VEGEPHY : Impact of additive extemporaneous vegetable oils combined with oligosaccharides on pesticide residues and their potential in crop protection

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The use of additive extemporaneous vegetable oils combined with oligosaccharides, was tested in combination with fungicide treatments to determine how they impact on pesticides residues and biological efficiency.

Impact of treatments on pesticides residues

The use of additive extemporaneous vegetable oils combined with oligosaccharides (guar, xanthan and CMC), was tested in combination with 2 fungicide treatments (07/05/2010 and 31/05/2010) on wheat at 158 L/ha with OPUS (epoxiconazole 125 g/l SC) to determine how they impact on pesticides residues.

The use of refined vegetable oil as an extemporaneous additive improve penetration into the plant. This was reflected in the higher level of epoxiconazole residues than in the treatment without additives (Fig. 1). The use of guar gum does not change the kinetic of epoxiconazole residues.

The combination of xanthan and CMC oligosaccharides with refined vegetable oils increase the persistence of epoxiconazole residues (Fig. 2). 21 days after treatment, the residue level is four to five times greater than with the treatment with no additives and three times greater than with the treatment using refined vegetable oil as an additive, with no oligosaccharides (Fig. 1 and 2). The kinetics of the CMC and xanthan-based blend is close to that observed when mineral oil is used as an extemporaneous additive.

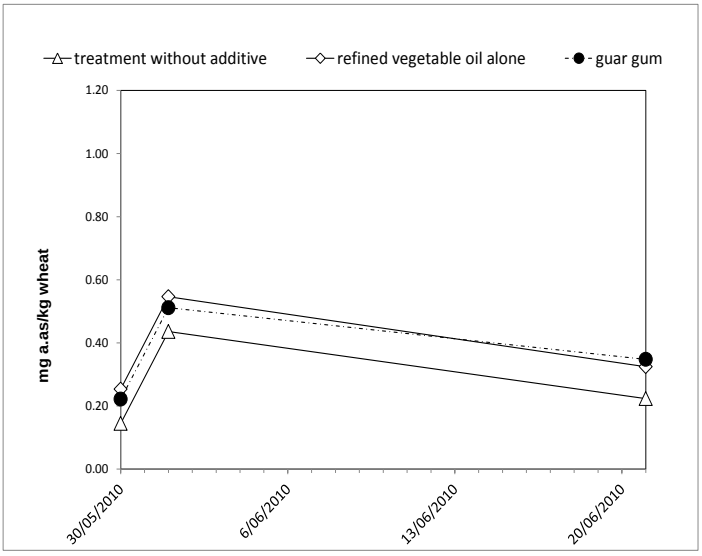

Fig. 1

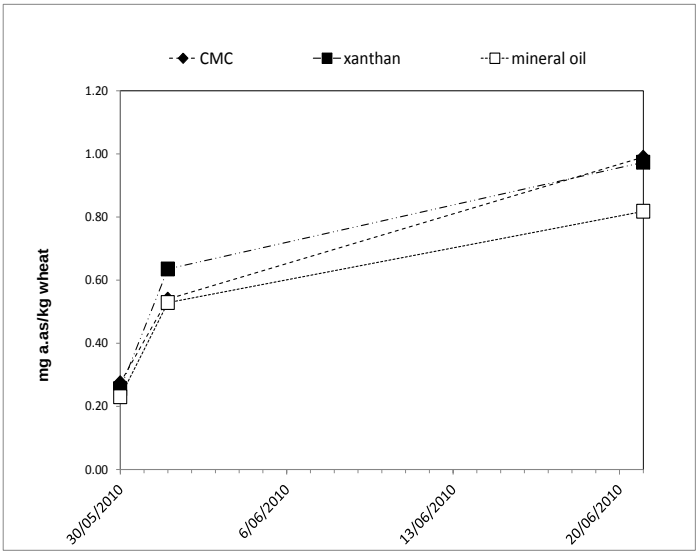

Fig. 2

Impact of treatments on biological efficiency

A fungicide treatment at 162 L/ha with BELL (boscalid 233 g/L + epoxiconazole 67 g/L SC) combining oligosaccharides with refined vegetable oils increase the persistence of epoxiconazole residues, but only guar gum and xanthan have a similar effect on boscalid. 49 days after treatment, the level of epoxiconazole residues observed in the treatments with refined vegetable oil with or without oligosaccharides is up to twice as high as in the treatment with no additives.

The results for septoria measured 35 days after treatment at the leaf canopy layer L2 show an efficacy of 41% for the treatment at 1.1 l/ha and 61% for the treatment at 1.5 l/ha. The success rates for the treatments are 44% for guar gum, 57% for the treatment using mineral oil as an extemporaneous additive, 58% for CMC, 62% for xanthan and 63% for refined vegetable oils without oligosaccharides. With the exception of the guar gum treatment, these treatments show a significant improvement in efficacy. No phytotoxicity was observed in any of the treatments tested and none of the treatments exceeded the relevant pesticide MRL.

Despite its mediocre efficacy, the guar gum treatment show epoxiconazole residue kinetics comparable with that observed in other treatments containing an oligosaccharide. The most likely explanation of this discrepancy is that the particular meteorological conditions in 2011 (heat and low rainfall) stimulated the refined vegetable oil-guar blend into forming a sort of coating on the leaf. Epoxiconazole and boscalid were then permanently trapped in this gel, rendering them unavailable for plant protection and preventing them from breaking down.

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