



# Secundum Artem

*Current & Practical Compounding  
Information for the Pharmacist.*

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## COMPOUNDING LACQUERS, VARNISHES, COLLODIONS AND PROTECTANTS

### GOALS AND OBJECTIVES

**Goal:** To provide information on the historical development and contemporary uses of lacquers and protectants.

**Objectives:** After reading and studying the article, the reader will be able to:

1. Discuss the history of varnishes, lacquers and protectants.
2. List at least three commonly used protectants.
3. Discuss common drugs incorporated in lacquers and protectants and their usages.
4. Describe the methods of preparing lacquers and protectants.

### INTRODUCTION

It is often necessary to apply a material to a part of the body to form an adherent, continuous coat that may be either flexible or semirigid, depending upon the substance(s) and the manner in which it is applied. These materials can serve to (1) provide occlusive protection from the external environment, (2) provide mechanical support, and (3) serve as vehicles for carrying various medications. Materials that have been used for this purpose in the past have included lacquers, varnishes, shellacs, plasters and protectants. Different terms have been used over the years to describe the dosage forms so we begin by first looking at some definitions.

### DEFINITIONS

#### Lacquers

A lacquer has been defined as (1) a gold-colored varnish, consisting chiefly of a solution of pale shellac in alcohol tinged with saffron, anatta, or other coloring materials; used chiefly as a coating for brass, (2) a term applied to various kinds of resinous varnish, capable of taking a hard polish, used in Japan, China, Burma and India for coating articles of wood or other materials, (3) the class of decorative articles made of wood coated with lacquer and often inlaid with ornaments of ivory, mother-of-pearl, or metal; chiefly made in Japan, China and India.<sup>1</sup>

A more recent definition is any of various clear or colored synthetic organic coatings that typically dry to form a film by evaporation of a volatile constituent.<sup>2</sup>

#### Varnishes

A varnish is defined as resinous matter dissolved in some liquid and used for spreading over a surface in order to give a hard, shining, transparent coat, by which it is made more durable or ornamental.<sup>1</sup> Early literature in

1899 describes "A medical preparation resembling a varnish... Both tar and pyrogallol work better as paints and varnishes than the chrysarobin."<sup>3</sup>

A more recent definition is a liquid preparation that when spread upon a surface dries forming a hard lustrous typically transparent coating.<sup>2</sup>

#### Dental Varnishes

Dental varnishes (cavity liners) are solutions of natural resins and gums in a suitable solvent, of which a thin coating is applied over the surfaces of the cavity preparations before placement of restorations. They are used to seal the dental tubuli in deep-seated cavities so as to protect the pulp from acid-containing dental cements used as a protective agent for the tooth against constituents of restorative materials.

#### Shellacs

Lac refers to the dark-red resinous incrustation produced on certain trees by the puncture of an insect. The incrustated twigs are called "stick-lac"; the resin broken off the twigs and triturated with water to remove the color is called "seed-lac"; when melted, strained, and formed into irregular thin plates, it is known as "shell-lac" or "shellac".<sup>1</sup> Shellac is defined as lac that is melted and run in thin plates; formerly used in the manufacture of gramophone records.<sup>1</sup> The term "shell" coming from the appearance of the thin plates and "lac" from the material, forming "shellac".

Today, shellac is used to refer to a preparation of lac dissolved usually in alcohol and used chiefly as a wood filler and finish. Another recent definition is a purified lac resin usually prepared in thin orange or yellow flakes by heating and filtering and often bleached white.<sup>2</sup>

#### Protectants

*Collodions* are liquid preparations composed of pyroxylin dissolved in a solvent mixture usually composed of alcohol and ether with or without added

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medicinal substances. They are often applied to cuts and small burns as a protective. Application often causes pain but it is effective as an antiseptic and for excluding air from open wounds.

Pyroxylin (soluble gun cotton, collodion cotton) is obtained by the action of a mixture of nitric and sulfuric acids on cotton and consists chiefly of cellulose tetranitrate. It has the appearance of raw cotton when dry but is harsh to the touch. It is frequently available commercially moistened with about 30% alcohol or other similar solvent.

