INTERIM REPORT ON EFFICACY OF DISINFECTANTS AGAINST CLUBROOT RESTING SPORES, 2019

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INTRODUCTION:

The purpose of this study was to determine the antimicrobial efficacy of PREMISE DEGREASER PLUS™ and ADHERE CPM™ on clubroot resting spores. Clubroot is a serious disease affecting canola crops in Alberta and throughout the world, and disinfecting equipment is an important aspect to managing the spread of the disease. Therefore, discovering the effectiveness of different chemical disinfectants can be a useful tool for the agricultural industry. In this study, clubroot spores were exposed to different concentrations of the disinfectants for a set time and then the viability of the spores determined using Evans blue stain.

METHODS:

Clubroot galls were collected from canola roots and air-dried followed by grinding in a laboratory mill with a coarse screen. The ground gall material was then suspended in distilled water and filtered through cheese cloth to make a spore suspension (spore count of 2.2×10^8 spores mL^{-1}) and transferred to 5 mL tubes. These tubes were then centrifuged and the water was poured off and the pelleted spores retained. To these spore pellets 1 mL of disinfectant was added, the spores re-suspended, and left for 20 min. At the end of the 20 min., 9 mL of Universal neutralizer was added and the tubes were centrifuged again. The supernatant was decanted and the spore pellet was rinsed with sodium phosphate buffer 3 times, and then re-suspended in a final volume of 5 mL of sodium phosphate buffer. Then, 50 µL of spore suspension was mixed with an equal volume of Evans blue stain and left for 24 hrs at room temperature. This stained suspension was then observed under the microscope, rating 100 spores for blue stained (blue stained = dead) spores to determine mortality.

RESULTS AND CONCLUSIONS:

The most effective disinfectant we have found so far has been sodium hypochlorite, so it was included as a "standard" treatment (Fig 1). PREMISE DEGREASER PLUS™ and ADHERE CPM™ have the highest mortality at concentrations of approximately 10% of the concentrated stock solution. PREMISE DEGREASER PLUS™ produced 94% resting spore mortality (Fig. 2) and ADHERE CPM™ 95.8% (Fig. 3). ADHERE CPM™ also had an 88.4% mortality at 5% concentration, which is by far the highest mortality of any disinfectant (except sodium hypochlorite) we have tested at that concentration.

Figure 1. Efficacy of Bleach (NaClO) in different concentrations on Clubroot resting spores in solution.

