

## Research Article



## Formulation and Evaluation of Concealer with Preventive Activity of Dark Circle Under the Eye

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### ABSTRACT

Based on this study, the objective was to create a concealer that not only hides dark circles under the eyes but also has preventive properties. It is common for individuals to use concealer as a part of their makeup routine to enhance the appearance of their skin by hiding blemishes, scars, and pigmentation. Concealers are generally thicker than foundation and provide more coverage to create a flawless and even skin tone. The concealer in this study is expected to have medium to high buildable coverage and is best suited for normal to dry skin. It is made with skin brighteners that reduce the appearance of dark circles and provide a brightening effect to the under-eye area. In addition, hydrators are included in the formula to replenish the skin with moisture, resulting in plump and soft skin. The concealer is also expected to tighten the skin under the eye area, which can help prevent the formation of dark circles. The use of a concealer with preventive properties is an innovative approach to skincare and makeup. By incorporating skincare benefits into a makeup product, individuals can achieve a flawless appearance while also improving the health and quality of their skin. This type of product may be particularly useful for individuals who are prone to dark circles or who want to prevent the development of this concern.

**Keywords:** DC-Dark Circle HA-Hyaluronic Acid, POH-Peri Orbital Hyperpigmentation B.C-Before the Christ Etc.-Et cetera.

### QUICK RESPONSE CODE →

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broken veins, or rosacea. Purple-tinted concealers can make sallow complexions appear brighter.<sup>12-15</sup>

### Types of Concealer

Each type of concealer is unique and has qualities that are better suited for different skin types. i. Cream concealer ii. Liquid concealer iii. Stick concealer iv. Cream to powder concealer v. Pencil concealer.

**Cream Concealer:** Available in a small pot or palette, leaves a satin or cream finish on skin. Has a thick texture with opaque pigment.

**Liquid Concealer:** Available in squeezable tubes, cylindrical tubes (or) square tubes (also known as vials). Leaves a satin, radiant shimmer (or) matte finish.<sup>15</sup>

**Stick Concealer:** Leaves a matte or satin finish. Both finishes are long-lasting and will not crack or bleed.<sup>16-17</sup>

**Cream to Powder Concealer:** Available in a powder compact/concealer. Apply with a sponge for a powdery, matte finish.<sup>15</sup>

**Pencil Concealer:** Multipurpose, creamy concealer that can be used to precisely cover small blemishes and dark spots.

**Balm Concealer:** The balm concealer has a thicker consistency when compared to liquid concealer and give more coverage.

### INTRODUCTION

Concealer or colour corrector is a cosmetic product used to hide imperfections on the skin, such as dark circles, age spots, and blemishes. It is similar to foundation but is thicker and more heavily pigmented. Both concealer and foundation are used to even out skin tone, but concealers are designed to be more opaque. They can be used alone or with foundation and are available in various forms, such as liquid or powder. Camouflage makeup is a heavier pigmented form of concealer used to cover more severe skin discolorations, such as birthmarks and scars.<sup>1-6</sup>

The first commercially available concealer was Max Factor's Erace, which was launched in 1954. Concealers are available in different shades, and people tend to choose shades that are one or two tones lighter than their skin tone to better hide their imperfections.<sup>7-11</sup> Some concealers have yellow undertones and are used to hide dark circles, while green and blue concealers can counteract red patches on the skin caused by pimples,



**Dark Circle<sup>13</sup>**

Dark circles under the eye may look purple or blue to dark brown or black, depending on skin colour. These circles are rarely a cause for concern, but people may wish to reduce their appearance for cosmetic reasons. In some cases, dark circles under the eyes can indicate a need for life style changes, such as improvements to sleep habit or diet. People offend think dark circles are due to tiredness and a lack of sleep. Although this can be one cause there are other reasons for dark circles under the eye such as allergies or the natural aging process.

**MATERIALS AND METHODS****CHEMICALS**

The ingredients of the formulation were purchased from Namsiang Trading Co., Ltd., Thailand. Essential oils, kojic dipalmitate, and dimethicone were purchased from Chemipan Corporation Co., Ltd., Thailand.

**MATERIALS AND METHODS**

**Chemicals:** The ingredients of the formulation were purchased from Namsiang Trading Co., Ltd., Thailand. Essential oils, kojic dipalmitate, and dimethicone were purchased from Chemipan Corporation Co., Ltd., Thailand.

