

Disinfection and Hygiene in Sericulture

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Disinfection is an essential and indispensable step to ensure healthy and successful silkworm rearing. It aims at the complete destruction of disease-causing pathogens such as bacteria, viruses, fungi, and protozoans. Pathogens released by diseased silkworms easily accumulate and spread in the rearing environment. These pathogens can survive for long periods under favourable conditions. Therefore, proper disinfection and maintenance of hygiene are crucial to prevent diseases.

Methods of Disinfection

A. Physical Methods

1. Disinfection by Sun Drying: Sunlight is used to disinfect wooden rearing appliances like trays. The ultraviolet (UV) rays of sunlight kill pathogens by denaturing proteins and causing lethal mutations. Infrared and visible rays help by heating and drying, enhancing the disinfecting effect.

2. Disinfection by Boiling Water: Boiling water destroys pathogens through protein coagulation. Used for small tools like nets, chopsticks, and brushes. Materials are boiled for about 30 minutes, then dried before use.

3. Disinfection by Steam: Steam under high pressure acts as an effective sterilizing agent by denaturing microbial proteins. Tools are placed in steaming cabinets and treated at 100°C for 30 minutes. For higher efficiency: Add formalin (12.5 ml/m³) and maintain temperature at 88°C for 40 minutes.

4. Disinfection by Hot Air: Hot air is circulated in rooms containing equipment. Helps in sterilizing materials by dry heat action.

B. Chemical Disinfectants (General Disinfectants)

1. Formalin: Formalin is a solution of formaldehyde gas in water, containing 36–40% formaldehyde. It is a colourless liquid with a pungent odour and acts as a powerful disinfectant. It removes oxygen from germ cells and gets oxidized to formic acid. It is generally used at a 2% concentration. For best results, disinfection should be carried out under airtight conditions, with relative humidity around 70% and temperature above 20°C.

2. Bleaching Powder: Bleaching powder is a white amorphous powder with a strong chlorine odour. High-grade bleaching powder containing about 30% active chlorine should be used. It acts as a strong oxidizing agent due to the release of nascent oxygen. It must be stored in sealed containers away from moisture, as it loses effectiveness on exposure. Its action is most effective under moist and contact conditions, and a 5% solution is commonly used against most microorganisms.

3. Slaked Lime Powder: Slaked lime is a dull white powder that helps in maintaining hygiene by absorbing excess moisture from the rearing bed. It has good antiviral properties and is also

used as a carrier material. A 0.3% solution is recommended for controlling viral diseases such as grasserie and viral flacherie.

4. Chlorine Dioxide (ClO₂):Chlorine dioxide is a strong oxidizing disinfectant marketed under trade names such as Sanitech and Serichlor. It has a chlorine-like odour, which is tolerable. It is available in concentrations of up to 20,000 ppm. Compared to bleaching powder, it is less corrosive, highly germicidal, and effective over a wide pH range. Being a contact disinfectant, it is suitable for use in all types of silkworm rearing houses.

Names of General disinfectants

1.Sanitech is a chlorine dioxide-based disinfectant combined with lime solution, developed by Sericare. It is commercially available at a concentration of 20,000. Sanitech is a versatile, powerful, and user-friendly disinfectant that is effective against all silkworm pathogens. It is non-corrosive to metallic equipment and does not produce an irritating pungent odour. It acts rapidly, killing pathogens within 10–30 minutes of application. Additionally, it requires a smaller quantity per square meter of floor area, making it cost-effective, and ensures about 99.9% disinfection with minimal residual effect.

2.Sanitech Super, developed by Sericare, is a highly effective disinfectant used in silkworm rearing houses to destroy disease-causing pathogenic microbes present in and around the rearing environment. It is about 2.5 times more potent than many other disinfectants available in the market. The formulation is non-corrosive to iron and other metallic equipment and is odourless as well as safe on the skin. During application, it is recommended to cover the nose and eyes with a mask, although windows and doors can remain open. Spraying can be carried out at any time of the day, making it convenient for farmers. The disinfectant acts rapidly and is capable of controlling up to 99.9% of disease-causing microbes within 30 minutes after spraying.

3. Seri Swachh, developed by Sericare, is a powder-based disinfectant used in silkworm rearing. It is applied soon after the harvest of cocoons by spraying inside the cleaned rearing house to ensure proper sanitation. Additionally, a drenching spray is recommended two days prior to brushing or introduction of chawki larvae, covering both the rearing house and equipment. The disinfectant is used at a dosage of 1½ liters per m² (or 140 ml per sq. ft.) of floor area, along with 10% of the usable solution for application outside the rearing house, ensuring effective disinfection and hygienic conditions.

4. Decol is a disinfectant jointly formulated by the Silkworm Seed Technology Laboratory of the Central Silk Board, Kodathi, Bengaluru.

