linn **Synonym:-**Neroli

3)Rose water :-

Rose oil, when used along with another carrier oil,
is known to add luster to hair. It also works effectively towards promoting hair growth and makes the scalp healthier with its antifungal properties.
You could use it with tea tree oil to help with an itchy
scalp. Rose oil moisturizes your hair strands leaving them soft and shiny. Few drops of the rose essential oil blended with a carrier oil such as coconut oil or Olive oil will intensely moisturize dry hair. ... Rose oil is also a good source of Vitamin C and lycopene which have anti-oxidant activity

Biological source:-Rose Petals
Synonym:-Odoriferous

4) Vitamin E :-

Vitamin E is a nutrient your body needs to support your immune system and help your cells to regenerate. It also has antioxidant and anti-inflammatory properties that make getting enough essential to your everyday health

Vitamin E is most commonly known for its benefits for skin health and appearance. It can be applied topically to your face to reduce inflammation and make your skin look younger. Vitamin E oil can be used on your face as an overnight anti-aging treatment. Since vitamin E has a thick consistency, it's best to apply it before bed so that it can fully absorb.

Typically, you can apply a serum or oil mixture containing vitamin E as an all-over treatment on your face. This is different than using vitamin E to spot-treat a blemish, using a beauty treatment mask for a brief period of time, or taking an oral supplement that contains vitamin E

Biological source:- Vegetable oil

Synonym:- Tocopherol

5) Glycerin:-

Glycerin is great for the skin because it acts as a

humectant, which is a substance that allows the skin to retain moisture. It can increase skin hydration, relieve dryness, and refresh the skin's surface. It's also an emollient, which means it can soften skin. You can use glycerin as a moisturizer but keep in mind that using only glycerin on the face might not be a good idea because it is thick.

It attracts dust which may lead to acne and pimples. You should always dilute it. You can dilute it with water or a little bit of rose water before applying it to the face. Applying glycerin to your skin traps moisture in your skin and gives it a youthful, healthy glow. By drawing moisture to the top layer of skin, glycerin helps reduce the appearance of wrinkles and keeps skin looking soft and smooth. Glycerin also improves skin function to slow down aging. Glycerin cleanses the skin pores and removes dirt. It keeps the skin healthy.

Glycerin reduces acne and keeps the skin pores clean

Biological source:-Triglycerides

Synonym:-Glycerol

6)Turmeric Powder:-

Turmeric doesn't darken the skin. In fact, turmeric

has skin-lightening properties which help you get rid of dark spots effectively without causing any side-effects. Using turmeric along with other moisturizing ingredients such as milk or honey will help improve your skin complexion.

Turmeric contains antioxidants and anti-inflammatory

components. These characteristics may provide glow and luster to the skin. Turmeric may also revive your skin by bringing out its natural glow. You may want to try a turmeric face mask at home to see if the spice has any positive effects on your skin. Turmeric also helps even out skin tone, and its extract may also help reduce the appearance of acne scars. Studies have shown turmeric to reduce dark spots on the skin AKA hyperpigmentation. In fact, one study showed that a turmericextract cream reduced hyper-pigmentation up to 14 per cent after four weeks of use

Biological source:-Curcuma longa

Synonym:-cardamon

7) saffronsaffron-If If you'd like to enhance your skin care routine, try using saffron. Its active compounds work against inflammation, hyperpigmentation, and UV radiation. It also offers protection from UV radiation, a common cause of premature skin aging. Be cautious if it's your first time using saffron. To use saffron essential oil as a moisturizer, mix it with carrier oils like grapeseed or almond in order to avoid overly sensitizing your skin. Saffron oils can be used as a natural moisturizer for clear, glowing skin.

Biological source:-Saffron crocus

Synonym:-Waldon

8) Multani Soil:-

Multani mitti or fuller's earth is used as a natural
cleanser and astringent, offering a host of benefits for the skin, including: reducing oil. fighting acne.

Biological Source:-Deposits of volcanic ash of cretaceous and youn **Synonym:-**Bleaching clay

9) Raw Honey:-

Raw honey helps balance the bacteria on your skin,
which makes it a great product to use for acne. Manuka honey has been studied as an anti-acne product and found to be significantly more effective than other popular products. Honey speeds up your skin cells' healing processes.

Honey has skin brightening properties and also
lends a healthy moisturized glow to the face after usage. Honey is good to treat dry skin but also works extremely well in treating oily, acneprone and combination skin types as well. It might be time to ditch your daily face wash. Honey's antioxidants, antiseptic and antibacterial properties make this ingredient a go-to for fighting acne. It'll open your pores and get rid of those pesky blackheads while keeping your skin hydrated all day long.