**Material:** Kojic dipalmitate, dimethicone, mineral oil, cyclopentasiloxane (and) PEG/PEG-18/18 dimethicone, C30-45 alkyl dimethicone, candelilla oil, beeswax, propylene glycol, magnesium aluminium silicates, distilled water, titanium dioxide, bentonite, yellow oxide, red oxide, black oxide, coffee oil, Aloe Vera, vitamin E.

**Preparation of Coffee Oil:** 21By using the double boiling method, to prepare coffee oil, we have to add 0.740g of coffee powder and 2.6 ml of coconut oil to a china dish and gently heat for 2–5 minutes at 60–80 °C.

**Preparation of Dark Circle Cream:** To prepare the dark circle cream. We have to take 1.5 ml of coffee oil and add 6.740g of Aloe Vera gel and 0.6 ml of vitamin E capsules in a china dish to make it cream consistency.

**Preparation of Concealer:** Cyclopentasiloxane (and) PEG/PPG-18/18 dimethicone was used as an emulsifier, silicone wax C30-45 alkyl dimethicone was used as a thickening agent, candelilla wax and beeswax were used as stiffening agents, and the silicon-based polymer dimethicone was used to improve skin smoothness. The freshly prepared formulation was a water-in-silicone oil emulsion with fairly high viscosity and a slightly acidic pH. The colour was a light yellowish brown, with a mild and pleasant odour. The product had a good texture without separation, providing good coverage and spreadability.

**Preparation of concealer with dark circle cream:** The freshly prepared concealer was mixed with a small amount of freshly prepared dark circle cream under the eye. The colour of the concealer became yellowish-brown because of the presence of the coffee oil. The concealer has a mild

and pleasant odour with good spreadability characteristics.

**METHODOLOGY****Chemicals**

The ingredients of concealer in quantity in grams 1. Kojic dipalmitate 2.0g; 2. Dimethicone 12.0g; 3. Cyclopentasiloxane; and PEG/PPG-18/18 dimethicone 17.0g; 4. C30-45 alkyl dimethicone 5.0g; 5. mineral oil 5.0ml; 6. candelilla wax 1.0g; 7. Beeswax 1.0g; 8. Propylene glycol 5.0ml; 9. magnesium aluminium silicate 0.1g 10. Distilled water 37ml 11. Titanium dioxide 10.0g; 12. Bentonite 2.0g; 13. Yellow oxide 1.5g; 14. Red oxide 0.3g; 15. Black oxide 0.1g

**Preparation of concealer**

We expected to formulate a stable water-in-silicone emulsion concealer, providing viscous textures, good coverage, and spreadability with preventive activity for dark circles under the eye. The concealer is prepared by using a Silverson homogenizer by following the following steps: First, pour water heated to 50°C–60°C into an appropriate sized mixing vessel. Begin mixing with a Silverson high shear mixer operating at about 8000 rpm and slowly add the pigments to the mixing vessel while continuing to mix. Mix for five minutes, add the bentonite, and mix for another five minutes. Add titanium dioxide, and continue mixing for another ten minutes. Simultaneously, kojic dipalmitate was dissolved with various mixtures of dimethicone, then added to the mixer. Candelilla wax and beeswax are combined as solids and melt slowly while stirring. Carefully and gently add the liquid wax mixture to the mix containing the pigments in a manner such that foaming is minimised. Magnesium aluminium silicate and propylene glycol were mixed with water and heated to 75 °C. Silicone based concealers were prepared by the addition of the aqueous phase to the lipophilic phase, which was continuously mixed at 8000 rpm for ten minutes. The preparation is very viscous but can be readily poured into appropriate containers. Volatile oil was added after the preparation had cooled down.

**EVALUATION OF THE CONCEALER**

**pH of the Concealer:** The pH of various formulations was determined using a digital pH metre. About 1 gram of the concealer was weighed, dissolved in 100 ml of distilled water, and stored for two hours. The measurement of the pH of each formulation was done in triplicate, and average values were calculated.

**Primary Skin Irritation Test:** The purpose of this application is to induce or establish sensitivity and also detect the presence of any primary irritant. A test is performed on selected subjects. If the results of the test are favourable, more subjects may be used. The cosmetic to be used is placed on the skin of the subjects for 1 to 5 days. The patch sites are examined, and observations are made.



