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EC5 Disinfection and Disinfectants

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DISINFECTION
AND
DISINFECTANTS

THE UNIVERSITY OF NEBRASKA
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Disinfection and Disinfectants

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Disinfection means the destruction of disease producing germs by natural or chemical agents.

Such methods should be practiced at regular intervals before diseases make their appearance.

Prevention is the real issue in combatting diseases because the treating of sick animals is costly and the outcome uncertain.

Natural processes of disinfection are sunlight and heat.

The direct rays of the sun prevent the growth of bacteria and under proper conditions act as a germicide. Plenty of light in the stable also emphasizes the presence of dirt and filth.

The direct rays of the sun kill tuberculosis germs in a few hours, however, the action of light is very superficial and cannot be entirely depended on for complete disinfection.

Heat in the form of fire is a very powerful and valuable agent in the destruction of diseased animals, dangerous bedding, manure and other infective materials.

It is always better to burn animals that die of such diseases as anthrax, blackleg, cholera, etc., than to bury them. The carcass of such animals can readily be burned by digging two ditches in the shape of a cross 7 feet long, 15 inches wide and 18 inches deep at the center where the two meet and becoming shallower at the ends. An iron wheel, pieces of heavy green wood or railroad irons are placed across the ditches. The wood is placed on these, and on this is placed the carcass, followed by more wood and manure. Then set fire to the mass. The addition of a few gallons of kerosene will assist the burning process.

Live steam may also be used for disinfection purposes.

Boiling water, 100 quarts, to which has been added 3 pounds of lye or 5 pounds of either soda or soap are good agents for cleaning and disinfection.

The heating of milk or the boiling of water are effective means of eliminating danger from the use of such food and drink.

Two parts of chlorinated lime per million parts of water will make water safe for human use and without the presence of an objectionable taste. To safeguard water for animal use, one-half ounce of chlorinated lime is added to sixty-five gallons of water.

CHEMICAL DISINFECTANTS

Chemical substances are most commonly used in stable disinfection because they are effective and easily applied.

A thorough cleaning should precede their application because such solutions must come in actual contact with the germs in order to destroy them.

All manure, dust and dirt must be removed, likewise porous wood, rotten wood floors and mangers should be removed and burned.

Smooth floors can be swept with oiled sawdust to keep down the dust. Cracks, crevices and corners must be cleaned; all infective utensils and implements are included in the cleaning up process.

Earth floors which have become contaminated must be removed to a depth of 3 to 4 inches and replaced from an uncontaminated source or better, a new floor of concrete may be laid, this being the most durable and sanitary material for the purpose.

Small surfaces can be disinfected with hand brushes or brooms, but where large surfaces are to be disinfected this is best accomplished by means of a force spray pump. This method forces the solution into all cracks and crevices. Spray the surface until it is thoroughly soaked, do not spare the disinfectant.

There are many chemical disinfectants which may be used but only the more important and common ones will be considered.

CARBOLIC ACID—PHENOL

Carbolic acid is one of the most popular and a very useful disinfectant. Only the pure product should be used as the "crude" articles are too unstable in quality and disinfecting properties.

Five gallons of hot water, one-half pound of washing soda and one pound of pure carbolic acid makes a very good disinfecting solution. Phenol is readily obtained, but is rather expensive to use in cases where a great amount of solution is required for use.

CRESOL

Cresol is efficient when used in a 2 per cent solution. Allowance should be made for the impurities when the cheaper grades are used. Cresol is not readily soluble in cold water, therefore, it should be thoroughly mixed with hot water.

The "saponified solutions of cresol" such as liquor cresolis compositus are very desirable substances to use because they are readily soluble in water.

CHLORINATED LIME—BLEACHING POWDER

This is a soft, white, friable substance, very slightly soluble in water and of variable chemical composition. When used, it should be fresh. Its germicidal action is due to the liberation of chlorine gas. It is somewhat destructive to metals and the dye of fabrics.

Because of its permeating odor it is objectionable to use in stables where milk is produced. When used it is mixed in the proportion of 1 part to 20 parts of water.

SLACKED LIME

When freshly prepared, slacked lime is a popular, but a more or less feeble disinfectant. Fresh slacked lime should be used and is made by adding one pint of water to two pounds of quick lime. One of the most common forms in which lime is used is milk of lime. This is prepared by adding one part of freshly slacked lime to four parts of water. Its disinfecting properties are increased by the addition of cresol, liquor cresolis compositus or preferably pure phenol. The following mixture may be used: Slack 7½ pounds of quick lime, mix to a creamy consistency and then add 15 ounces of cresol or phenol. Stir thoroughly, strain thru a wire sieve and then add water sufficient to make 5 gallons of solution. This is best applied as a spray.