One part of pyroxylin is slowly but completely soluble in 25 parts of a mixture of 3 volumes of ether and 1 volume of alcohol. It is also soluble in acetone and glacial acetic acid. Pyroxylin is precipitated from solution in these solvents upon the addition of water. *Note: Pyroxylin, like collodion, is exceedingly flammable and must be stored away from flame in well-closed containers, protected from light.*

Collodions are intended for external use. When applied to the skin with a fine camel's hair brush or glass applicator, the solvent rapidly evaporates, leaving a filmy residue of pyroxylin. This provides an occlusive protective coating to the skin, and when the collodion is medicated it leaves a thin layer of that medication firmly placed against the skin. Naturally, collodions must be applied to dry tissues to effect adhesion to the skin's surface. The film is useful in holding the edges of an incised wound together. However, its presence on the skin is uncomfortable due to its inflexible nature. The following product, which is flexible, has a greater appeal when a nonpliable film is not required.

*Flexible Collodion* is prepared by adding 2% of camphor and 3% of castor oil to collodion. The castor oil renders the product flexible, permitting its comfortable use over skin areas that are normally moved, such as fingers and toes. The camphor makes the product waterproof. Physicians frequently apply the coating over bandages or stitched incisions to make them waterproof and to protect them from external stress. The products must be clearly labeled "For External Use Only" or with words of similar effect.

*Compound Benzoin Tincture* is prepared by the maceration in alcohol of 10% benzoin and lesser amounts of aloe, storax and tolu balsam totaling about 24% of starting material. The drug mixture is best macerated in a wide-mouthed container, since it is difficult to introduce storax, a semi-liquid, sticky material into a narrow-mouthed container. Generally, it is advisable to weigh the storax in the container in which it will be macerated to avoid possible loss through a transfer of the material from one container to another.

Benzoin is the balsamic resin obtained from *Styrax benzoin* Dryander or *Styrax paralleloneurus* Perkins, known in commerce as Sumatra Benzoin, or from *Styrax tonkinensis* (Pierre) Craib ex Hartwich, or other species. It should be labeled as to whether it is Sumatra Benzoin or Siam Benzoin.

Benzoin is used to protect and toughen skin in the treatment of bedsores, ulcers, cracked nipples, and fissures of the lips and anus. It is also used as an inhalant in bronchitis and other respiratory conditions, one teaspoonful commonly being added to a pint of boiling water. The volatile components of the tincture travel with the steam vapor and are inhaled by the patient. Because of the incompatibility of the alcoholic tincture and water, a mixture of the two produces a milky product with some separation of resinous material. Alcohol or acetone may be used as necessary to remove the residue from the vaporizer after use.

## HISTORY AND DEVELOPMENT

### Lacquers

Lacquer or lacquerwork is a process which originated in China but was brought to its greatest perfection in Japan. It is a species of natural varnish which, when applied to wood or metal, makes the surface impregnable to moisture, alcohol, or other damaging elements. The term comes from "lac," a resinous substance secreted by the *Laccifer lacca*, a scale insect native to India, from which shellac is made. But the basic material of lacquer is vegetable rather than animal—the sap of a variety of sumac tree, the *Rhus verniciflua* (*R. vernicifera*, de Candolle) found in Japan, China, and in the Himalayas. The Japanese tap this tree (also called varnish tree or lacquer tree) once every ten years, between June and September.

In China, lacquer was originally used for writing on bamboo slips, the earliest form of books. Later, food utensils were made of black lacquer; this was followed by lacquer being employed for carriage decorations and its use expanded and continued over many centuries.

The spraying of lacquers was developed in 1903. World War I led to the development of many new resins and low viscosity cellulose components. After the war, an extensive expansion of the manufacture of lacquers increased the demands for rapid-drying industrial finishes.

The automobile and railroad industries employ lacquers for both exterior and interior finishes. A careful selection of plasticizers and resins has made it possible to produce the necessary properties. In some industries, castor oil is added to the lacquer to obtain the desired flexibility.

### Varnishes

The ancient Egyptians were acquainted with the art of varnishing, but its origin appears to have arisen in the East as lacquering. Varnish and lacquer work are, however, generally treated in the arts as separate and distinct. True varnish does not appear to have been known in Europe until the 17th century.

