

## EFSA Calculator – Summary for worker exposure scenarios

The European Food Safety Authority (EFSA) has published a spreadsheet-based calculator as part of its Guidance document on the assessment of exposure to pesticides<sup>1</sup>. The calculator contains a model for estimation of worker exposure.

The exposure and pesticide parameters, and types of personal protective equipment, are summarized in the table below. Note that not all variables may be applicable to all scenarios.

Exposure model	
<p style="text-align: center;"><b>Systemic dermal exposure</b> = <math>\frac{AR \times DFR \times TC \times T \times A \times (x \text{ MAF})}{1000 \times bw}</math></p> <p><i>with:</i>            Systemic dermal exposure (mg a.i./kg bw/day)            AR = application rate (kg a.i./ha)            DFR = dislodgeable foliar residue (µg/cm<sup>2</sup> per kg a.i./ha applied)            TC = transfer coefficient (cm<sup>2</sup>/hr)            T = work rate (rh/day)            A = absorption fraction (%)            MAF = multiple application factor (-) [if more than one pesticide treatment]            bw = body weight (kg)</p>	<p style="text-align: center;"><b>Systemic inhalation exposure</b> = <math>\frac{AR \times TSF \times T \times A}{1000 \times bw}</math></p> <p><i>with:</i>            Systemic inhalation exposure (mg a.i./kg bw/day)            AR = application rate (kg a.i./ha)            TSF = task specific factor (ha/hr x 10<sup>-3</sup>)            T = work rate (hr/day)            A = absorption fraction (%)            bw = body weight (kg)</p>
Exposure parameters / scenarios	
Dislodgeable foliar residue (DFR)	Pesticide & crop & climate specific Default initial DFR = 3 µg/cm <sup>2</sup> per kg a.i./ha applied
Transfer coefficient (TC) (≈ work scenario)	Various crops can be selected in the model. Crops are linked to specific worker tasks and associated TC values.
For inhalation exposure: Task Specific Factor (TSF)	Various tasks can be selected in the model, which are linked to TSFs. All TSFs in the model are based on working in ornamentals in greenhouses.
Work rate	8 hours per day for harvesting, cutting, sorting etc. 2 hours per day for inspection

<sup>1</sup> Guidance on the assessment of exposure of operators, workers, residents and bystanders in risk assessment for plant protection products. European Food Safety Authority. EFSA Journal 2014; 12(10): 3874. [\[http://www.efsa.europa.eu/en/efsajournal/pub/3874.htm\]](http://www.efsa.europa.eu/en/efsajournal/pub/3874.htm)

	Pesticide absorption fraction		Dermal = pesticide product specific (default = 100%) Inhalation = 100%
	Re-entry time		Dermal: Immediately after the pesticide deposit has dried Inhalation (greenhouse): 8 hours after application
<b>PPE during work activity</b>			<b>Exposure reduction</b>
	Clothing	No clothing (bare skin) = potential exposure	--
		Work wear (arms, body and legs covered) & bare hands	Variable; depends on crop and activity
		Work wear (arms, body and legs covered) & bare hands	Variable; depends on crop and activity
	Respiratory protection	None	--
<b>Reference value non acutely toxic active substances (RVNAS)</b>			Acceptable Operator Exposure Level (AOEL)
<b>Body weight</b>			60 kg (default)
<b>Exposure routes</b>			Dermal & inhalation