



FORMULATION AND QUALITY TESTING OF POLYHEBAL DANTDHAWAN CHURNA USED AS TEETH CLEANER

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ABSTRACT

In underdeveloped nations like India, where dental disorders constitute a significant burden, particularly in the rural population, oral health is given very little attention. More than 50% of the population in India has issues with their teeth and other supporting components. The prevalence of dental issues in children has increased as a result of urbanization, continued use of chemical tooth paste, and related dietary changes. About 70% of adults suffer from illnesses of the gums and dental roots. However, there are a number of medicinal plants that have been used as tooth cleaners since ancient texts. These plants are safer than manufactured toothpaste with chemical bases and serve a significant role in maintaining oral hygiene and preventing dental problems. Therefore, the task was undertaken and selected the ingredients for the formulation and quality evaluation of a polyherbal Dant Dhawan churna used as tooth cleaner. Churna has been formulated with using some herbs *such as* Haritki, Vibhitaki, Amalki, Babool and Salt. The study provides information on formulation and quality evaluation of Dant Dhawan Churna based on macroscopic study, organoleptic characteristics, and physicochemical tests like LOD, extractive value, ash value preliminary phytochemical screening and development of HPTLC fingerprints profile.

KEYWORDS: Dant Dhawan Churna, Formulation, Quality evaluation, Polyherbal, Toothcare.

INTRODUCTION

Ayurveda has long been the dominant system of medicine in India, as well as many other Asian and African nations, and it continues to be the most often used type of therapy for a variety of illnesses. Tooth decay is a significant dental problem that affects a lot of people. It is brought on by a high sugar intake, the build-up of plaque, and an unbalanced *pH* level in the mouth. By reducing the mouth's acidic content and bringing the *pH* level back into balance when the brush and teeth with herbal formulation tooth cleaner, can prevent tooth decay.^[1,2] Herbal toothpaste is safer and has fewer side effects than synthetic toothpaste with a chemical base, which serves a vital role in maintaining oral hygiene and preventing dental cavities. Properly prepared toothpaste has the ability to preserve dental and oral hygiene and has antibacterial activity against germs^[3,4] like *E. coli*. Herbal toothpaste was found to be equally effective as commercially available toothpaste in an exploratory in-vitro investigation in terms of all toothpaste evaluation parameters.^[5,6,7] From this research, we developed Dantdhawan churna a stable polyherbal teeth cleanser that helps to preserve healthy teeth and prevent dental illnesses, which, as compared to allopathic medications or current formulations, have no side effects or negative

consequences at all. It has numerous advantages that help strengthen teeth, lean teeth, and treat dental diseases. The formulation is prepared by using some herbal ingredients and salt *viz.* Haritki, Vibhitaki, Amalki, Babool and Salt.

Present study deals with the formulation and quality evaluation of poly herbal compound formulation Dant Dhawan Churna used to treat the dental disorders and teeth cleaner. Prepared polyherbal formulation was tested by standard parameters such as organoleptic tests, physicochemical parameters (LOD on 105°C, Water, ethyl alcohol, methyl alcohol, acetone, chloroform, hexane and benzene soluble extractive value, total ash value and acid insoluble ash value), preliminary phytochemical analysis and development of HPTLC fingerprints profile.

MATERIALS AND METHODS

Collection of plant materials

For formulation of Polyhebal DantDhawan Churna ingredients *such as* Babool stem bark was collected from Arogyadham campus, Chitrakoot while Haritki fruits, Vibhitaki fruits, Amalki fruits, Salt were purchased from Chitrakoot market, Satna M.P.. Collected raw materials

were washed through soft water and dried in shade and powdered for further use.^[8,9]

Formulation of Polyhebal DantDhawan Churna

All grounded ingredients were taken and weighted in specific quantity separately; mixed the ingredients in specific ration and prepared the DantDhawan Churna for further study.^[10,11,12]