A practical varnish has the following characteristics. First, it is a homogeneous fluid or solution; second, it must be fixed or permanent in effect as to tone of color, transparency (or opacity); third, on application in thin layers by brush or otherwise, it should dry within a short period by evaporation of its volatile solvents (alcohol, ether, benzene, spirits of turpentine, etc.); and fourth, upon drying it leaves a film of smooth, lustrous (sometimes purposely dull), elastic oil and resin, impervious to its surrounding atmospheric conditions.

### Protectants

*Collodion*: The first cellulose derivative incorporated in lacquers was pyroxylin or cellulose nitrate (often incorrectly called nitrocellulose or nitrocollon). Alexander Parkes received a patent in 1852 for applying solutions of it to fabrics, but it was not until 1886 that such compositions were first manufactured in the U.S. by the F. Crane Chemical Co.

*Compound Benzoin Tincture*: The tincture originated in the fifteenth or sixteenth century and through the years probably has acquired more synonyms than any other official preparation. A few of these include Friar's Balsam, Turlington's Drops, Persian Balsam, Swedish Balsam, Jerusalem Balsam, Wade's Drops, and Turlington's Balsam of Life.

## TYPES OF VARNISHES

Varnishes may be divided into natural, spirit, oleoresinous and water varnishes.

- (1) Natural varnishes are the group of lacquers as used in India, China and Japan and are the saps or juices of trees such as the *Rhus vernicifera*.
- (2) Spirit varnishes are solutions of a resin or other film-forming material in a volatile liquid. When the liquid (thinner, solvent) evaporates, the resin is left behind in the form of a film. A wide range of natural and synthetic resins are available for the manufacture of this type of varnish. The most important natural ones are lac, dammar, Manila and rosin. Synthetic spirit varnish resins and film-forming materials include urea-formaldehyde, vinyl resins, acrylic acid resins and chlorinated rubber. Solvents include petroleum spirits, turpentine, toluene, coal-tar naphtha and alcohol.
- (3) Oleoresinous varnishes are mixtures of resins, oils and driers, dissolved in a volatile thinner. Air (oxygen) is necessary to solidify the oil in the residual mixture as the volatile thinner evaporates.
- (4) Water varnishes are produced as follows:

*Lac water varnishes* contain the proportions of six ounces of shellac to one and one-half ounces of borax boiled together to each pint of water. *Glazing varnish* is made with a mixture of egg white and water preserved by the addition of a little carbolic acid or thymol. Dissolved albumen can take the place of egg whites. *Glue varnish* is a solution of the proportions of one pound pale glue to every two gallons of water. *Crystal water varnish* is produced by dissolving, in the following proportions, one pound of good white gum Arabic to one pound of glucose to each three pints of water.

## USES AND CURRENT LITERATURE

### Dental Varnishes-Fluoride

Fluoride dental varnishes help to reduce the development of enamel white spot lesions. Compared to fluoride foams, fluoride varnishes were found to take less time and resulted in fewer signs of discomfort than foams.<sup>4</sup>

Another study shows that fluoride varnish may offer an efficient nonsurgical alternative for the treatment of decay in children.<sup>5</sup>

Studies too numerous to mention have looked at the effect of fluoride varnishes that are commercially available, including Fluoritop – SR (in India), Fluor Protector 0.9% with fluorsilane; Bifluorid 12; Duraphat (Colgate-Palmolive Co.) containing 5% sodium fluoride and even a polyurethane lacquer containing silane-fluoride.

### Dental Varnishes-Chlorhexidine

Chlorhexidine has been marketed as a commercial varnish in products such as Cervitec (1% chlorhexidine and 1% thymol) and Chlorzoin (a 2-stage chlorhexidine varnish).