FORMALDEHYDE OR FORMALIN

This is a 40 per cent solution of formaldehyde gas in water. It can be used in liquid or gaseous form. Its use for gaseous disinfection will be considered later. A 5 per cent solution is very efficient and is prepared by mixing one part of formalin to 19 parts of water.

CORROSIVE SUBLIMATE—BICHLORIDE OF MERCURY

One of the oldest disinfectants known. It may be purchased in tablet form and is used in 1-500 to 1-1000 solution. The water with which it is mixed should be hot, free from organic matter and hardness. Corrosive sublimate is a powerful disinfectant when used under the proper conditions. Its dis-

advantages are that it is extremely poisonous, corrodes metals and is precipitated by albumens and alkalies. It is useless for disinfecting manure or other decomposing animal or vegetable matter except when used in very large quantities.

GASEOUS DISINFECTANTS

Formalin and sulphur are generally used for gaseous disinfection and fumigation.

The quantity to be used is determined by estimating the space to be disinfected and this is figured in terms of a thousand cubic feet.

When substances are used the rooms or stables must be tightly closed, the floors, walls and ceilings previously moistened with water and the temperature at least 65 degrees Fahrenheit.

Formalin may be used by sprinkling the 40 per cent solution over a large surface. A method by which the gas may be more rapidly formed is by mixing one-half pound of the crystals of permanganate of potassium, with 1 pint of formalin for every one thousand cubic feet of space. An earthenware jar is placed in a washtub partly filled with boiling water. When the jar is heated the formalin is poured into it and the permanganate added. The gas forms so quickly that the operator cannot remain within the stable very long. The stable must be kept tightly closed for at least 12 hours. The gas does not injure hay or grain for feeding purposes.

SULPHUR DIOXIDE

The burning of sulphur may also be practiced for disinfecting and for the destruction of insects, rats, and mice within stables. The same precautions of tightly closing rooms, previously moistening of surfaces with water and high temperature must be observed in its application as explained in formaldehyde gas disinfection.

The simplest method of producing sulphur-dioxide is the so-called pot method. Five pounds of rolled sulphur, for every 1000 cubic feet of space is placed in an iron pot. The pot is then placed in a wash-tub partly filled with hot water in order to prevent danger from fire. Two ounces of wood alcohol are poured over the sulphur and the mass ignited, doors closed and the space left exposed to the fumes for at least 12 hours.

Food stuffs, such as hay and grain should be removed for they readily take on the disagreeable odor of the gas. Stables

should be thoroughly aired after fumigation before animals are returned to them.

DESTRUCTION OF VERMIN AND INSECTS

The use of burning sulphur may be used as just explained.

Kerosene emulsion is a very valuable insecticide and exterminator of lice.

The emulsion is prepared as follows: Dissolve one-quarter of a pound of common laundry soap in one gallon of soft water by boiling. When the soap has all dissolved and the solution is still hot, pour into it 2 gallons of kerosene and mix thoroughly.

One part of the emulsion is added to 8 to 10 parts of warm, soft water and this can now be used as a spray.

Kerosene and gasoline are useful insecticides which can either be poured or sprayed on the surfaces, into cracks, crevices, etc. These substances are highly inflammable and care must be taken to prevent fire.

Prussic or hydrocyanic acid gas is perhaps the most active destroyer of all forms of animal life. It kills mice, rats, flies, fleas, lice, roaches, etc., with great certainty and very quickly.

The gas is very poisonous and should not be used by an inexperienced person or in buildings inhabited either by animal or man.

The gas is produced by the action of dilute sulphuric acid upon the cyanide of potassium. For every one thousand cubic feet of space use:

Cyanide of potassium	1 pound
Sulphuric acid	1½ pints
Water	2¼ pints

Mix the acid and water in an earthenware jar, that will withstand heat. Allow this mixture to cool. The potassium cyanide is put in a gauze bag and suspended over the diluted acid in such a way that it can be lowered into the jar through a crack in the door. Exposure should be continued for 6 hours. Have the windows arranged so that they can be opened from the outside. Under no condition should the building be occupied by man or animals until it has been aired from 8 to 10 hours. The gas is not injurious to hay or grain.

DISINFECTION OF HARNESS, CLOTHING, BRUSHES, ETC.

When harness or other leather is to be disinfected it should first be cleaned by scraping and washing. Then immersed in a 5 per cent solution of carbolic acid; 4 per cent liquor cresolis compositus solution or a 1-1000 solution of corrosive sublimate and left in such solution for 6 to 8 hours. They are then removed, rinsed in clear water and dried. As soon as the leather is dry it should be oiled in order to prevent it from cracking or becoming brittle.

Clothing, brushes and curry-combs, etc., may be disinfected with any of the above solutions or by the use of formaldehyde gas as previously described.

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