

# PREPARATION AND INVITRO CHARACTERIZATION OF NAIL POLISH PREPARED BY USING NATURAL DYE

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## ABSTRACT

The global nail polish market size was estimated at USD 6.89 billion in 2015 and it is expected to grow rapidly due to growing purchases by the teenage population who prefer beautiful designer nails. Nail paint is a kind of preparation which once applied on nails give aesthetic appeal, and it has been the part of cosmetic preparation since ages by using different form of dye and agents, In this work an attempt is made to formulate nail paint by using natural dye since artificial dyes and chemical have possibility of giving toxic effect while using finger in daily work having nail painted with different chemicals. Turmeric powder a plant processed material have yellow color which is used for the extraction of yellow dye and then this dye is finally used in the nail paint preparation .

## INTRODUCTION

The nail as an anatomic structure and it protects the terminal phalanx of the digit from any sort of injury. it has been serving as a tool for protection. As civilizations developed many things around us changed and even our need also changed in many aspects and now the desire of Nail beautification has established number of Industries today, with variety of nail cosmetics available, including nail hardeners, nail extensions, artificial/sculpted nails, and different glitters, shiners and sculpted and decorated nail by using precious stones, multicolor polishes.<sup>1</sup>

There are different type of Nail Coat which we use in the beautification of nails they are of following types:

Base coat-This sort of nail polish is a clear, milky-colored, or opaque pink polish formula

that is used before applying nail polish to the nail as a priary coat .it is used to strengthen nails, restore its moisture and also help polish adhere to the nail so staining do not occur and the color lasts longer.<sup>2</sup> Top coat-As form its name cleat that it's the final coat of the nail polish which is used top revent chipping, scratching and peeling of the nail along with it also give finished and die sired look to the nail polish and help to keep the polish on for longer time .<sup>2</sup>

Gel-Gel polish is a long-lasting type of nail polish made up of sort of methacrylate polymer. It also paint the nail like normal nail polish but does not dry instead it is cured under an UV lamp or ultraviolet LED. This polish last two to seven days without chipping.

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Matte-Matte polish is sort of regular polish, but has a intentionally dull finish. Matte nail polish can also be found in a top coat. Matte top coat is most useful for painting over any dry base color, giving it a different appearance. it can also be used in nail art and design applications in which designs can be created on the nail surface using the contrast of both matte and shiny.

## **SHELLAC**

This nail polish is a long-lasting polish that can easily go on acrylic and artificial nails or the natural nail that gives off a fresh shiny look. It last up to 4 weeks.<sup>3</sup>

## **NAIL POLISH FROM A NATURAL DYE**

Natural nail Polish is formulated by using natural dye that is extracted from a plant source through various sequential procedures. The problem with conventional synthetic nail polish is that it is made with harmful chemicals that are often highly toxic. Nail polish prepared from a natural dye reduces the toxicity level by a great margin.<sup>4</sup>

Advantage of Nail polish with natural coloring Agent -

1. It does not have any harmful effects on children.
2. It provides shiny, glossy appearance to the nails.
3. It can be applied on nail injuries as turmeric has healing properties.
4. Natural Nail Polish are very less harmful as compared with conventional synthetic nail polish.
5. Natural nail polish will not cause any harm to children if it is accidentally swallowed.<sup>5</sup>

After considering all the facts an attempt is made to formulate nail paint by using natural dye.

## **DIFFERENT INGREDIENTS NORMALLY USED IN FORMULATION OF NAIL POLISH**

Nail polish basically consists of a film-forming polymer dissolved in a volatile organic solvent. A plasticizer to form non brittle films other constituents like dyes and pigments to give color to the formulation and opalescent and pigment for the glittery/ shimmer look in the color an adhesive polymers that helps nitrocellulose adhere to the nail's surface, thickening agents are also added to maintain the sparkling particles in suspension while in the bottle.<sup>6</sup>

## **MATERIAL AND METHOD**

Butyl toluene, Ethyl toluene, Nitrocellulose 30% IPA, Dye, Dibutyl phthalate, Camphor, Titanium dioxide were purchased from Central Drug House Delhi.