In one study, the application of a chlorhexidine 40% varnish reduced the quantity of the *Streptococcus mutans* colonies significantly and improved clinical parameters in patients with elevated plaque accumulation.<sup>6</sup>

Another study showed that chlorhexidine-thymol varnish is effective in preventing caries in permanent first molars. The results suggest that the chlorhexidine/thymol-containing varnish may to some extent reduce the viability and metabolic activity of susceptible oral bacteria.<sup>7</sup>

### Dental Varnishes-Other

Konsberg et al. showed that a single application of a miconazole denture lacquer considerably reduces the number of Candida yeast for a substantial period of time.<sup>8</sup> The study utilized miconazole 55 mg/g of denture lacquer with the application of 1 g of lacquer. It was demonstrated to be safe and almost as effective as administration of the gel four times a day for 2 weeks (3000 mg of miconazole as compared to only 55 mg of miconazole).<sup>8</sup>

### Nail Lacquers

Onychomycosis, infections of the nail caused by fungi, are among the most common problems. Because of the high incidence of these infections and problems involved in their therapy, they have received much attention. Onychomycosis is a relatively common condition affecting toenails more than fingernails, caused predominantly by dermatophytes. It can cause pain and discomfort and has the potential to be a source of morbidity.

Factors involved in treating nail fungus involve the thickness of the nail, presence of lateral onychomycosis, longitudinal spike, dermatophytoma and severe onycholysis. Single and combination therapy with either terbinafine, itraconazole, (continuous and pulse), fluconazole, or griseofulvin have also been considered. There is some debate involving monotherapy, combination therapy and adjunctive therapy. The primary advantage of the lacquer dosage forms is a significant benefit/risk ratio.

Lipophilic vehicles and especially nail lacquers are more appropriate for topical application on the nail than aqueous systems because of their better adhesion.

Vehicles including medium chain triglycerides and n-octanol and a lacquer based on quaternary poly (methyl methacrylates, Eudragit RL) have been studied. Generally, penetration through the nail plate follows first order kinetics after a long lag-time.

Antifungals that have been used in nail lacquers include Amorolfine 5% Lacquer (Loceryl, Galderma Laboratories), Ciclopirox 8% (Penlac, Aventis Pharma), Tioconazole 28%, and Econazole 1% lacquer containing 0.45 mg per 10 microL of 2-n-nonyl-1,3-dioxolane.

Amorolfine nail lacquer was shown to be more resistant than ciclopirox and tioconazole nail lacquers to chemical trauma from soaps and to mechanical aggressions from the immediate nail environment.<sup>9</sup>

Topically applied ciclopirox nail lacquer may be a consideration for prophylaxis of onychomycosis.<sup>10</sup> Ciclopirox nail lacquer 8% is a topical product that provides an active fungicidal agent in a delivery system capable of penetrating nails. Ciclopirox nail lacquer 8% was approved by the US FDA in December 1999.

The concentration of ciclopirox, after the evaporation of solvents from the ciclopirox 8% nail lacquer approaches 35%, providing a high concentration gradient for penetration into the nail.

### Topical Skin Treatments

Topical skin treatments using protectives include the treatment of warts, corns, and callouses as well as for protection from the environment, abrasion, etc.

*Salicylic Acid Collodion:* Salicylic Acid Collodion is a 10% solution of salicylic acid in flexible collodion. It is used for its keratolytic effects, especially in the removal of corns from the toes. Patients who use such products should be advised about their proper use. The product should be applied one drop at a time onto the corn or wart allowing time to dry before the next drop is added. Because salicylic acid can be irritating to normal, healthy skin, every attempt must be made to ensure application directly onto the corn or wart. A useful preventive measure is to line the adjacent healthy skin with some white petrolatum prior to application of the product. *Lastly, proper tightening and storage of the product after use is an absolute necessity because of the volatility of the vehicle.*

*Compound Tincture of Benzoin:* Compound Tincture of Benzoin serves as a delivery vehicle of podophyllum in the treatment of venereal warts. It is important that podophyllum not be systemically absorbed after application because the drug can cause peripheral neuropathy characterized by paresthesias, loss of sensation and loss of deep tendon reflexes in the extremities, in addition to neuropathy involving the central nervous system, e.g., lethargy, confusion, coma. Secondly *podophyllum is teratogenic* and should be administered only when the risk to benefit ratio is extremely low in a pregnant woman suffering from venereal warts. Thus, the nonocclusive compound tincture of benzoin is preferred to the occlusive flexible collodion to avoid excessive adsorption.

## STABILITY

*Note: Formulas containing alcohol, collodion, flexible collodion, acetone or compound benzoin tincture are highly flammable. Take all necessary precautions when compounding these preparations.*

If no water is contained in these preparations that are compounded, a beyond use date of up to six months can be used. If water is present and there is no stability information available, a beyond use date of up to 30 days can be used for topicals.

