

Residue analysis of Azadirachtin A in/on fruits, vegetables & herbs



Residue analysis of foodstuff like fruits, vegetables and herbs is an important issue in terms of consumer protection and therefore for registration of a plant protecting product.

Azadirachtin A (AzA) is the analytical lead compound which is used for clarification of the residue situation in Neem products.

Table 1: Residues in fruits and vegetables

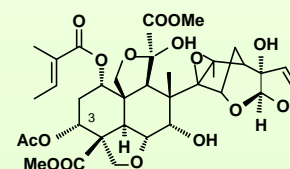
Matrix	LOQ ¹⁾	AzA concentration ²⁾	DT ₅₀ ³⁾
	[mg AzA / kg]	[mg AzA / kg]	[d]
Tomato	0.10	< 0.043	3
Strawberry	0.02	0.032	4.9
Peach	0.02	0.049	2.5
Cucumber (greenhouse)	0.02	0.024	2.5
Cucumber (field)	0.02	< LOQ	-
Cabbage	0.02	0.034	1.8
Orange (peel)	0.02	0.055	7.6
Orange (pulp)	0.02	< LOQ	-
Spinach	0.10	1.01	2
Apple	0.0	< 0.07	1
Potato ⁴⁾	0.1	< 0.001	-
Head lettuce	0.02	0.13	1.1
Cherry	0.02	0.26	9.4

¹⁾ LOQ: limit of quantification

²⁾ concentration after recommended application

³⁾ Disappearance time, where 50% is degraded

⁴⁾ evaluation of the LOQ according to the analytical method



Azadirachtin A

For residue analysis the crops were generally treated 3 times in weekly intervals with a 0.3 to 0.5% NeemAzal-T/S spraying solution in water. First sampling was carried out after drying of the spray film.

Table 2: Residues in herbs ¹⁾

Matrix		AzA concentration ²⁾	DT ₅₀ ³⁾
		[mg AzA / kg]	[d]
Dill	fresh	0.70	0.5
	dried	1.38	0.5
Savory	fresh	1.43	0.5
	dried	5.39	0.9
Parsley	fresh	2.75	2.3
Fennel seeds	dried	< LOQ	-
Lemon Balm	dried	6.9	1.3
	fresh	0.81	0.8
Basil	fresh	0.43	0.6
Sage	fresh	1.0	4.0

¹⁾ the limit of quantification (LOQ) for all herbs is 0,02 mg AzA / kg

²⁾ concentration after recommended application

³⁾ Disappearance time, where 50% is degraded

As some herbs are offered in fresh an dry conditions both products were analysed. During the drying process the AzA concentrations increase because of the loss of water (see table 2).

Conclusion:

The following waiting periods on the basis of the residue data are proposed:

- Fruit and fruity vegetables: no waiting period
- Leafy vegetables and herbs: 3 to 7 days, depending on the crop

The concentrations of Azadirachtin A directly after application are depending on the consistency of the crop. Roughly the crops can be classified into two groups:

1. Fruity vegetables and fruits, small surface to the mass ratio (e.g. tomato, apple, see table 1).
2. Leafy vegetables and herbs, large surface to the mass ratio. (e.g. spinach).



Neem-tree and seeds



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