The effect of Zumsil and MicroSoil on the growth of *Sclerotinia sclerotiorum* and *Leptosphaeria maculans*

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A "poisoned plate" technique was used to determine effect of two products, Zumsil and MicroSoil, on the growth (*in vitro*) of the fungal plant pathogens *Sclerotinia sclerotiorum* and *Leptosphaeria maculans*.

Fungal isolates were obtained from existing collections at Charles Sturt University and represent isolations taken from canola crops in the Riverina region. Cultures were established on full strength potato dextrose agar (PDA) and incubated for 7-14 days to establish active mycelial growth, and in the case of *S. sclerotiorum*, fresh sclerotia.

Poisoned plate media was prepared using ½ strength PDA containing no product (control), a 1:50 final dilution and a 1:100 final dilution of Zumsil, or a 1:50 final dilution of MicroSoil. Plates were then inoculated with a $5mm^2$ plug of actively growing mycelium. For *S. sclerotiorum* individual sclerotia of approximately 2mm were also used as inoculum. All plates were incubated at 25°C in darkness. Each treatment was conducted in triplicate.

Plates were assessed 6 days post inoculation with visual examination and measurement of colony diameter. Each of the treatments resulted in inhibition of fungal colony growth compared to the no-product control (Figure 1 and 2; Table 1). Zumsil completely inhibited colony growth, while fungal colonies established on the MicroSoil plates, but failed to expand substantially.

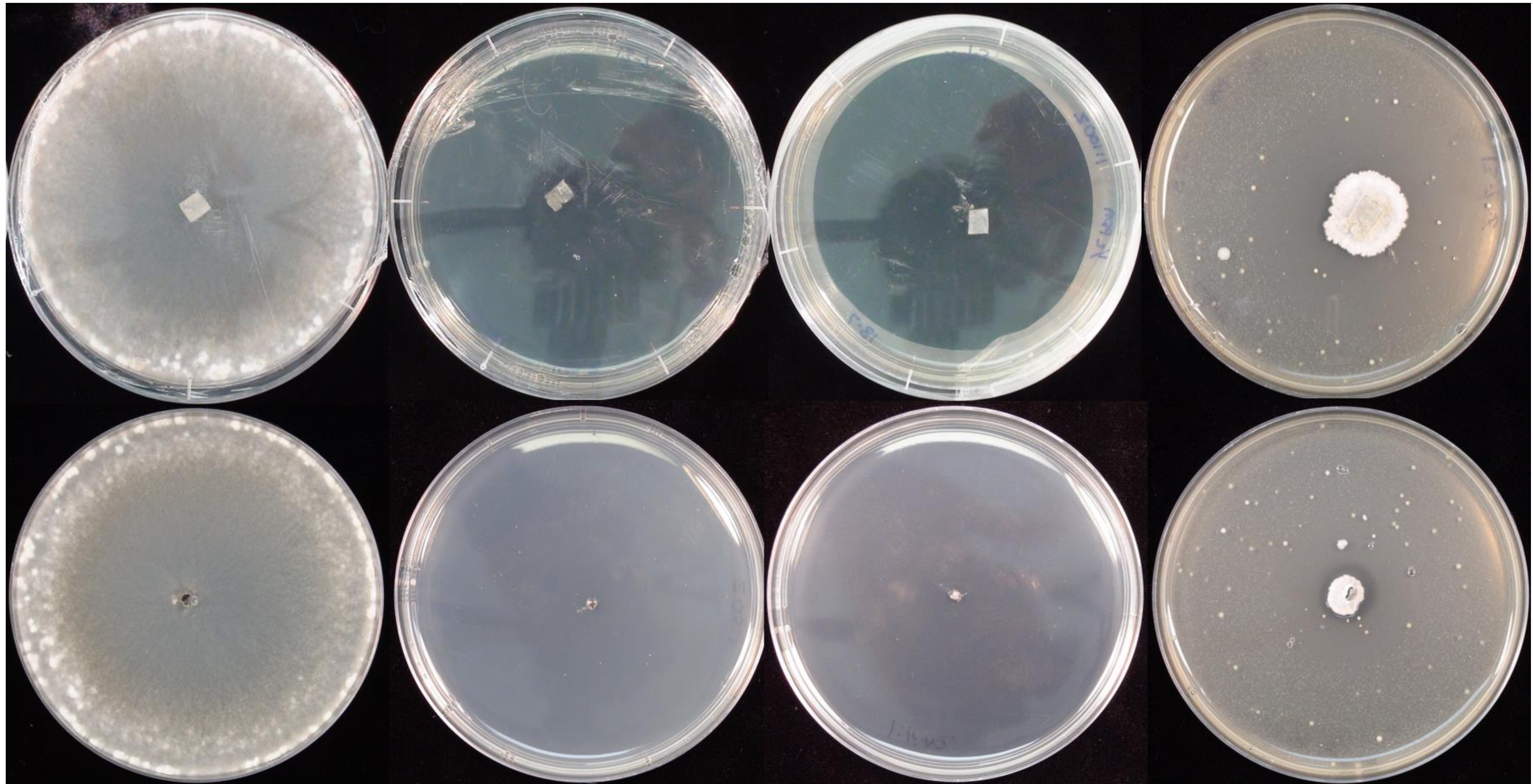

Figure 1: *Sclerotinia sclerotiorum* 6 days post inoculation on potato dextrose agar (PDA) infused with Zumsil or MicroSoil

Top row – inoculation with $5mm^2$ agar plug of active mycelium. Bottom row – inoculation with sclerotia.