## QUALITY CONTROL

Quality-control assessment can include weight/volume, pH, specific gravity, active drug assay, color, clarity, rheological properties/pourability, physical observation, physical stability (discoloration, foreign materials, gas formation, mold growth).<sup>12</sup>

## PACKAGING

Due to the volatile constituents in these preparations, they should be packaged in tight containers. Light-resistant containers would be required in circumstances where an light-sensitive ingredient was incorporated into the formula.

## LABELING

Keep away from heat and open flame. Keep away from children. Use only as directed.

## STORAGE

Store in a cool place, room temperature is fine. Keep away from excessive heat.

## FORMULAS

### Dental Formulas (Historical)

Rx	Pulp Capping Varnish (Mastic Varnish)
Mastic	30 g
Peruvian Balsam	30 g
Chloroform	qs 100 mL

Dissolve the mastic and Peruvian balsam in about 50 mL of chloroform and add sufficient chloroform to make 100 mL of solution.

Rx	Copal Varnish
Copal	5 g
Chloroform	100 mL

Powder the copal, mix with 5 g of dry washed sand, place in a flask, add the chloroform and shake occasionally during at least 24 hours, frequently breaking up the gummy mass to facilitate extraction. Filter, and add chloroform to make 100 mL. If necessary, add 5 g of purified talc and again filter.

*Continued.....*

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Please circle the most appropriate answer for each of the following questions. There is only ONE correct answer per question.

1. Lacquers and protectants, in general, can serve which of the following purposes?
  - I. provide occlusive protection from the environment
  - II. provide mechanical support
  - III. serve as vehicles to carry medication
    - a. I only
    - b. III only
    - c. I and II only
    - d. II and III only
    - e. I, II and III.
2. A lacquer can be defined as a:
  - a. clear or colored synthetic organic coating that dries to form a film.
  - b. gold-colored varnish, consisting chiefly of a solution of pale shellac in alcohol tinged with saffron, anatta, or other coloring materials.
  - c. class of decorative articles made of wood coated with lacquer and often inlaid with various materials.
  - d. type of resinous varnish capable of producing a hard polish.
  - e. all the above.
3. Pyroxylin is derived from:
  - a. tar
  - b. pyrogallol
  - c. cotton
  - d. Sumatra benzoin
  - e. *Rhus verniciiflua*
4. Which ingredient(s) make Flexible Collodion flexible and waterproof?
  - I. camphor
  - II. castor oil
  - III. pyroxylin
    - a. I only
    - b. III only
    - c. I and II only
    - d. II and III only
    - e. I, II and III.
5. Which of the following contain primary ingredients historically derived from plants or insects?
  - a. shellac
  - b. varnish
  - c. benzoin
  - d. collodion
  - e. all the above
6. Dental varnishes have been used for:
  - a. the application of fluoride
  - b. the application of chlorhexidine
  - c. the application of miconazole
  - d. as a protectant in dental cavity preparations
  - e. all the above
7. Antifungals that have been incorporated in nail lacquers include:
  - a. amorolfine 5%
  - b. ciclopirox 8%
  - c. econazole 1%
  - d. tioconazole 28%
  - e. all the above
8. After the volatile solvent evaporates when ciclopirox nail lacquer topical solution is applied, what is the nominal concentration of the ciclopirox in the dried film?
  - a. 8%
  - b. 13%
  - c. 26%
  - d. 35%
  - e. 47%
9. If one wants to prepare a flexible collodion preparation that will dry quicker, which of the following would be substituted for part of the alcohol?
  - a. purified water
  - b. glycerin
  - c. propylene glycol
  - d. acetone
  - e. isopropyl myristate
10. Compound Benzoin Tincture is also known by which of the following names?
  - a. Friar's Balsam
  - b. Wade's Drops
  - c. Turlington's Balsam of Life
  - d. Jerusalem Balsam
  - e. all the above.
11. My practice setting is:
  - a. Community-based
  - b. Managed care-based
  - c. Hospital-based
  - d. Consultant and other
12. The quality of the information presented in this article was:
  - a. Excellent
  - b. Good
  - c. Fair
  - d. Poor
13. The test questions correspond well with the information presented.
  - a. Yes
  - b. No
14. Approximately how long did it take you to read the Secundum Artem article AND respond to the test questions?  
\_\_\_\_\_
15. What topics would you like to see in future issues of Secundum Artem? \_\_\_\_\_

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Rx	Rosin Varnish I
Rosin, fragments	7 g
Chloroform	100 mL

Make a solution.