**Visual Appearance:** The appearance of the concealer was judged by its colour, pearlscence, and roughness and graded. **VISCOSITY:** The viscosity of the formulation was determined by a Brookfield viscometer. At 20 rpm at a temperature of 25°C, the determinations were carried out in triplicate, and the average of the three readings was recorded.

**Removal:** The ease of removal of the concealer applied was examined by washing the applied part with tap water.

**Spreadability:** The spreadability was expressed in terms of time in seconds. Take two slides to slip off from the cream, placed in between the slides, under a certain load. The less time taken for separation of the two slides, the better the spreadability.

**Stability Test:** The formulation was kept at room temperature (25 °C, 2°C) for 30 days or under a heating or cooling cycle between 4°C and 45°C for 6 cycles. At the end of the storage time, the physical changes, including colour, odour, separation, spreadability, and coverage properties, were determined by visual observation, and viscosity was measured using a rheometer.

**Saponification Value:** Introduce about 2 g of substance refluxed with 25 ml of 0.5 N alcoholic KOH for 30 minutes, to which 1 ml of phenolphthalein was added and titrated immediately with 0.5 N HCL. Saponification value =  $(b-a) \times 28.05/w$  a = the volume in ml of blank. b = the volume in ml of the sample; w = the weight of the substance in grams.

**Acid Value:** Take 10 g of substance accurately weighed in a 50 ml mixture of equal volume alcohol and solvent ether. The flask was connected to a reflux condenser and slowly heated until the sample was dissolved completely. To this, 1 ml of phenolphthalein was added and titrated with 0.1 N NaOH until a faintly pink colour appeared after shaking for 30 seconds. Acid value =  $n \times 5.61/w$  n = the number of ml of NaOH required. W = the weight of the substance in grams.

## RESULTS AND DISCUSSION

### pH of the concealer:

The pH of the concealer was found to be in the range of 5.0 to 5.5, which is good for skin pH. All formulations of concealer were shown to have a pH nearer to skin requirements, i.e., the pH of the formulation is 5.5.



Figure 1: Before



Figure 2: After

### Primary Skin Irritancy Test:

The formulation of concealer was tested for redness, edema, inflammation, and irritation during irritancy studies. These formulations are safe to use on the skin.

### Visual Appearance:

The appearance of the concealer was judged by its colour, pearlscence, and roughness and graded.

Table 1: Various Parameters of the concealer

Parameter	Results
1.Colour	Yellowish brown color
2.Odour	Mild and pleasant odor
3.Spreadability	Easily spread

### Viscosity:

The viscosity of was concealer was in the range of 27015-27040 cps which indicates that the Concealer is easily spreadable by small amounts of shear. Concealer shows good spreadable property than other formulations.

### Removal:

The ease of removal of the concealer applied was examined by washing the applied part with tap water. The concealer applied on skin was easily removed by washing with tap water.



Figure 3: Removal of the concealer

### Spreadability:

The concealer was tested for homogeneity by visual appearance and by touch. The time taken for the separation of the two slides is shorter. concealer with better spreadability characteristics.



Figure 4: Spreadability of the concealer

**Stability Test:**

After storage at room temperature for 6 cycles of heating and cooling, the prepared concealer has a good texture without phase separation. The viscosity, colour, scent, and pH did not change.

**Saponification Value:**

The saponification value of the prepared concealer was found to be 263.67, within the limit as per the Indian Pharmacopoeia (I.P.).

**Acid Value:**

The acid value of the prepared concealer was found to be 5.6, within the limit as per the Indian Pharmacopoeia (I.P.).

**CONCLUSION**

We made a formulation and evaluation study of concealer with the preventive activity of dark circles under the eye. Possible factors of dark circles include excessive pigmentation, thin and translucent lower eyelid skin overlying the orbicularis oculi muscle, and shadowing due to skin laxity and tear trough. Because dark circles occur in the majority of patients, it is essential to identify the cause and choose the appropriate treatment according to the cause. The above formulation studies the tendency for more dilated, thicker, or increased number of capillaries and thinner skin in the under-eye area. The combination of these two formulated contents (concealer and dark circle cream) prevents and reduces hyperpigmentation in dark circles around the eyes.

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