Spike Lavender Oil Varnish

Warning

This activity involves several safety hazards. Please carefully review the section below on "Safety Considerations" before undertaking any experiments following this protocol. The Making and Knowing Project is not liable for any injury or damage incurred by those who use this assignment sheet.

Background

Varnish
Any transparent protective or decorative coating. Varnishes are composed of a resin dissolved in a liquid which dries to form a hard glassy film (http://cameo.mfa.org/wiki/Varnish).

Varnishes fall into two categories:

- **Oil-based varnishes:** Resin dissolved in oil, such as linseed or nut oil
- **Spirit-based varnishes:** Resin dissolved in solvents or spirits, such as alcohol or volatile oils

Spike lavender oil
An essential oil distilled from the leaves of lavender plants (*Lavandula latifolia* or *Lavandula spica*) from the mint family. It is also known simply as spike oil or aspic oil. Spike lavender oil is distinct from lavender oil, which is typically distilled from the flowers of *Lavandula angustifolia*.

Sandarac gum
A water-insoluble, pale yellow, natural resin that is exuded in "tears" from the sandarac tree (*Tetraclinis articulata*), native to northern Africa, and the alerce tree (*Callitris quadrivalvis*), native to Australia.

The protocol below is adapted from instructions in Ms. Fr. 640.

Historical Recipe for a Spirit-based Varnish

Ms. Fr. 640, fol. 4r

Varnish of spike lavender oil

One needs to heat lavender spike oil & as it begins to simmer, put in powdered sandarac gum so that it soon melts. And over a charcoal fire stir continuously until the sandarac is well melted, which you will know by taking a little of the said varnish on a plate, and if it is fatty when you handle it with a finger, it is ready. And for one lb of lavender spike oil, you will put five ounces of pulverized sandarac, although some only put in four ounces, but this is neither so good nor so fatty. This one is promptly dry. Frame makers, to avoid the trouble of polishing their ebony, varnish it with this, as do guitar makers. This is not as appropriate for panels as that of fine turpentine, though it is good for the moldings of panels. One did not use to varnish the landscape of a panel when linseed varnish was in use, because it yellowed the landscape. But with that of turpentine, one varnishes everywhere. You can put in pulverized mastic extracted in tears or otherwise, & it will be more desiccative, in place of sandarac.

If you want to varnish on plaster or a wall, first put on your very hot hide glue, because if were cold it would not penetrate the wall, & when you would put your varnish on, it would come off.

Varnish of spike lavender oil is not as appropriate for colors as that of turpentine, for spike lavender oil ~~makes them die~~ eats the colors since it is too penetrating.

Translation take from *Secrets of Craft and Nature in Renaissance France*, https://edition640.makingandknowing.org/#/folios/4r/f/4r/tl.

Modernized Recipe

Rationale

- 16 oz (1 lb) of spike lavender oil
- 5 oz of powdered sandarac gum

→ 5:16 ratio gum to spirits

Ingredients

- 48 g spike lavender oil
- 15 g sandarac gum

Equipment

- Hotplate
- Scale
- Weighboat
- Thermometer
- 250 ml glass beaker
- Stirring utensil

- Hammer
- Plastic or cloth bag
- Mortar and pestle
- Glass vials with lids (to store the varnish)
- Beaker tongs or heat-resistant gloves/mitts
- Silicone trivet or potholder
- Optional: bowl of playground sand

Process

- If sandarac gum is not powdered, place it in a bag and crush it with a hammer. Continue to pulverize to a fine powder with a mortar and pestle
- Weigh out powdered sandarac gum in weighboat or small container. Set aside
- Measure spike lavender oil into the 250 ml glass beaker
- Place hotplate inside fume hood
- Set beaker with spike lavender oil on hotplate and heat gently until it simmers (~120 °C)
    - Caution: the flash point of spike lavender oil is 57 °C. Keep open flames away from the heating spike lavender oil, as there is risk that it might ignite at temperatures of 57 °C and above
    - Do not bring to a boil or to a temperature above 130 °C
    - Start with low settings on the hotplate
    - Monitor temperature with the thermometer and watch the solution carefully as it heats. You are looking for steam/vaporization and the formation of tiny bubbles that indicate a simmer (but not a boil)
- Once simmering, remove the beaker from the hotplate and place in bowl of sand or on a heat trivet. Do not place directly on a cold surface to prevent heat shock to glass
- Add the powdered sandarac gum to the hot spike lavender oil and stir until thoroughly dissolved
- Pour varnish into glass vials and allow to cool before capping for storage

Safety Considerations

- Personal protection: Always wear appropriate personal protective equipment, including safety glasses/goggles, lab coat or similar, long pants or skirt, closed-toed shoes. Tie back hair and avoid wearing jewelry, scarves, or other dangling/loose items.
- Fire and burns: The preparation of this varnish recipe requires the heating of a volatile oil and an oily resin. There is a risk that these materials may ignite suddenly.
- Fire and burns: Hotplates must be used carefully.
- Fire safety: An ABC fire extinguisher and/or a fire blanket should be close at hand.
- Fumes: Volatile oils should only be heated with appropriate ventilation, such as in a laboratory fume hood or outside.
- Flammable materials: Spike lavender oil and its resulting varnish are flammable materials. Keep away from heat sources and store with care.

- Glass shattering: Even tempered pyrex beakers may shatter or explode when heated. Moreover, heat shock increases this risk. Do not place a hot beaker directly on a cold surface and vice versa. Always use an insulating material such as a heat trivet or sand.
- Check that your plans comply with safety and environmental regulations in your jurisdiction, institution, or community.

Material Safety Data Sheet Information Excerpt: Spike Lavender Oil

- Flash point = 57 °C (Kremer SDS); 34.44 °C (Dipentene SDS - CAS 7705-14-8)
- Boiling range = 158.5–159.5 °C (Camphene SDS - CAS 79-92-5)
- Autoignition point = >200 °C (Kremer SDS)

Fieldnotes

Making and Knowing Fieldnotes with step-by-step pictures and notes about the production of this and several similar varnishes can be consulted here: https://fieldnotes.makingandknowing.org/pre-2018-Fall/sp18_rosenkranz-uchacz_naomi-tianna_varnishes-in-the-rain/sp18_rosenkranz-uchacz_naomi-tianna_varnishes-rain-2/sp18_rosenkranz-uchacz_naomi-tianna_varnishes-rain-2-varnish-making-application.html#h.w4fnrsg2bdnc.