

## WHITEPAPER

# Setting a New Standard for Greenhouse Biosecurity

## Achieving Hospital-Grade Disinfection in Greenhouses with Intra Multi-Des GA



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As pest and disease pressure continues to rise, a proper clean-out round during crop rotation has become more important than ever. The declining availability of broad-spectrum pesticides has led fungal and bacterial diseases to take over, and the threat of viral outbreaks continues as well. Thorough and strategic crop rotation practices are becoming essential to safeguard crop health and production.

Intra Multi-Des GA is the ultimate disinfectant designed to have the best possible start of your new crop. Intra Multi-Des GA is based on 5 active ingredients, ensuring protection against bacteria, fungi and viruses with no risk of resistance. Additionally, 20% of wetting and penetration agents make sure the product effectively reaches and eliminates pathogens, even when they are hiding in uneven surfaces.

Previous laboratory studies have demonstrated the exceptional efficacy of Intra Multi-Des GA. To assess its efficacy in practice, several trials with Intra Multi-Des GA were conducted at tomato greenhouses in the Netherlands. Initially, Intra Multi-Des GA was introduced as a final step in their existing cleaning program. Lastly, the product was integrated as the sole disinfectant in the cleaning cycle.

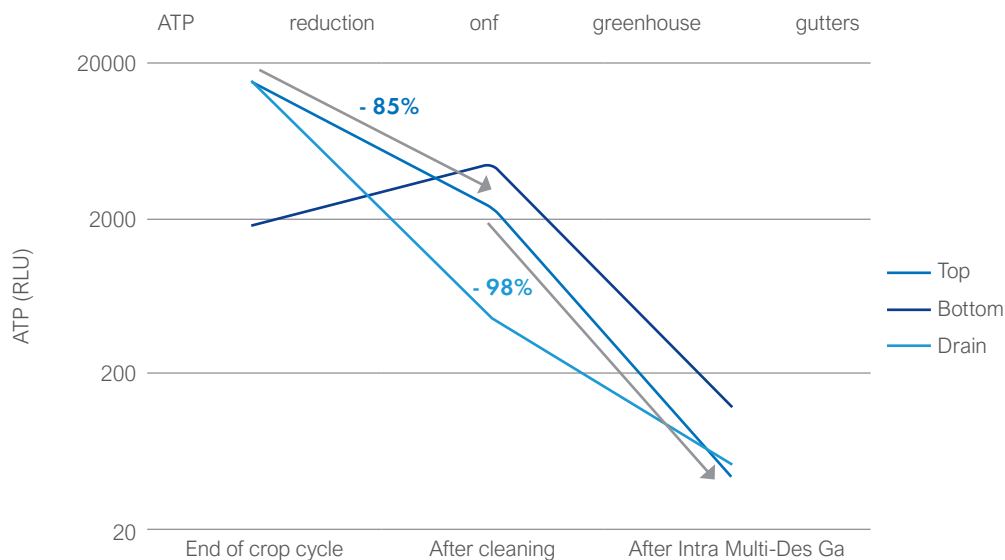
### Hospital-Grade disinfection

To assess the level of contamination, the Intra Hygiene Quick Scan was used. The Intra Hygiene Quick Scan is able to measure the amount of ATP on a surface,



Figure 1. Taking agar contact plates

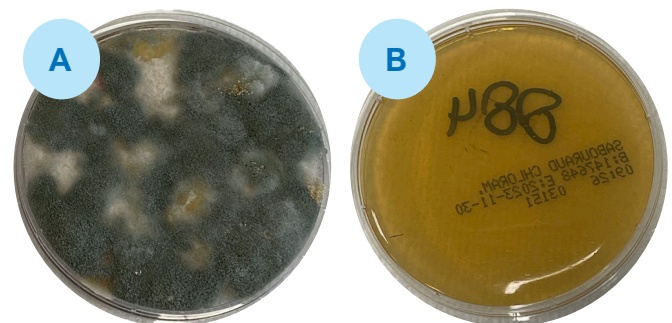
indicating the amount of organic pollution. Three time points during the cleanout round were included; after the last harvest, after cleaning and after Intra Multi-Des GA. Samples were taken from the gutters, comprising the top, bottom and drain of the gutters. Additionally, bacterial and fungi counts were assessed at the end of crop rotation using agar contact plates (Figure 1).



**Figure 2.** The average ATP reduction in relative light units (RLU) on the top, bottom and drain of gutters in a Dutch tomato greenhouse. On the x-axis the time of sampling during crop rotation is shown. In the graph, the ATP reduction on the top of the gutters from between timepoints is given as percentage (%).

The results demonstrate that Intra Multi-Des GA effectively eliminates bacteria and fungi on gutters. The highest reduction in ATP-levels occurred after applying Intra Multi-Des GA (**Figure 2**). The microbial counts confirm that nearly all bacteria and fungi were eliminated (**Figure 3 & Table 1**). All samples even meet the hospital-grade disinfection standard of 60 CFU/plate<sup>1</sup>. Before the clean-out, there were tomato plants present suffering from Tomato brown rugose fruit virus (ToBRFV). This was confirmed by PCR analysis at an independent ISO certified laboratory. Plant material from the new round was also sent in for PCR analysis, and the absence of ToBRFV was confirmed.

GUTTER		BACTERIA (CFU/PLATE)	FUNGI (CFU/PLATE)	ATP (RLU)
946.3	Top	8	5	40
946.3	Bottem	2	0	37
946.10	Top	0	0	59
946.10	Bottem	0	0	79
884.4	Top	0	0	50
884.4	Bottem	0	1	71



**Figure 3.** Fungal contact plates at the start of crop rotation (A) and after Intra Multi-Des GA (B).

**Table 1.** The number of bacterial and fungal colony-forming units (CFU) per contact plate sampled on the top and bottom of greenhouse gutters. For each location, also the ATP-value in relative light units (RLU) is given.

## Conclusion

Intra Multi-Des GA has consistently proven in numerous laboratory efficacy studies that it is effective to eliminate microorganisms in 10 minutes. Trials conducted in a tomato greenhouse confirm that this same level of efficacy is achieved in field conditions.

Therefore, Intra Multi-Des GA stands as the **number-one solution** for biosecurity in greenhouses.

