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Successful Marketing of NeemAzal-T/S for the Biological Control of Insect Pests

Hubertus Kleeberg, Edmund Hummel, Beate Ruch

Trifolio-M GmbH, Lahnau/Germany

Contents:

- Characteristics of Neem-Extract: NeemAzal technical and its formulations
- Residue data
- Registrations
- Efficacies and potential markets

Neem Extraction Process yields NeemAzal technical

Neem fruit
(100 kg)

Neem seeds
(20 kg)

Seed kernels
(10 kg)

Extraction Process

NeemAzal ®
(0,1 kg)
34% Azadirachtin A

Neem oil
(4 kg)

Neem cake
(5 kg)

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Developmental cost of Biological Plant Protection Products (estimated)

Years	1	2	3	4	5	6	7	8	9	10	million Euro
Active ingredient	Extraction/Fermentation										2
Chemistry		Lab-scale									
			Process development								
Formulation									Production*		
		Development									
					Development of Packing						
									Production*		
Research	Screening Lab/Greenhouse								Registration		2
Biology		Small plot trials									
Development			Field trials								
DEGRADATION AND RESIDUES			plant, animal, soil, water, air						Registration		8
TOXICOLOGY			acute u. chronic toxicity, cancerogenicity, mutagenicity, teratogenicity, reproduction								
ECO-TOXICOLOGY			algae, daphnia, fish, birds, micro-organisms, bees, beneficials						Registration		
MILLION EURO	**2**		**10**								**12**
NUMBER OF SUBSTANCES	**5 - 10**		**1**								

* without cost for production plants

Composition NeemAzal

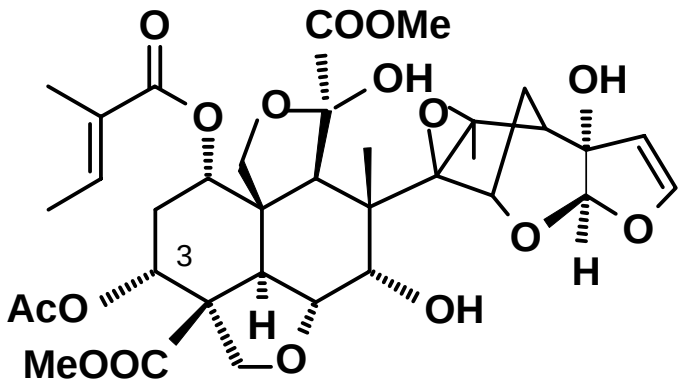
Substance	av. content in NeemAzal By weight (%)
Azadirachtins:	
Azadirachtin A	34
Azadirachtin B	approx. 5.5
Azadirachtin D	aprrox. 2.1
Azadirachtin E	≤ 1
Azadirachtin F	≤ 1
Azadirachtin G	≤ 1
Azadirachtin H	approx. 2.3
Azadirachtin I	approx. 0.8
Azadirachtin K and other Azadirachtins	≤ 2
Azadirachtinin	approx. 2
Sum of Azadirachtins:	**51,7**