From left – PDA only; PDA + 1:50 Zumsil; PDA + 1:100 Zumsil; PDA + 1:50 MicroSoil.

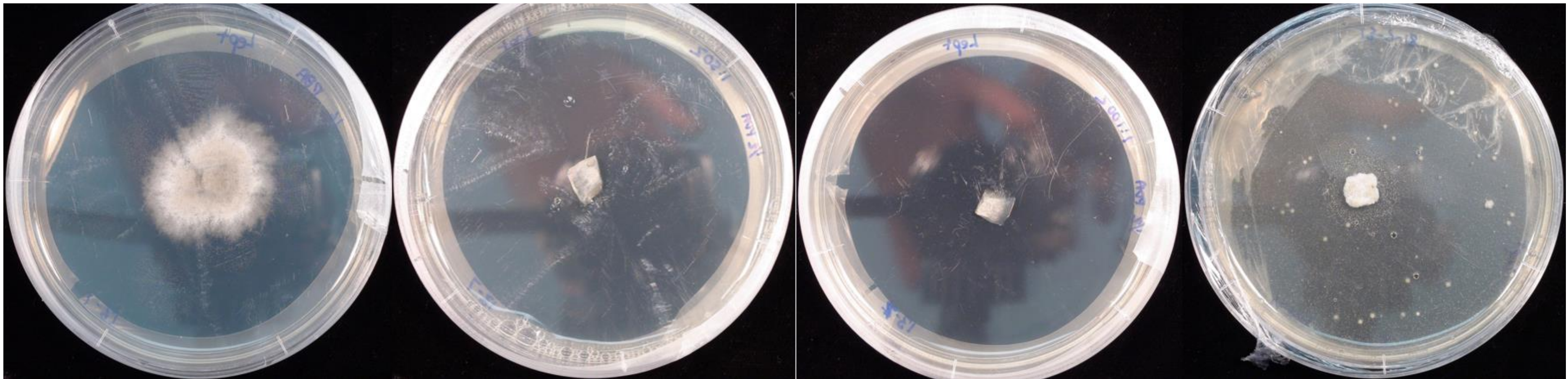

Figure 2: *Leptosphaeria maculans* 6 days post inoculation on potato dextrose agar (PDA) infused with Zumsil or MicroSoil

From left – PDA only; PDA + 1:50 Zumsil; PDA + 1:100 Zumsil; PDA + 1:50 MicroSoil.

Table 1: Diameter of colony growth (mm) for each species cultured on ½ strength PDA infused with either Zumsil or MicroSoil. Measurements were taken on two axis, minus the inoculum size (5mm for plug; 2mm for sclerotia).

Fungus	Treatment	Rep1	Rep2	Rep3	Average diameter (mm)
***Sclerotinia sclerotiorum* mycelia**	½ PDA	85	85	85	**85.0**
	½ PDA+1:50 Zumsil	0	0	0	**0**
	½ PDA+1:100 Zumsil	0	0	0	**0**
	½ PDA+1:50 MicroSoil	10	8	12	**10.0**
***Sclerotinia sclerotiorum* sclerotia**	½ PDA	87	87	87	**87.0**
	½ PDA+1:50 Zumsil	0	0	0	**0**
	½ PDA+1:100 Zumsil	>1	>1	>1	**>1**
	½ PDA+1:50 MicroSoil	10	12	10	**10.66**
***Leptosphaeria maculans* mycelia**	½ PDA	30	31	30	**30.33**
	½ PDA+1:50 Zumsil	0	0	0	**0**
	½ PDA+1:100 Zumsil	0	0	0	**0**
	½ PDA+1:50 MicroSoil	>1	>1	>1	**>1**

>1 represents emergence of new mycelia from the inoculation source however colony measurement was not possible.

General notes:

Sclerotinia

Zumsil at 1:50 inhibited growth of active mycelia and the emergence of mycelia from sclerotium. At the 1:100 concentration, active mycelia remained inhibited, however mycelia were observable from the sclerotium. These however did not progress to a measurable colony.

From the inoculation technique used there is potentially an effect of volatile production causing the inhibition, as active fungal mycelium were not in contact with the infused agar medium.

MicroSoil inhibited colony growth for both the active mycelium and sclerotia inoculation. A clear zone of inhibition was present around the fungal growth in which bacterial colonies were not present.

Leptosphaeria

As for the *Sclerotinia* active mycelium were inhibited at both concentrations of Zumsil examined. All cultures will be examined again on the 26th of July, due to the slower colony expansion dynamics of the fungus.

From the inoculation technique used there is potentially an effect of volatile production causing the inhibition, as active fungal mycelium were not in contact with the infused agar medium.

Microsoil inhibited colony growth with mycelia restricted to the agar plug used for inoculation. Unlike the case for *Sclerotinia*, no clear inhibition zone was observable. In this case, bacterial colonies appeared to have increased in density surrounding the fungal plug. An additional assessment will take place on 26th July.