

EXILVA MICROFIBRILLATED CELLULOSE IMPROVES THE RAINFASTNESS OF AGROCHEMICAL FORMULATIONS

Unpredictable weather often makes crop protection difficult in many places around the world. Even with good planning, unexpected rainfall may occur after active ingredient application. Rainfall occurring shortly after application might wash-off most of the applied product and active ingredients resulting in a significant drop in the efficiency of the agrochemical formulation. Adjuvants that improve the retention of the actives on the surface of the fruits and leaves of the plant can be added to increase the rainfastness and overall performance of a formulation. Rainfastness is defined as an intrinsic property of an active ingredient to resist the physical impact of rain droplets and the carry-out effect of water films. Exilva can be used as an adjuvant to enhance the rainfastness of active ingredients.

Exilva is a bio-based sustainable microfibrillated cellulose with high water holding capacity and high viscosity at rest. Exilva improves rheology and stability, as well as enhancing the structure in your product formulations. When dried, Exilva is an excellent film former. Exilva has been shown to allow homogeneous distribution of active ingredients on the leaf surface. Due to the above mentioned properties, Exilva can help retain and possibly bind active ingredients to the leaves, hence improving rainfastness.

The wash-off resistance of a pesticide formulation with and without Exilva was evaluated in the laboratory. Exilva F 01-L was used for these tests. The pesticide formulation was diluted according to the recommended product use dilution rate (1:1.5) either in pure water or in water containing already dispersed Exilva. Three different Exilva concentrations were evaluated. The final dilutions contained 0.02 wt.%, 0.10 wt.% and 0.50 wt.% Exilva cellulose fibril content. These dilutions were compared to the reference: the pesticide diluted in pure water.

The diluted pesticide blends are then dropped onto a Parafilm surface; a hydrophobic surface commonly used to simulate the surface of a leaf. All drops were left to dry for 24 h at 20 °C. The drops were then placed under a constant flow of running water and the times needed for the drops to disappear from the surface were recorded. The longer time required for the drop to wash-off, the better the rainfastness.

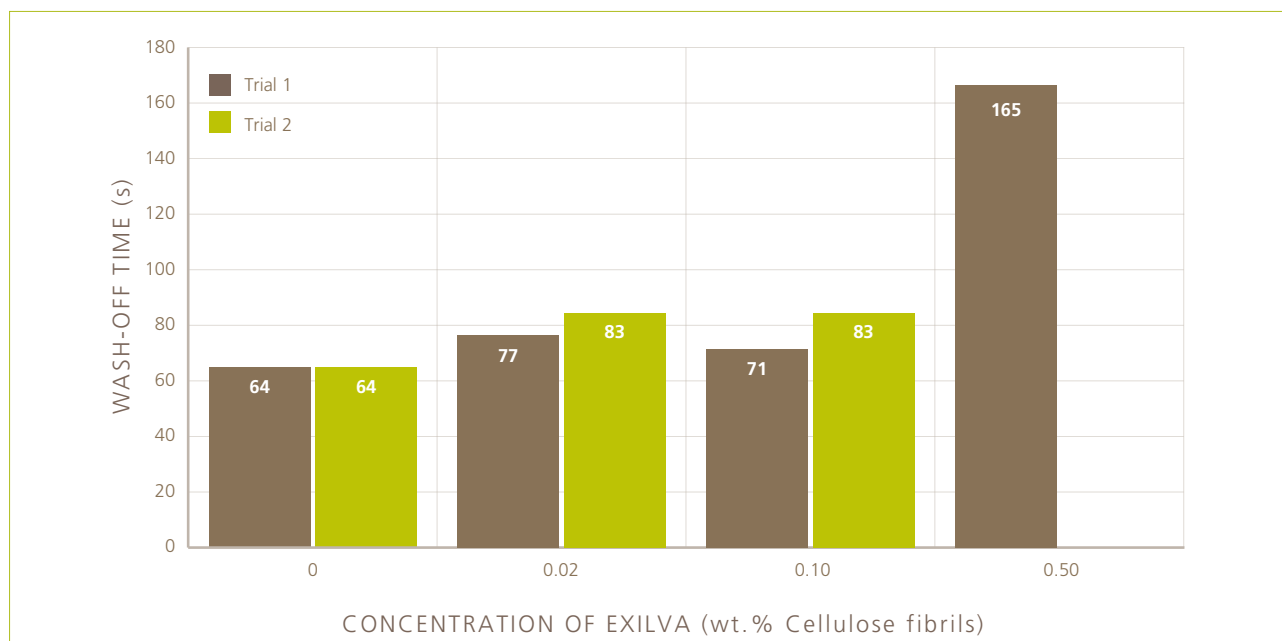


FIGURE 1: Time recorded to wash-off a drop of diluted pesticide, under a constant water flow, from a Parafilm surface as a function of the concentration of Exilva. The pesticide was diluted at a ratio of 1:1.5. Exilva concentration is expressed in weight percent (wt.%) of cellulose fibrils in the final pesticide dilution. The drop of diluted pesticide was left to dry for 24 h at 20 °C.

Figure 1 shows that the wash-off time recorded for the diluted pesticide increases with the increase in the Exilva concentration. All pesticide dilutions containing Exilva had a longer wash-off time than the reference pesticide dilution with no Exilva.

The longest wash-off time was recorded for the pesticide dilution containing the highest concentration of Exilva, 0.50 wt.% of cellulose fibrils. Little to no difference in the wash-off time was observed when changing the concentration of Exilva in the pesticide dilution from 0.02 wt.% to 0.10 wt.% cellulose fibrils. This implies that Exilva shows a tendency to increase the wash-off time of pesticide formulations and hence might improve the rainfastness. The minimum required concentration for this to occur is 0.02 wt.% cellulose fibrils in the pesticide dilution that is to be applied or sprayed on the crop.

RECOMMENDED MINIMUM CONCENTRATION OF EXILVA PRODUCTS WHEN EVALUATING RAINFASTNESS

Exilva products are commercially available either as a 2 wt.% suspension in water (Exilva F 01-L) or as a 10 wt.% paste (Exilva F 01-V). Table 1 shows the recommended minimum amount of Exilva products to add into the spray tank in order to reach the minimum recommended cellulose fibril content in the spray tank (0.02 wt% cellulose fibrils). The amounts are expressed as weight percent of the total and final weight of the formulation in the spray tank.

TABLE 1: Recommended minimum dosage of Exilva F 01-V and Exilva F 01-L to be added into the spray tank in order to incorporate the minimum concentration of 0.02 wt.% cellulose fibrils and observe an effect on rainfastness. The amounts are expressed as weight percent (wt.%) of the total and final weight of the formulation in the spray tank.

EXILVA PRODUCT NAME	WEIGHT PERCENT OF EXILVA PRODUCT IN THE SPRAY TANK (wt.%)
EXILVA F 01-V	0.2
EXILVA F 01-L	1.0

Note: it is important to calculate how much Exilva F 01-L or Exilva F 01-V is to be used in a pesticide concentrate in order to correctly incorporate 0.02 wt.% of cellulose fibrils into the final spray. Calculations should take into account the recommended use dilution rate of the pesticide.

CONCLUSION

- Exilva Products show potential in improving rainfastness of a pesticide formulation.
- The recommended minimum concentration of cellulose fibrils required to observe an impact on rainfastness is of 0.02 wt.% cellulose fibrils in the final spray tank.
- The type of surface and hence the type of leaves to be treated and the flow of water under which these tests are carried out will influence the results obtained in this study. Increasing the speed of the water flow will reduce the wash-off time for all the samples.

Disclaimer

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