Composition of the formulation

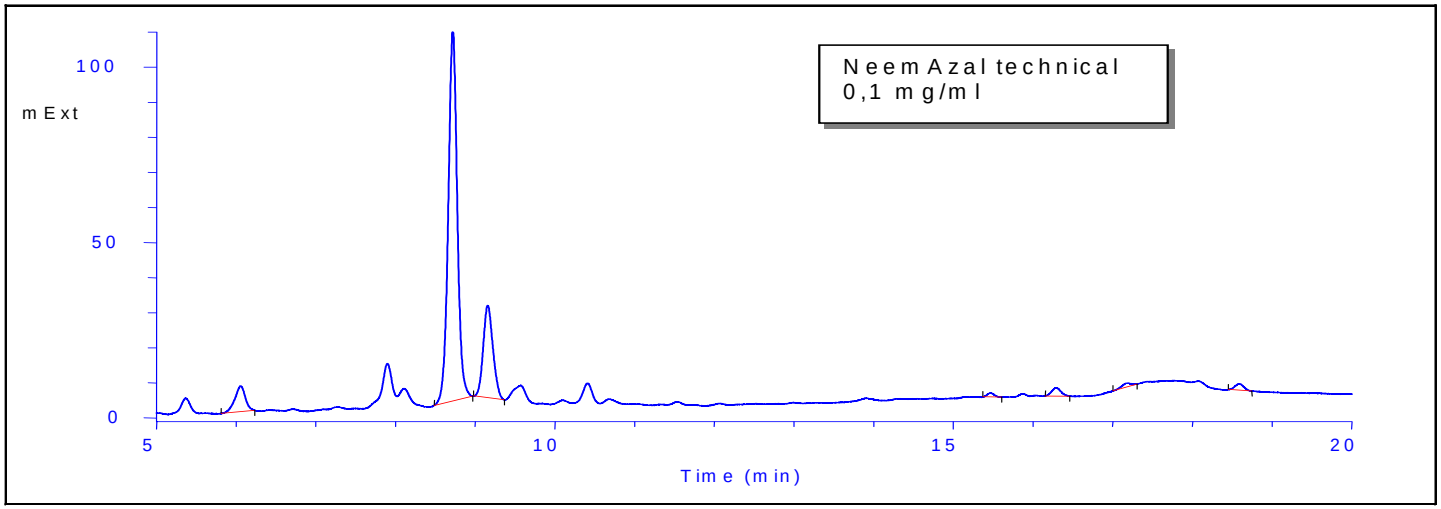
NeemAzal-T/S (ec):

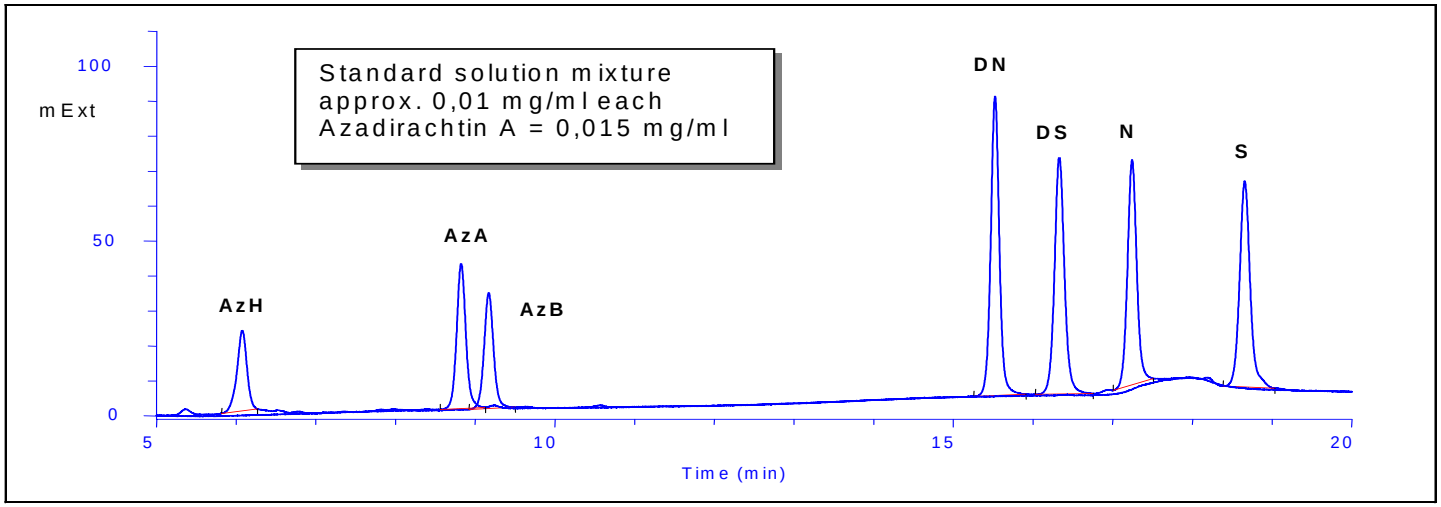
- **Active ingredient (a.i.):**
  - **Standardised natural Neem extract (approx. 3% NeemAzal technical)**
  - **Containing Azadirachtins and other limonoids**