Biological source:-The nectar of flowers by the hive-bee apish malefice and bees o other species of Apies

Beeswax:-

Beeswax can create a protective layer on the skin. It's also a humectant, which means that it attracts water. Both of these qualities can help the skin stay hydrated. Beeswax is also a natural exfoliator, ideal for sloughing away dead skin cells. "Beeswax is an effective occlusive, which means that it can create a protective layer on the skin, sealing in moisture. It also has antibacterial, anti-inflammatory and antiviral properties, which can help protect the skin as well," Hadley adds.
Biological source:- honey bees of the geus Apis

synonym- crude wax

Method of preparation:-

For the preparation of herbal skin care
cream, I have selected nine important ingredients such as Aloe vera, Saffron, Multani Soil, Sandal wood powder, rose water, Raw honey, Bee wax, turmeric, glycerin and Vitamin E were collected from local market and Aditya botanical garden.

We have to take each herbal ingredient and convert
into the fine powder. The conversion of fine powder is done by the help of grinder. With the help of sieves we can separate out particles of same size each herbal ingredients I have taken Rose water because it provides cooling effect and scent First Bee wax was melted down and then put in a wide mouth vessel then gradually add the herbs Bee wax– 50,Turmeric powder 10g, sandalwood powder 10g aloe verra pulp 10g, Saffron 5g, Multani soil 20g,Rose water 9ml Raw honey 20g glycerin 10g vitamin E 6g.

All the ingredients were mixed vigorously using spatula for about 30-45 mins and then cooled down slowly.

List and Qauntity of ingredients used in formulation:-

Sr.No	Ingredients	Quantity (g)
1	Aloe vera	10
2	Turmeric	10
3	Multani soil	20
4	Sandalwood	10
5	Bee wax	50
6	Raw Honey	20
7	Saffron	5
8	Rose water	9ml
9	Glycerin	10
10	Vitamin E	6

Sr no.	Ingredients	Batch (g)		
		B1	B2	B3
1	Aloe vera	15	15	10
2	Turmeric	15	20	10
3	Multani soil	15	10	20
4	Sandalwood	15	10	10
5	Bee wax	55	60	50

6	Raw Honey	15	10	20
7	Saffron	5	5	5
8	Rose water	**5ml**	**5ml**	**9ml**
9	Glycerin	5	10	10
10	Vitamin E	5	5	6

Ideal batch was found to batch No. B3 Evaluation:

Organoleptic Evaluation:

The Face Cream thus obtained was evaluated for its organoleptic properties like colour, odour and state. The appearance of the cream was judged by its colour and roughness and graded.

Homogeneity:

Homogeneity of the prepared creams was confirmed by the visual appearance and by touch.

After Feel:

Emollience, slipperiness and amount of residue left after the application of the fixed amount of cream was found to be good.

Removal:

All the cream formulations are applied on the skin was easily removed by washing with tap water

Irritancy Test:

All formulations shows no redness enema inflammation and irritation and during irritancy studies these formulations are found to be safe to use for the skin.

Spread ability test

Cream base should spread easily without too much drag and should not produce greater friction in the rubbing process. Spread ability was calculated using the spread ability apparatus made of wooden board with scale and two glass slides having two pans on both sides mounted on a pulley

Skin Whitening Test:

5 volunteers were selected for the following studies. All the preparation are applied and observed for 1 month. After 1 month skin test has been done that there is no pigmentation and skin gets whitens from F5 formulation than other formulations. So F5 formulation shows better result than other formulation containing single herb.

The penetration test, using a hemispherical probe, is an imitative test simulating the ease by which a human finger will deform the sample during application of the cream. This test allows the consistencies of creams to be assessed.
Test Speed: 2.0 mm/s(ideal test result)
Test Type: Compression
Pre-Test Speed: 1.0 mm/s
Trigger Force: 10 g

Viscosity -Instruments called “rheometers” and “viscometers” are used to measure viscosity of pharmaceutical liquids and semi-solid materials like creams/ ointments. Viscosity flow curves shown in the instrument display - see Figure 1 – characterize typical behavior of pharmaceutical products.

pH Test -First, you have to make sure that the cream is o/w and not w/o. Only for the o/w system based products, you should do the pH of the finished product (as is) using a properly calibrated pH meter and then (5o% dilution with water.) This will give you the true pH of your product.

1)The penetration test

SrNo	The penetration test	Observation
1	Batch 1	1.7mm/s
2	Batch 2	1.2mm/s
3	Batch 3	2.0 mm/s

2)Viscosity test

SrNo	Viscosity test	Observation
1	Batch 1	32
2	Batch 2	42
3	Batch 3	46

3) pH Test

SrNo.	pH Test	Observation
1	Batch 1	5.9
2	Batch 2	5.2
3	Batch 3	6.8

Final product-

Benefits :-

-Protection from environmental damage such as pollution
-help fighting the effects of aging such as wrinkles and sunburn
-it has no side effects
-manufacturing doesn't harm animals they are packed with benificial nutrients

Colour:the colour of cream is pail yellow.
Odour:the odour of cream is fantastic.

Result:-

Preparation and evaluation of herbal skin care cream is done

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To,
Jadhav Ramesh Rangrao

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