

<https://doi.org/10.46344/JBINO.2020.v09i5b.19>

## DANERA™ MULTIPURPOSE HAIR TONIC: A HERBAL COMPOSITION WITH POMEGRANATE AND BEETROOT EXTRACTS FOR DANDRUFF AND HAIR FALL

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### ABSTRACT

DanEra, a first time reported, an aqueous multipurpose herbal hair tonic from Pomegranate and Beetroot extracts has been evaluated for its physico-chemical characteristics along with its microbiological and clinical tests for dandruff. The microbiological studies clearly indicate equivalent potency of the DanEra and Ketoconazole active drug which is routinely used in dandruff cases. Further the clinical test result shows a significant relief and complete cure from extreme dandruff (itching and flaking of skin) cases in all volunteers within 10 days of use. The presence of abundant natural polyphenols along with antioxidant rich component, absence of any artificial color and heavy metal components makes DanEra an ideal choice for a natural hair care solution for dandruff, hair fall and hair growth.

**Keywords:** Dandruff; Hair fall; Hair growth; Pomegranate; Beetroot; Danera;

## 1. Introduction

Nowadays, there is a high demand for natural care products particularly in cosmetic and health care sector consisting of natural compounds as an alternate to synthetic compounds which may cause many possible side effects on health and the environment. Hair is considered to one of the most important beauty and health index for individual look and personality. Dandruff and hair fall is one of the most common problems of hair. Among various treatments available for hair and scalp mostly oil, shampoo, conditioner, serum etc are widely used. Generally, chemicals are used in commercial hair care products which increases the chances for serious hair and scalp problems such as dry hair, hair damage, hair fall and dandruff in prolong use. [1].

From, ancient times pomegranate (*Punica granatum*) has long been recognized as a fruit with many benefit for health. The plant is botanically unique of having wide range of polyphenolic compounds including flavonoids, anthocyanins and tannins that have been characterized both in pomegranate juice and pericar. Further, concentrations of these polyphenols extracted fractions from different techniques have been shown to be potentially antioxidant *in vitro* and *in vivo* for skin and hair repair and regeneration [2]. Beetroot (*Beta vulgaris*) is a root vegetable and a plant grown for its fleshy root, which is mostly used as a legume in human nutrition, as a forage plant and for the production of sugar. It is from the family of Amaranthaceae, according to the

phylogenetic classification. Betalains is known as beetroot pigment and consists of two sub-classes; betacyanins or red pigments and betaxanthins or yellow pigments and both of these pigments are highly water-soluble. The antioxidant rich beetroot fractions promote skin and hair growth and repair from long time [3].

Among several techniques available for extraction of bioactive compounds from natural sources hydro-distillation (steam distillation and aqueous extraction) and solvent extraction are routinely used in commercial scale. Supercritical carbon dioxide extraction is used now days used as a solvent less green extraction technology [4].

Till date, there is no research publication or a commercial product available in market comprising of pomegranate and beetroot extract for hair care treatments particularly for dandruff and hair falls. Hence, the current research evaluates DanEra, a first time reported, an aqueous multipurpose herbal hair tonic from pomegranate and beetroot extracts for its physico-chemical characteristics along with its microbiological and clinical efficacy for dandruff and hair falls.

## 2. Materials and Methods

### 2.1. Raw Materials

The pomegranate fruit and beetroot were purchased from local market of Chandigarh, India. The raw materials were cleaned and dried, which were then freshly cut and ground into mixture using an electric blender and mixer (Philips Mixer

Grinder, Model No:- IL 1708, Philips India Limited, Chennai, India)

## 2.2. Preparation of hair care formulation

The herbal extract mixtures were mixed in particular ratios along with other aqueous based GRAS status excipients (generally regarded as safe under USFDA guidelines) according to the method mentioned in patent application (Indian Patent Application No. 201911047987, dated 24 Nov, 2019). The composition was further registered under Ayurvedic proprietary medicines, AYUSH, (Govt. of Haryana, India).

## 2.3. Determination of physico-chemical and microbial properties

All the physico-chemical and microbial tests were performed at Interstellar Testing Center, Panchkula Haryana, India. (A Govt. Approved Test House, ISO 9001:2008 and 14001:2015, OHSAS 18001:2007 certified Laboratory) by Pharmacopoeial and In-house test methods. pH, specific gravity, polyphenol content, gallic acid content, preservative content, synthetic color, heavy metal tests and microbial test (total aerobic count, total fungal count, minimum inhibitory concentration and zone of inhibitions of DanEra hair tonic has been studied and reported.