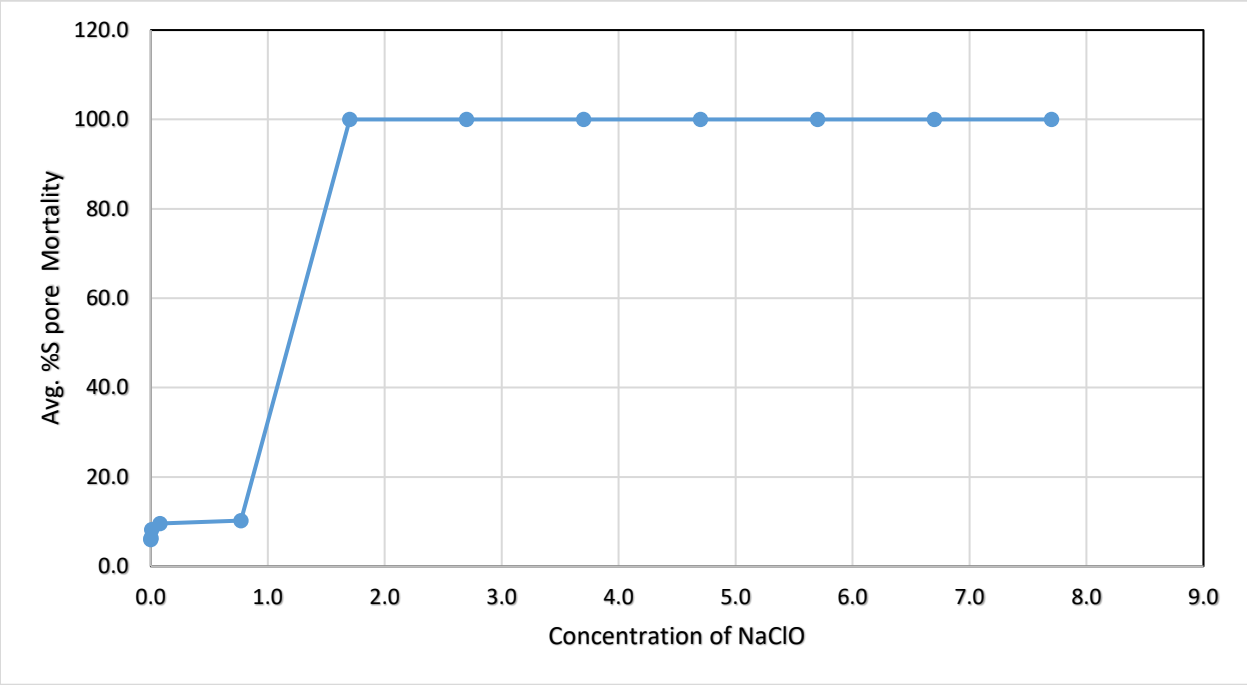

Figure 2. Efficacy of Premise Degreaser Plus in different concentrations on Clubroot resting spores in solution.

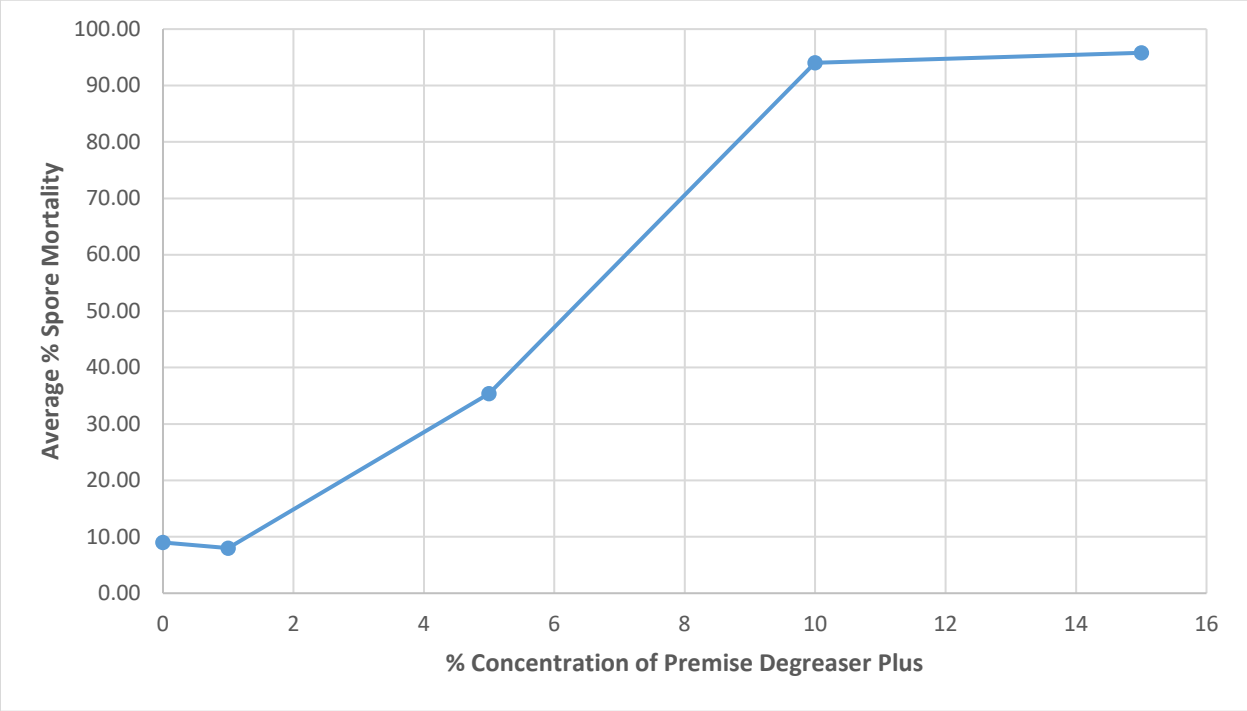

Figure 3. Efficacy of Adhere CPM in different concentrations on Clubroot resting spores in solution.