Organoleptic tests

Organoleptic tests such as colour, odor, taste and texture were evaluated and results are noted.^[12,13]

pH determination

For determination of pH, 10% churna solution was prepared in distilled water and measured pH, with using of a digital pH metre, at 25°C room temperature.^[14,15]

Physico-chemical tests

Physico-chemical parameters such as moisture content (loss on drying at 105°C), water soluble extractive value, hexane soluble extractive, alcohol soluble extractive value, total ash value, acid insoluble ash value was calculated.^[16,17]

Preliminary phyto-chemical investigation

Preliminary phyto-chemical tests were carried out on ethanolic and water extract for the presence/absence of phyto-constituents like alkaloids, flavonoids, tannins, resins, carbohydrates, proteins and saponins.^[18,19]

High Performance Thin Layer Chromatography (HPTLC) fingerprint profile

For High performance thin layer chromatography, the powdered 10 gm of the sample powder was extracted

with 100 ml of methanol overnight, filtered and concentrated. It was applied by spotting extracted sample on pre-coated silica-gel aluminium plate 60 F₂₅₄ (5x10 cm with 0.2 mm layer thickness Merk Germany) using Camag Linomat -5 sample applicator and a 100 µl Hamilton syringe. The sample, in the form of bands of length 6 mm, were spotted 15 mm from the bottom, 15 mm from left margin the plate and 10 mm part. Plates was developed using mobile phase consisting of toluene: Toluene: ethyl acetate: Formic acid (7: 2:1 v/v). Linear ascending development was carried out in 10x10cm twin through glass chamber equilibrated with mobile phase. The optimized chamber saturation time for mobile phase was 30 min. at room temperature. The length of chromatogram run was 8 cm. 20 ml of the mobile phase. Subsequent to the development, Thin Layer Chromatography plate was dried with the help of Hot Air Oven. The peak area for samples and standard were recorded with Camera photo documentation system Camag Reprostar 3. Visualization of spot was made before and after derivatization (with 5% Methanolic - sulphuric acid reagent) at UV light with Win cat software and R_f values noted.^[20,21,22]

RESULTS AND DISCUSSION

Formulation of Stomach Disorder Polyherbal Churna

All grounded ingredients were taken and weighted in specific quantity separately; mixed the ingredients and prepared the stomach disorder polyherbal churna. Formulation composition is given in table 2.

Table2: Formulation composition of Polyhebal DantDhawan Churna.

S. no.	Ingredients name	Botanical name	Part used	Quantity
1	Babool	<i>Acacia nilotica</i> L.	Stem bark	4gm
2	Haritaki	<i>Terminalia chebula</i> (Gaertn.) Roxb.	Fruits	1gm
3	Bibhitaki	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Fruits	1gm
4	Amalki	<i>Emblica officinalis</i> Gaertn	Fruits	3gm
5	Saindhava	Salt	Salt	1gm

Organoleptic evaluation

Organoleptic tests such as colour, odour, taste and texture were tested through sensory organs and results are given in table3.

Table-3: Organoleptic tests of Polyhebal DantDhawan Churna.

S.No.	Tests name	Results
1	Color	brownish
2	Odor	Pleasant
3	Taste	Salty bitter
4	Texture	Fine & Smooth

Physicochemical tests

Physicochemical tests were performed such as pH, Moisture Content (Loss on drying at 105°C), Water soluble extractive value, Ethanol soluble extractive value, Methanol soluble extractive value, Acetone soluble extractive value, Benzene soluble extractive value and Chloroform soluble extractive value, total ash value and acid insoluble ash value, results are given in table 4.