## 2.4 In-vivo clinical test

25 healthy human volunteers with severe to moderate dandruff and hair fall cases were included in the trial at Chiranjeev Healthcare Clinic, Thane, Maharashtra, India, 421605 under supervision of certified

medical practitioner. 100 ml DanEra was supplied to each volunteer and instructed to apply and massage it gently on scalp every day. During DanEra usage, all the volunteers were requested not to use of any other antidandruff shampoo/hair oil/hair cream or any antifungal medicines. All the volunteers were reviewed every alternative day for 10 days.

## 3. Results and Discussion

### 3.1. Physico-chemical characteristic of DanEra Multipurpose Hair Tonic

The physical appearance of the DanEra multipurpose hair tonic was transparent light brownish viscous liquid with mild but pleasant odor. The pH and specific gravity was found to be 7 and 1.075 respectively. The high total polyphenol (2.20 % w/w) and gallic acid (9.77 ppm) content had been identified by HPLC method (In-house method). Presence of high polyphenol and gallic acid individually in pomegranate and beet root had been reported earlier by researchers [5]. There was no trace of artificial color and heavy metal (lead, arsenic, mercury and cadmium) in DanEra multipurpose hair tonic which makes it an ideal choice for hair care solution without any adverse effect.

### 3.2. Microbiological tests and antimicrobial activity DanEra Multipurpose Hair Tonic

The total viable aerobic count and total fungal count of DanEra was found to be <10 cfu/ml and well within official pharmacopoeial limit. There were no

traces of *E.coli*, *Salmonella*, *S. aureus* and *P. aeruginosa* in DanEra multipurpose hair tonic.

The minimum inhibitory concentration of the DanEra multipurpose hair tonic against *Malassezia* species was found to be 40 microlitre which was equivalent to 4 mg of the herbal extract used in DanEra. The zone of inhibition study of DanEra had been studied with respect to similar concentration (4 mg) of Ketoconazole standard and found to be 12.33 mm and 12.19 mm respectively (Fig. 1). The efficient antimicrobial effect of the DanEra predicted a promising result in *in-vivo* study.



Fig. 1

Fig. 1: Zone of inhibition at minimum inhibitory concentration of 4 mg of DanEra and standard Ketoconazole respectively

### 3.3. The in-vivo clinical test on human volunteers

Out of 25 volunteers 7 had severe dandruff problem suffering from itching, flaking and scaling problems, 4 patients had severe hair fall problems along with dandruff and rest patients had moderate dandruff problems. After use of DanEra multipurpose hair tonic for 10 days there was a significant reduction and complete cure of dandruff eliminating itching, flaking and scaling problems and hair fall problems (Fig. 2 and Fig. 3). Although there was significant reduction in hair fall issues with DanEra usage over continuous 30 days but 2 patients reported no effect on hair fall issues and which was further confirmed by their previous medical history of thyroid or other hormonal problems. All the patients reported very positive cosmetic feeling along with smooth and silky hair texture after the use of DanEra. Promotion of hair and scalp health along with a very good sensory evaluation feedback had been reported in all cases (Fig. 4). There was surprising result of re-growth of new hair follicles in earlier severely infected scalp areas due to extreme dandruff after continuous use of DanEra over 60 days.