Rx	Rosin Varnish II
Rosin	6.7 g
Sodium carbonate, monohydrate	1.7 g
Acetone	100 mL

Mix. Do not filter.

#### Nail Formulas (Current)

Rx	Ciclopirox 8% Topical Nail Lacquer
Ciclopirox	8 g
Ethyl acetate	33 mL
Butyl monoester of poly (methylvinyl ether/maleic acid) in isopropyl alcohol (50%)	30 mL
Isopropyl alcohol	qs 100 mL

Place isopropyl alcohol in a suitable vessel away from heat and flame in a well-ventilated room. Mix the ethyl acetate and the butyl monoester in isopropyl alcohol in a separate vessel and add to the isopropyl alcohol. Add the ciclopirox and mix well. Add sufficient isopropyl alcohol to volume and mix well. Package immediately.

Ciclopirox 8% topical solution (Penlac Nail Lacquer) contains 80 mg/mL ciclopirox in a solution base consisting of ethyl acetate, NF, isopropyl alcohol, USP; and butyl monoester of poly(methylvinyl ether/maleic acid) in isopropyl alcohol. Ethyl acetate and isopropyl alcohol are solvents that vaporize after application.

#### Protectants (Current)

Rx	Collodion
Pyroxylin	4 g
Ether	75 mL
Alcohol	25 mL

Add the alcohol and the ether to the pyroxylin in a suitable container and stopper the container well. Shake the mixture occasionally until the pyroxylin is dissolved.

Rx	Flexible Collodion
Camphor	2 g
Castor Oil	3 g
Collodion	qs 100 g

Place in a stoppered bottle and shake occasionally until the camphor has dissolved.

#### Protectants with Medications (Current)

Rx	Trichloroacetic Acid 10% in Flexible Collodion
Trichloroacetic acid	10 g
Flexible collodion	qs 100 mL

Add the trichloroacetic acid to sufficient flexible collodion to volume. Stir until dissolved.

Rx	Salicylic Acid 25% in Flexible Collodion
Salicylic acid	25 g
Absolute alcohol	25 mL
Flexible collodion	qs 100 mL

Add the salicylic acid to the absolute alcohol. Add sufficient flexible collodion to volume and mix well.

Note: A thinner and faster drying preparation can be made by omitting the alcohol and substituting 25-50 mL of acetone.

Rx	Lactic Acid 10% and Salicylic Acid 25% in Flexible Collodion
Lactic acid 85%	11.7 mL
Salicylic acid	25 g
Absolute alcohol	25 mL
Flexible collodion	qs 100 mL

Add the lactic acid and salicylic acid to the absolute alcohol. Add sufficient flexible collodion to volume and mix well.

Rx	Salicylic Acid 25% in Flexible Collodion Gel
Salicylic acid	25 g
Hydroxypropyl cellulose	1.75 g
Flexible collodion	qs 100 mL

Add the salicylic acid to about 99 mL of flexible collodion in a sealed container and mix well until dissolved. Add the hydroxypropyl cellulose and mix well. Allow to stand until a clear gel is obtained.

Rx	Compound Benzoin Tincture
Benzoin	100 g
Aloe	20 g
Storax	80 g
Tolu Balsam	40 g
Alcohol	qs 100 mL

Prepare a tincture by Process M (maceration- see Remington's Pharmaceutical Sciences, 18th Edition), using alcohol as the menstruum. Compound Benzoin Tincture is best stored in tight, light-resistant containers. Exposure to direct sunlight or to excessive heat should be avoided.

#### Protectants with Medications

Rx	Podophyllum Resin 25% in Compound Tincture of Benzoin
Podophyllum resin	25 g
Compound Tincture of Benzoin	qs 100 mL

Add the podophyllum resin to a calibrated container. Add sufficient compound tincture of benzoin to volume and periodically shake until dissolved.

