

# Formulation and evaluation of topical preparation for antifungal activity

[Health & Medicine](#), [Disease](#)



Background: Aspergillosis, blastomycosis, coccidioidomycosis cryptococcosis and histoplasmosis are the most common fungi's causing disorder in areas that have a warm and moist climate. They can cause wide variety of diseases such as athlete's foot, jock itch and ringworm which either can spread directly or by infected person. Persons with weak immunity such as who are taking antibiotics, diabetic or cancer patients are infected with fungus easily. Date palm is the most grown fruit in hot countries especially Saudi Arabia. It contain impactful list of essential nutrient, vitamin, minerals and phenol that benefit human being.

Aim: The aim of this study is to formulateing a topical date palm extract cream that is physically and chemically stable, homogenous, nonirritant to skin with a pH suitable to skin, easy permeability to skin with good and evaluation of its antifungal activities as a safe natural and approved FDA product.

Method: Formulation preparation of vanishing and cold cream and characterizing of them bythem by number of tests such as ensuring drug content is mixed, ing cream homogeneity, pPH level. Physical and chemical stability, easy permeability to skin and evaluating of their antifungal activity by using agar well-diffusion method. .

Expected results: Cream will be physically and chemically stable, homogenous, nonirritant to skin with a pH suitable to skin, easy permeable to skin with good antifungal activities.

Conclusion: Dates are known to have an impactful amount of nutrient, mineral and vitamins . They can be used as herbal treatment for cold, sore throat and asthma because of tannin content. So we expect that Phoenix dactylifera L. will have good fungicidal properties, penetrate skin easily with limited side effect. In addition, Dates could treat various types of skin disorder because of phenol, tannin and alkaloid content.

## **Introduction**

Phoenix dactylifera L (date palm) is a monocot plant from Arecaceae family. Dates are high source of energy. They contain carbohydrate, fat, protein, fiber, minerals and small amount of vitamins such as C, B1, B2, A, riboflavin, niacin and thiamine. Carbohydrate and fiber content vary depending on ripening stage, date cultivar and environmental condition. Dates also contains anthocyanins, phenolics, sterols, carotenoids, procyanidins and flavonoids. They have been used as traditional medicine for treating diverse disorder such as fever, inflammation, memory disorder and paralysis. Nowadays studies discovered that date have a countless health benefits for human being which are antioxidant, anticancer, hepatoprotective, nephroprotective, neuroprotective, gastrointestinal protective, anti-diabetic, antimicrobial, antiviral, antihyperlipidemic, antidiarrheal, laxative and sexual improvement activity.

Previous studies of phoenix dactylifera L have tested its antibacterial and antifungal activity. Experiments showed that phenol content is toxic and have a good inhibitory effect against different types of bacteria and fungi. Inhibitory degree increase with the increase in extract concentration.

Nystatin, amphotericin B, anidulafungin, griseofulvin, terbinafine, flucytosine and different azole antifungal medications are treatment of diverse types of fungal infection but they have potential adverse effects and life threatening in some conditions. A previous study has prepared phoenix dactylifera L cosmetic cream were it found to have anti acne, whitening, antiaging and anti-inflammatory effect. Cream is better than other dosage forms because it increase patient compliance, limit body exposure to medication, which can lower number of side effect, avoid first pass metabolism and drug level fluctuation. In addition, patient can apply it easily.

Vanishing cream is oil in water emulsion that is non-sticky, less oily and messy texture, easily removed by water and most user preferred dosage form and can be used during the day. While cold cream is water in oil emulsion that prevent water loss from outer layer of skin and help dry skin become more moisturized which can be suitable to use at bedtime. In this study, we will formulate a vanishing and a cold cream containing phoenix dactylifera L. as the active constituent and evaluate their antifungal activity.

## **Aim**

Formulation of date palm extract vanishing cream that contain active constituent, nonirritant to skin, physically and chemically stable, homogenous with pH of 5.5 and ensuring of its permeability to and skin, and evaluating of topical date palm extract creamam for antifungal activity by testing them on several types of fungus.

## Method

To prepare Vanishing cream Vanishing cream is emulsion base which is oil in water, the oil phase gives the cream shine and pearl look because of stearic acid in oil. To form emulsion, the alkali will react with stearic acid to form stearate soap. Then mix Sodium Hydroxide (NaOH) with Potassium Hydroxide (KOH) to give cream hard and soft properties. The difference between Vanishing cream and cold cream is vanishing cream having larger quantity of water phase.

## Procedure:

1. Heat the oil phase (i. e. stearic acid) and water phase (i. e. potassium hydroxide, glycerine, propyl paraben, methyl paraben, water) to approximately 65°C.
2. Add the aqueous phase slowly to the oil phase with stirring to form a crude emulsion.
3. Cool to nearly 50°C and homogenize.
4. Cool with agitation until congealed.

To prepare 30 g of Cold Cream (w/o).

## Method for Preparation of Creams

1. Heat oil soluble materials over steam bath until melted in evaporating dish.
2. Heat all water soluble materials to approximately same temperature.
3. Add water (2) to Oil (1) with constant stirring.
4. Remove evaporating dish from heat; continue stirring until at room temperature.

## **Characterization of the Vanishing cream containing drug:**

1. Drug content: The amount of drug in cream will be determined by taking 100 mg of the cream formulation and dissolve it in 10 mL of methanol after that it will be filtrated. AlsoIn addition, it will be analysedanalyzed the content of Drug spectrophotometrically using (UV-VIS) at specific  $\lambda_{max}$ .
2. Irritation to skin: In this test, the cream formulation will be applied on four healthy volunteers which they should not have any sensitivity to drug. They will inform about the nature of formulation and obtain a written approval from them about the irritation effect of the formulated cream.
3. homogeneity test: Cream homogeneity will have tested by visual appearance of the cream. Moreover, will pressed a small quantity of cream between the fingers (thumb & index), and noticing the uniformity of formulation.
4. pH evaluation: The cream pH value will have measured by a digital pH meter. The rang of skin pH is = (4. 5 - 6) and the average pH is = 5. 5, so the pH of formulation will use should close to this range.
5. In vitro release: cellophane membrane was stretched over the end of an open-ended glass tube and made water tight using a rubber band. The tube will be immersed vertically in a 100-mL beaker containing 50 mL of buffer (pH 5. 5) maintained in a thermostatically controlled shaker, 50 stroke/min maintained at  $37. 0 \pm 1. 0^{\circ}\text{C}$ .

The formulation (1 g equivalent to 50 mg) will be placed into the glass tube. At predetermined time intervals for up to 24 h, 5 mL aliquots of the release

medium will be withdrawn for analysis and replaced with equal volume of release medium and buffer, at the same temperature to maintain constant volume. The absorbance of the collected samples will be measured spectrophotometrically at specific  $\lambda_{\text{max}}$ .

Anti-fungal studies: The antifungal action for formula will be studied using different strains of fungi by agar well-diffusion method. The inhibition zones for all formulae were compared with known standard antifungal.

Physical and chemical Stability: Physical stability will be checked by storage the cream at room temperature = (25 °C) and at (4 °C), for one month. The physical stability will evaluate of any sedimentation and particle size determination by visual observation. Also will use spectrophotometry to determine the chemical stability of cream at different days.

## **Conclusions**

Date palm is a good source of nutrient with high antifungal and antibacterial activity. It can be used as natural source for treatment of different disorders. Therefore, we expect that vanishing and cold cream will have a good activity against superficial fungal and bacterial infection in similar properties.