Fig. 2

Fig. 2: Dandruff and dry scalp during 10 days of DanEra application

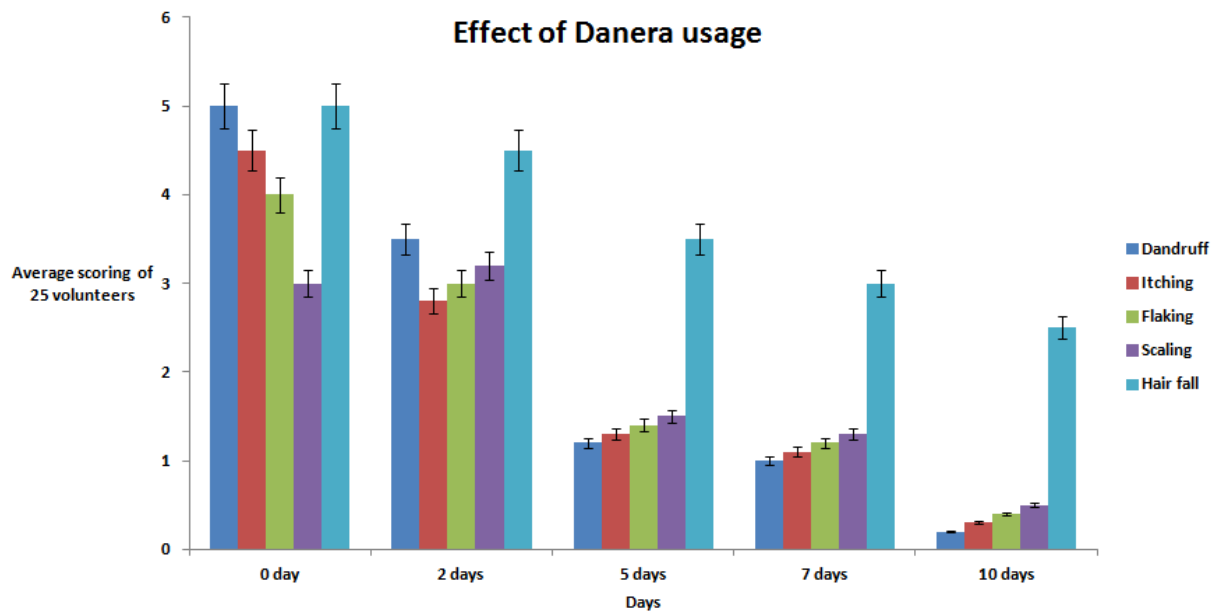


Fig. 3

Fig. 3: Effect of DanEra use for 10 days

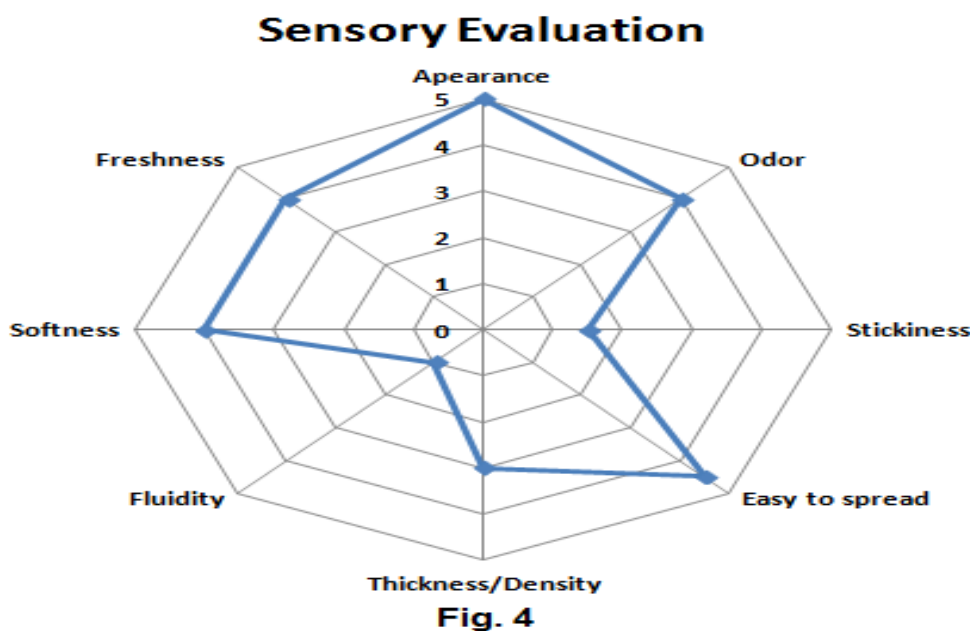


Fig. 4: Sensory evaluation of DanEra

#### 4. Conclusion

The current research focused on physico-chemical study and antimicrobial potency along with effectiveness of a first time reported unique aqueous based composition comprising pomegranate and beetroot extracts. Presence natural antioxidant rich polyphenols, absence of any artificial colorants, heavy metals, effective *in-vitro* physico-chemical characteristic along with antimicrobial effect which was further supported by *in-vivo* human study makes DanEra multipurpose hair tonic an ideal choice for day to day use for complete hair care management particularly in dandruff and hair fall problems.

#### 5. Acknowledgements

The authors would like to acknowledge InEra Formulations Pvt. Ltd, Mohali, Punjab,

Interstellar Testing Centre Pvt. Ltd, Panchkula, Haryana, and Chiranjeev Healthcare Clinic, Thane, Maharashtra for carrying out the research. The authors do not receive any funding for this work.

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