Table-4: Physicochemical tests Polyhebal DantDhawan Churna

S.No.	Tests name	Results
1	pH	4.8
2	Moisture Content (Loss on drying at 105°C)	4.22%
3	Water soluble extractive value	32.34%
4	Ethanol soluble extractive value	41.32%
5	Methanol soluble extractive value	43.6%
6	Acetone soluble extractive value	30.10%
7	Benzene soluble extractive value	1.26 %
8	Chloroform soluble extractive value	5.72%
9	Total ash value	7.9%
10	Acid insoluble ash value	1.33%

Preliminary phyto-chemical investigation of Polyhebal DantDhawan Churna

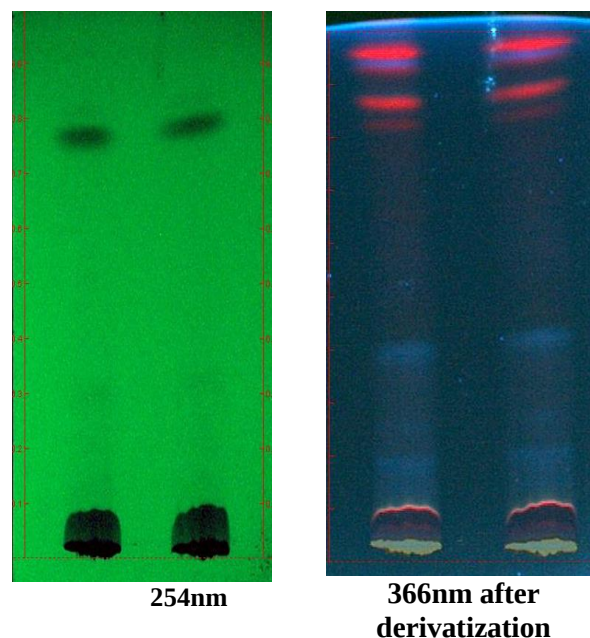
Preliminary phytochemical tests were evaluated in water and methanolic extracts. Various types of phytoconstituents such as, flavonoids, tannins, saponins, resins, proteins and alkaloids were present.

HPTLC fingerprints profile of face pack powder

HPTLC fingerprinting was developed by using a Camag Linomat -5 sample applicator and a 100 l Hamilton syringe, it was applied by dotting the extracted sample onto a pre-coated silica-gel aluminium plate 60 F254 (5x10 cm with 0.2 mm layer thickness, Merk Germany). The sample, which was in the shape of 6 mm long bands, was placed 15 mm from the plate's left margin, 10 mm from the bottom, and 15 mm from the plate's edge. *Toluene: Ethyl acetate: Formic acid* (7:2:1 v/v) mobile phase was used. After development of the plate, a hot air oven was used to dry the thin layer chromatography plate. Utilizing the Camag Reprostar 3 camera photo documentation system, the peak area for samples and standards was captured. Win Cat software was used to visualize the spot before and after derivatization (using 5% Methanolic-sulphuric acid reagent) under UV light, and R_f values were recorded and given in table 5 and captured fingerprints image were given in Fig.1.

Table-5: R_f values of HPTLC fingerprints profile of Polyhebal DantDhawan Churna.

R_f Values	Before derivatization	After derivatization
	254nm	366nm
R_f1	0.08 light black	0.08 pink
R_f2	0.78 black	0.10 red
R_f3	-	0.20 light sky blue
R_f4	-	0.40 light sky blue
R_f5	-	0.84 red
R_f6	-	0.86 red
R_f7	-	0.92 red
R_f8	-	0.94 red

**Fig.2: HPTLC fingerprints profile of Polyhebal DantDhawan Churna.**

CONCLUSION

India and other developing countries medicinal plants are used to maintain, and treat the various diseases including oral disorders. There are a number of medicinal plants that have been used as tooth cleaners since ancient texts. Babool help strengthen the teeth and heals the gum. Amla fruit is useful for teeth and gums; it maintains the in dental disorders due to its significant antibacterial and astringent properties. Rock salt keep the healthy salt and prevent from bacterial infections. Therefore the formulation was prepared with the uses of herbal and mineral ingredients. Formulated churna was tested with standards parameters and found fit for prevention of oral diseases and teeth cleaner.

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