Rx	Podophyllum Resin 10% and Salicylic Acid 25% in Flexible Collodion
Podophyllum resin	10 g
Salicylic acid	25 g
Acetone	15 mL
Absolute alcohol	15 mL
Flexible collodion	qs 100 mL

In a calibrated bottle, add the acetone and absolute alcohol followed by the podophyllum resin and salicylic acid. Add sufficient flexible collodion to volume and seal. Periodically agitate until a uniform mixture is obtained.

Rx	Anesthetic and Anti-inflammatory Spray-Film
Benzocaine	1 g
Dexamethasone	100 mg
Non-aromatic hair spray, pump style	qs 100 mL

Dissolve the benzocaine and dexamethasone in sufficient non-aromatic hair spray vehicle to volume.

### Miscellaneous Formulas (Historical)

Rx Whitehead's Varnish		
Siam Benzoin, coarsely powdered		10 g
Storax		7.5 g
Tolu Balsam		5 g
Iodoform		10 g
Ethyl oxide,	qs	100 mL

Macerate the benzoin, storax and tolu balsam with 80 mL of ethyl oxide for 7 days, agitating frequently, filter, dissolve the iodoform in the filtrate and pass sufficient ethyl oxide through the filter to make the product measure 100 mL.

Rx Sandarac Varnish for Pills		
Sandarac		20 g
Ethyl oxide		40 mL
Dehydrated alcohol		40 mL

Dissolve the sandarac in the ethyl oxide-alcohol mixture by shaking; pour off the supernatant liquid and filter if necessary.

Rx Salol Varnish for Pills		
Phenyl salicylate		20 g
Amber shellac		30 g
Dehydrated alcohol		30 mL
Ethyl oxide	qs	100 mL

Dissolve the phenyl salicylate and shellac in a mixture of alcohol and ethyl alcohol.

Rx Gold Lacquer		
Shellac		125 g
Dragon's Blood		15 g
Turmeric		8 g
Denatured alcohol	qs	100 mL

Mix and digest the mixture for a week at about 38° C., then filter.

## REFERENCES

1. The Compact Oxford English Dictionary, 2nd Ed. Clarendon Press, Oxford 1991., 904-905, 931-932, 2216.
2. Anon. Webster's Seventh New Collegiate Dictionary, Springfield MA, G & C Merriam Company, 1963.
3. Albutt's Systematic Medicine VIII, 1899, p 582.
4. Hawkins R. et al. A comparison of the costs and patient acceptability of professionally applied topical fluoride foam and varnish. J Public Health Dent. 2004 Spring;64(2):106-10.
5. Autio-Gold JT and Courts F. Assessing the effect of fluoride varnish on early enamel carious lesions in the primary dentition. J Am Dent Assoc 2001 Sep;132(9):1247-53.
6. Frentzen M, et al. Clinical and microbiological effects of local chlorhexidine applications. Int Dent J. 2002 Oct;52(5):325-9.
7. Baca P, et al. Effectiveness of chlorhexidine-thymol varnish for caries reduction in permanent first molars of a 6-7 year-old children: 24-month clinical trial. Community Dent Oral Epidemiol. 2002 Oct; 30(5):363-8.
8. Kongsberg R, Axell T. Treatment of Candida-infected denture stomatitis with a miconazole lacquer. Oral Surg Oral Med Oral Pathol. 1994 Sep; 78(3):306-11.
9. Sidou F, Soto P. A randomized comparison of nail surface remanence of three nail lacquers, containing amorolfine 5%, ciclopirox 8% or tioconazole 28%, in healthy volunteers. Int J Tissue React. 2004;26(1-2):17-24.
10. Gupta AK and Lynch LE. Onychomycosis: review of recurrence rates, poor prognostic factors, and strategies to prevent disease recurrence. Cutis. 2004 Jul;74(1 Suppl):10-5.
11. The Encyclopedia Americana International Edition, 1967, Americana Corporation, New York, NY.
12. Allen Jr LV. Standard operating procedure for performing physical quality assessment of oral and topical liquids. IJPC 1999;3:146-147.

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