- **Analytical lead compound:**
  - **Azadirachtin A (AzA) standardised to 1%**
    - ***1H,7H-Naphtho[1,8-bc:4,4a-c´]difuran-5,10a(8H)-dicarbocylic acid,10-(acetyloxy)octahydro-3,5-dihydroxy-4-methyl-8-[(2-methyl-1-oxo-2-butenyl)oxy]-4-(3a,6a,7,7a-tetrahydro-6a-hydroxy-7a-methyl-2,7-methanofuro[2,3-b]oxireno[e]oxepin-1a(2H)-yl)-dimethylester,[2aR-[2aa, 3b, 4b(1aR*, 2S*, 3aS*, 6aS*, 7S*, 7aS*), 4ab, 5a, 7aS*, 8b(E), 10b, 10aa, 10bb)]***



Analytics


Neem Azal technical
0,1 mg/ml
mExt
100
50
0
5
10
15
20
Time (min)


Standard solution mixture
approx. 0,01 mg/ml each
Azadirachtin A = 0,015 mg/ml
mExt
100
50
0
AzH
AzA
AzB
DN
DS
N
S
5
10
15
20
Time (min)

Mode of action & target pests: NeemAzal-T/S (ec)

Effects the hormonal system of insects

1. feeding inhibition
2. moulting inhibition
3. fertility reduction

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

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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] [mg AzA / kg]	AzA concentration [2] [mg AzA / kg]	DT_{50} [3] [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

Table 2: Residues in herbs [1]

Matrix		AzA concentration [2] [mg AzA / kg]	DT_{50} [3] [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

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.

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).

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

Neem-tree and seeds

„ABIM-Lucerne: 23./24. Oct. 2006

Results from Efficacy Trials with NeemAzal-T/S

In total more than 850 efficacy test reports from different climatic regions are currently available for more than 150 pest species!

(see our home page: www.NeemAzal.de)

These results are a necessary prerequisite for convincing discussions with potential users and marketing partners!

Mode of action & target pests: NeemAzal-T/S (ec)

Especially sucking and biting insects as well as mites

- aphids
- caterpillars
- white flies
- thrips
- miners
- beetles, and
- mites

Registrations of NeemAzal-T/S

Country	Registration No and date
India (EID)	CIR-22,388/95 dated 22.01.1996
Sri Lanka (EID)	947 dated 01.01.1996
Germany	4436-00 dated 18.10.1998
Austria	2699-01 dated 30.05.2000 (valid until 2008-12-31)
Switzerland	W 5351 dated 1996/06.03.2000
USA (EID)	EPA 71908-1 dated 21.04.2000
New Zealand	5412 dated 21.12.2000
Turkey	3792 dated 20.06.2000 (valid until 2010)
Georgia	459 dated 4.08.2000 (valid 5 years)
Bulgaria	951 dated 03.05.2000
Estonia	0211 dated 12.10.2001
Kingd. of Saudi Arabia	356 159 241 dated 16.07.2003 (valid 5 years)
The Netherlands	12455 N dated 20.06.2003
Italy	11561 dated 20.01.2003
Slovenia	32702293/02 dated 15.04.2003
Lithuania	02401/02 and 07-368 dated 02.05.2003
Greece	119157 of 24.Dec.2003 valid till 24.12.2007
Latvia	0241 dated 14 Oct. 2004 valid till 14.10.2014
Luxemburg	LO1626-103 9 July 2004 valid till 31. Dec. 2008
China	NA technical Nov. 2005, Formulation 0.3% May 2006

EU: according to 91/414/EEC, & article 4(2)1869/2000 EC biocide notification No. N611

Different countries like Russia, Iran:
Registration proceedure is making progress

Brasil, France and others:
submitted since some or many years!!!!

Tox., eco-tox., efficacies, Analysis etc. see:
www.NeemAzal.de

After formally correct documentation and submission of these results and some patience you may get authorisation and think about putting the first product into containers

NeemAzal®-T/S is usually packed in containers of:

1 L, 2.5 L, 5 L, 25 L and/or 200 L

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