## **EXTRACTION OF NATURAL TURMERIC DYE**

*Curcuma longa* L, an important spice used as a cosmetic, and colouring agent has also been used in Indigenous System of Medicine. Turmeric is mainly valued for its principal colouring constituent curcumin, which imparts the yellow colour on textile fibers and food items. Rhizome, the main source of curcumin also contains various ingredients like protein, fat, fibers, carbohydrates, essential oil, etc. Curcumin possesses various bioactive properties and is used in modern system of medicine. It is well recognized for its anti-inflammatory, hepato protective, anticancer, metabolic disorders, antimicrobial, antiviral and antioxidant activities.<sup>4</sup>

## **PROCEDURE**

Powdered raw material (100 gm) soaked in ethyl alcohol (600 ml) it was vigorously stirred for 3 hours and was kept overnight. The

resulting solution was filtered and was concentrated under reduced pressure at 60°C to obtain residual mass. The concentrated paste was dried in oven at 45°C for 12 hours and kept in a desiccator for further use. Nitrocellulose of weighed quantity and add ethyl acetate into it. Now camphor into the solution and stir the solution continuously.

Add the extracted turmeric dye in the resulting solution and stir it continuously. Pour it in a suitable container and pack it. Place a label on the container.<sup>6</sup>

### EVALUATION

1. **SPREADIBILITY:** Spreadibility contrasts with stickiness of aggregating media on centralized places.
2. **SKIN IRRITATION TEST:** Apply the Nail polish for 10 minutes and observe the sign of irritation.
3. **COLOR UNIFORMITY:** The nail polish is

spread on any smooth surface, then the spreadibility of colour is observed to measure the colour uniformity.

4. **SURFACE SHINE:** Is determined visually.
5. **DRYING TIME:** Apply a thin film of the sample with a 0.006" applicator under controlled conditions of temperature and humidity at 25°C and 50% RH to a completely non-porous or melamine coated paper. Note the time required to form a dry to touch film. Dry to touch is a condition in which a film may be touched with a clear finger tip, without transfer of any material to the tip.

### RESULT AND DISCUSSION

The colour of the formulation is yellow due to the natural turmeric dye and shining of the formulation was found to be satisfactory. The formulation would not cause any irritation on applying to the nails.

Table 1. Different ingredients used in the formulation of nail paint

S. no	Chemical Name	Percentage
1	Butyl toluene	27.0
2	Ethyl toluene	23.0
3	Nitrocellulose 30% IPA	13.0
4	Dibutylphthalate	7.00
5	Camphor	0.95
6	Dye	0.50
7	Titanium dioxide	0.50

Table 2. Various Evaluation parameters evaluated for prepared nail paint using natural dye

S no	Parameter	Result
1	Surface shine	Proper
2	Spreadibility	Proper
3	Color uniformity	Uniform
4	Skin irritation test	Non irritating

Table 3. Comparative evaluation of prepared nail paint with the marketed formulation

S no	Parameter	Marketed Preparation	Nail Polish Prepared From Natural Dye
1	Surface shine	Proper shiny	Proper shining
2	Spreadibility	Very good	Good
3	Color uniformity	Uniform	Uniform
4	Skin irritation test	Non irritating	Non irritating
5	Drying time	2 minutes	2-3 minutes

## CONCLUSION

Nail enamels should be easy to apply and should be dry and harden rapidly. They should be waterproof, well adherent, glossy, elastic, and resistant to chipping and abrasion.

Lastly, lacquers must be non-toxic, non-irritant and non-sensitizing to the skin. The behavior of the prepared nail enamel on a substrate provides a good indication of its behavior on finger nails. Nail enamels was carefully evaluated to make sure that they meet the performance specifications.

The judical selection of evaluation parameters and their results shows that prepared nail polish can be used as a nail polish and if the effort will be made in future many other natural coloring agents will be used to manufacture different color safe nail polish.

## REFERENCE

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