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EVALUATION OF IN-VITRO EFFICACY OF DISINFECTANTS ROUTINELY USED IN VETERINARY FIELD

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Abstracts: The aim of this study was to evaluate and compare the efficacy of disinfectants locally available and commonly used under veterinary field settings. The research had employed a suspension method, wherein bacterial suspensions were exposed to disinfectants for specific periods, allowing for the assessment of microbial viability and the resulting phenol coefficients of different disinfectants. Sterile BHI broth tubes were inoculated with loopful of *Staphylococcus aureus* bacterial culture and the test tubes were incubated at 37ºC for 24 hrs. At an interval of 5, 10 and 15, minutes of culture containing test tubes were inoculated with phenol or test disinfectant at the dilutions of 1:400, 1:500, 1:600 and 1:700. In the experiments, variations in the dilution of lysol, sodium hypochlorite, povidone iodine, and phenol over different time intervals (5, 10, and 15 minutes) were observed, eventually showed that all substances effectively inhibited bacterial growth except povidone iodine. Lysol inhibited the growth of the organism in 1:600 and 1:700 dilution at all time interval. But, in sodium hypochlorite all the dilutions inhibited the growth of organism at 15 minutes interval. These results explored the relevance of comparing new disinfectants to phenol for critical assessments of their antiseptic properties.

Keywords: Evaluation; Disinfectants; Phenolic coefficient; *Staphylococcus aureus*

Introduction:

Pathogens have evolved in many ways to survive in the veterinary hospital environment. Disinfection in hospital may be applied by immersing the material in disinfectant or apply disinfectant on the contaminated material. Disinfection mainly used to cleaning the hospital surfaces, cleaning equipments, animal houses, manure pit and in entrance of farm and hospital premises. Different formulation have different application properties and disinfection may be affected by various factor like like temperature, contact period, pH and concentration of the disinfectant, bioburden, organic soil and hardness of water used for dilution. Hence, the commercially available disinfectants are needed to be tested to confirm its effectiveness in the field. Still in the field of veterinary and Para veterinary, the selection of disinfectant is based on the information provided by the manufactures are knowledge on the selection

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disinfectant. Many conditions are still using phenolic disinfectants, but their use is being discouraged throughout developed countries but in developing countries are encourages to use phenol components. The common tests to evaluate disinfection efficiency by Rideal-Walker (1903) phenol coefficient (R.W.C) Chick-Martin and Garrod's test, (Garrod, 1934) Kelsey and Maurer's in-use tests and surface disinfection tests capacity use dilution test (Kelsey and Sykes, 1969), modified by Kelsey and Maurer, 1974, various other microbial time kill assays and standard carrier tests such as EN 13697 (Kawamura et al., 2008) ASTM E2197, (Meyer et al., 2010) etc. But all the manufactures are claiming as their own product is best to apply. By considering the particular fact the present is planned to evaluate some locally available disinfectants for disinfection of surfaces and infectious microbiological agents. The disinfectant efficacies were tested against wild type *Staphylococcus aureus.*

Materials and Methods

Prepare brain heart infusion broth and dispense into test tubes at the rate of 5 ml each and sterilize. Prepare 5 ml of serial dilutions of phenol and disinfectant under test (lysol, sodiumhypochlorite, povidone iodine) in separate test tubes as shown in materials. A standard quantity of pure culture of *Staphylococcus aureus* is added to the first set of test tubes with each dilutions of phenol and other test disinfectants sodium hypochlorite, lysol, povidone iodine. At an interval of 5, 10 and 15 minutes of inoculation, the sterile brain heart infusion broth tubes are inoculated with a loop full of the contents of organisms in each dilution of phenol and test disinfectants. Test tubes with inoculated brain heart infusion broth are incubated at 37^{o}C for 48 hours. After the incubation period, examine the test tubes for the presence or absence of growth of the organisms and tabulate the results. Note the dilution of test disinfectant and phenol that killed the bacteria in 10 minutes but not in 5 minutes. The determination of phenolic coefficient is done by using the formula (Phenolic coefficient = dilution ratio of disinfectant /dilution ratio of phenol

Result and Discussion

In the experiments, variations in the dilution of lysol, sodium hypochlorite, povidone iodine, and phenol over different time intervals (5, 10, and 15 minutes) were observed, eventually showed that all substances effectively inhibited bacterial growth except povidone iodine (Table 1). Sodium hypochlorite inhibited the growth of *Staphylococcus aureus* in 1:400 and 1:500 dilution at all time interval. These results explored the relevance of comparing new disinfectants to phenol for critical assessments of their antiseptic properties. The results obtained were similar to those of Rodrigues et al. (2011), who documented that low

concentrations of sodium hypochlorite were highly effective in eradicating 1-day-old *S. enteric*. Many numbers of disinfectants are commercially available and undergo rigorous testing in controlled settings prior to being released to the market. Nevertheless, the products and methods outlined in the literature may frequently fall short of effectively disinfecting or decontaminating items when the surfaces are contaminated with highly resistant or atypical organisms, or when the microbial load is particularly high (Shrivastava et al., 2004). But, in our study Lysol in all the dilutions inhibited the growth of organism at 5, 10, 15 minutes interval. As expected, this study showed that all disinfectants were highly effective in killing live highly virulent wild type *Staphylococcus aureus*. Many researchers opined that **(**Rutala. 2001)**)** situation might be made more complex by the condition of environmental sanitation due to dust and various organic materials. When selecting a disinfectant for particular Veterinary field, it may be essential to understand the anticipated quantity and the varieties of organisms expected to be found on the surface. Choosing the disinfectant is essential based on its effectiveness against the common pathogenic microorganisms that can spread through direct or indirect environmental contact. Consequently, we decided to evaluate the disinfectants on standard strains present in Veterinary and Animal husbandry practice setting. It's essential to always take into account the surface type that needs disinfection and the product's uses. An effective disinfectant must possess a wide range of antimicrobial activity, be nonirritating, exhibit low toxicity, be noncorrosive, and be affordable.

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Table 1: Efficacy of different disinfectant in different time intervals against *Staphylococcus aureus* culture

Phenol			**Povidone iodine**			**Sodium hypochlorite**			**Lysol**		
1:400	5 mins	Growth	1:400	5 mins	Growth	1:400	5 mins	No Growth	1:400	5 mins	No growth
1:500		Growth	1:500		Growth	1:500		No Growth	1:500		No growth
1:600		Growth	1:600		Growth	1:600		Growth	1:600		No growth
1:700		Growth	1:700		Growth	1:700		Growth	1:700		No growth
1:400	10 mins	Growth	1:400	10 mins	Growth	1:400	10 mins	No Growth	1:400	10 mins	No growth
1:500		Growth	1:500		Growth	1:500		No Growth	1:500		No growth
1:600		Growth	1:600		Growth	1:600		Growth	1:600		No growth
1:700		Growth	1:700		Growth	1:700		Growth	1:700		No growth
1:400	15 mins	Growth	1:400	15 mins	Growth	1:400	15 mins	No Growth	1:400	15 mins	No growth
1:500		Growth	1:500		Growth	1:500		No Growth	1:500		No growth
1:600		Growth	1:600		Growth	1:600		Growth	1:600		No growth
1:700		Growth	1:700		Growth	1:700		Growth	1:700		No growth