General disinfectants developed from Karnataka state sericulture research and development institute (KSSR&DI)

Disinfection of rearing house , rearing appliances/ equipments (trays and rearing racks)	1 part of decol and 49 parts of water (spraying , 800 ppm)
Quantity of disinfectants required	@ 200 ml/sq. ft or @ 2 lit/ sq. mt floor area
Disinfection of equipment's by dipping	Dipping in 1 part of decol and 49 parts of water for 30 minutes
Floor mopping/ swabbing	Alternate days
Hand/Foot wash	1 part of decol and 79 parts of water (500 ppm)

5.Chlorofect- chlorine based: It is a chlorine-based, broad-spectrum germicide with a pleasant smell and a pH of 7.5–8.0. It can be diluted at a ratio of 1:39 and has a shelf life of one year. The disinfectant is highly effective against all major pathogens of silkworms. Being a contact-type disinfectant, it is suitable for use in all types of rearing houses and on various appliances. It is less toxic, non-irritant, user-friendly, and cost-effective, making it ideal for sericulture practices. Disposal of dead larvae: Chlorofect (1 ml. in 40ml of water) is prepared in a basin, collect dead and diseased larvae and dispose.

6.Seriphene-phenol based : Seriphene is a phenol-based disinfectant used for disinfecting silkworm rearing houses and appliances both before and after rearing. It can be diluted at a ratio of 1:200, and the diluted solution has a pH of 7.5–8.0. The product has a shelf life of one year and is applied at a rate of 1.5 liters per square meter for effective disinfection of the rearing room and equipment. Seriphene is highly effective against all major silkworm pathogens, ensuring hygienic rearing conditions. For the disposal of dead and diseased larvae, a solution of Seriphene (5 ml in 1 liter of water) is prepared in a basin, where the larvae are collected and safely disposed of to prevent the spread of infection.

7.Sinchana- chlorine based disinfectant: Sinchana is a chlorine-based disinfectant in powder form used for disinfecting silkworm rearing houses and appliances both before and after rearing. It can be diluted at a ratio of 1:200, and the diluted solution has a pH range of 7–8. The product has a shelf life of one year and is applied at a rate of 1.5 liters per square meter for effective disinfection of the rearing room and equipment. Sinchana is highly effective against all major silkworm pathogens, ensuring proper hygiene and disease-free rearing conditions.

8.Sanital Plus: chlorine based disinfectant : Sanital Plus is a disinfectant kit consisting of three components : component 1 (stabilized chlorine dioxide), component 2 (activator), and component 3 (booster). For preparation, 1 liter of chlorine dioxide (component 1) is taken in a 50-liter capacity drum, to which 100 g of activator (component 2) is added and mixed thoroughly. After 2–3 minutes, 40 liters of clean water is added while continuously mixing, followed by the addition of 500 ml of booster (component 3), ensuring thorough mixing of the solution. The prepared solution is then used for disinfection at a rate of 1.5 liters per square meter of floor area, providing effective sanitation of the rearing house and equipment.

“Rearing house should be kept closed for minimum of 6-10 hours”



Bed Disinfectants

To prevent secondary infection, occurrence, and spread of diseases in the silkworm rearing bed, proper use of bed disinfectants is essential. Lime powder is dusted on silkworms when the larvae settle for moulting, which helps in maintaining dryness and hygiene. After moulting, general bed disinfectants are applied when the larvae come out of moult, about half an hour before resuming feeding. The recommended dosage is 3–5 g per square foot, and approximately 6 kg of bed disinfectant is required for 100 DFLs, ensuring effective disease control and healthy larval growth.

List of Bed disinfectants

S. No.	Name	Diseases
1	Vetcare Vijetha 4 kg/ 100 DFL's – Tray method 6 kg/ 100 DFL's –Shoot method	All silkworm diseases
2	Vijetha Green	All silkworm diseases
3	Vetcare Vijetha Supplement	Prevention of Fungal Diseases
4	Vijetha Forte	All silkworm diseases
5	Ankush	All silkworm diseases
6	Sanjeevini (5 kg/ 100 DFL's)	Grasserie
7	Suraksha (5 kg/ 100 DFL's)	White Muscardine

S. No.	Name	Diseases
	RKO	
8	3 chemicals [Paraformaldehyde (2 %)+ Benzoic Acid(1%) + Captan (1%)+ Lime (96%)]	All silkworm diseases
9	Resham Jyothi	All silkworm diseases

					
Vetcare Vijetha	Vijetha Green	Vijetha Supplement	Vijetha Forte	Sanjeevini	Suraksha

Points to Remember

The required quantity of disinfectant solution should be prepared and thoroughly sprayed on the inner surfaces of the rearing house along with all appliances present inside. Care must be taken to ensure that the solution uniformly reaches all corners, crevices, and hidden areas for effective disinfection. While handling disinfectants, the operator should wear protective gear such as a mask, coat, gloves, and shoes. Bed disinfectants must be kept out of reach of children to avoid accidental exposure. After dusting bed disinfectants, silkworms should be fed only after 30 minutes, and dusting should not be done on larvae that are under moult, as it may disturb their normal development.

Conclusion

Disinfection and hygiene are fundamental to successful sericulture, as they play a crucial role in preventing the outbreak and spread of diseases among silkworms. Both physical and chemical methods of disinfection, along with the proper use of general and bed disinfectants, help maintain a clean and pathogen-free rearing environment. The use of effective disinfectants such as formalin, chlorine-based compounds, and improved formulations like Sanitech, Seriphene, and Sanitall Plus ensures high levels of disease control. Additionally, following recommended practices such as proper application methods, maintaining cleanliness, and using protective measures further enhances the efficiency of disinfection. Overall, strict adherence to hygienic practices and timely disinfection not only safeguards silkworm health but also improves cocoon quality and productivity, leading to sustainable and profitable sericulture.

References

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