US EPA ARCHIVE DOCUMENT

Date: May 16, 2005

SUBJECT: **FEE**: Product Chemistry Review of Rotam Abamectin Technical

FROM: Debra Rate
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Technical Review Branch/RD (7505C)

TO: RM 7 John Hebert / Thomas Harris
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DP BARCODE: D310856
EPA REG. NO.: 81598-R
PRODUCT: Rotam Abamectin Technical
PCC : 122804
REGISTRANT: Rotam Ltd.
USE: Insecticide / Rodenticide

INTRODUCTION:

The registrant has submitted a Confidential Statement of Formula (CSF) for basic formulation (dated 21/MAR/2005). The basic CSF is for a production facility in Chai Wan, Hong Kong. The registrant has claimed that proposed product is substantially similar to EPA Reg. No. 100-895. The 830 Series Subgroup A and B data have been submitted under the MRID Nos. 463850-01, 463850-02, 463850-03, 463850-05, 463850-11, 463967-01, and 465425-01. The Technical Review Branch (TRB) has been asked to evaluate the new submission and the similarity with the EPA Reg. No. 100-895 to determine if the submitted data and studies will support the registration of the subject product.

SUMMARY OF FINDINGS:

1. The manufacturing site where this product is to be produced by Rotam Ltd. is located at 7F, Cheung Tat Centre, 18 Cheung Lee Street, Chai Wan, Hong Kong. The 5 batch analysis was performed on test substances of the subject product produced by Rotam Ltd.

2. The registrant has submitted a basic formulation CSF (dated 21/MAR/2005) for Rotam Abamectin Technical. The nominal concentration (94.0%) of the AI (abamectin) concurs with the product label claim nominal concentration of 94.0%. The product chemistry data submitted corresponding to guideline reference 830.1550 (product identity & composition) and 830.1750 (certified limits) satisfy the data requirements of 40CFR§158.155 and 158.175, respectively.

3. The subject product is produced in an integrated system through a continuous process. The description submitted in MRID No. 463850-01 detailing the production and manufacturing processes corresponding to guidelines 830.1600 and 830.1620 satisfy the requirements for 40CFR§158.160 and 158.162.

4. The registrant has provided an adequate explanation of the impurities that are known to be associated with the subject product and potential impurities of the subject product. This submitted data corresponding to guideline 830.1670 (discussion on the formation of impurities) satisfy the data requirements of 40CFR§158.167. The preliminary 5-batch analysis provided by the registrant concurs with the data the registrant presented on the impurities. [MRID Nos. 463850-01]

5. The product chemistry data submitted corresponding to the guideline reference 830.1700 (preliminary analysis) satisfy the data requirements for 40CFR§158.170. The % AI and the impurities were determined for the test substance. See the Confidential Appendix for details. [MRID No. 463850-01]

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6. The data submitted corresponding to reference guideline 830.1800 (Enforcement Analytical Method) satisfies the data requirements of 40CFR§158.180. The method of analysis of the active ingredient (AI) is high-performance liquid chromatography (HPLC) with UV detection (254 nm). The method was validated for precision, linearity, and accuracy. See Confidential Appendix for details. [MRID No. 463850-01]

7. The basic formulation of the subject product is not substantially similar from a product chemistry point of view to EPA Reg. No. 100-895 for the following reasons:

(a). Although the % nominal concentration of the active ingredient of the subject product falls within the certified limits of the cited technical (EPA Reg. No. 100-895) it does not come within the Agency standards of limits set forth by 40CFR§158.175(b)(2).

(b). The reported pH values are quite varied.

(c). The impurity profiles of the subject and cited products are substantially different.

8. The data corresponding to 830 Series Subgroup B (physical-chemical properties) are acceptable and satisfy the data requirements for 40CFR§158.190.

CONCLUSIONS:

TRB has reviewed the product chemistry data submitted for Rotam Abamectin Technical and has concluded that:

1. All of the product chemistry data submitted corresponding to 830 Series Subgroup A satisfies the data requirements of 40CFR§158.155.

2. The data submitted corresponding to reference guidelines 830 Series Subgroup B data are acceptable and satisfy the data requirements of 40CFR§158.190.

3. The CSF for basic formulation (dated 21/MAR/2005) is acceptable.

4. The TRB has concluded that from a product chemistry point of view, the subject product is not substantially similar to the EPA Reg. No. 100-895. See finding # 7.

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Common Name: Abamectin

Chemical name: CAS: 5-O-demethyl-avermectin A1a mixture with 5-O-demethyl-25-de(1-methylpropyl)-25-(1-methylethyl)avermectin A1a

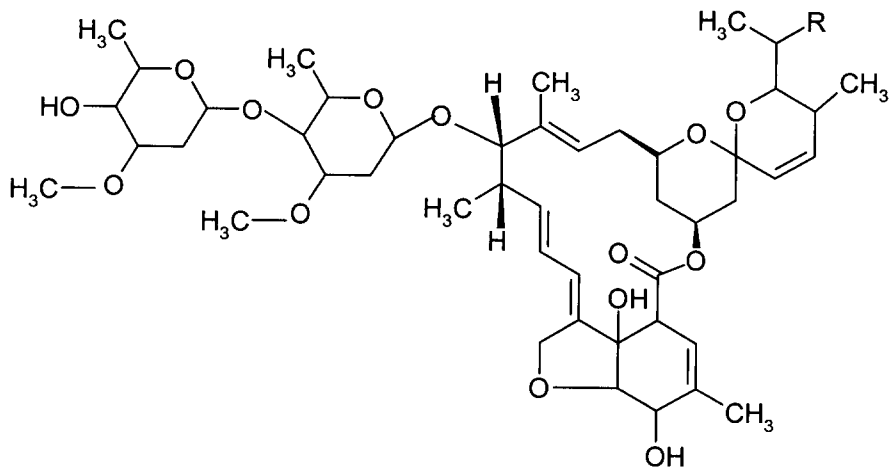
CAS No.: 71751-41-2

PC Code No.: 122804

Empirical formula: B1a: 873.1: $C_{48}H_{72}O_{14}$
B1b: 860.1: $C_{47}H_{70}O_{14}$

Molecular Weight: B1a: 873.1
B1b: 860.1

Structural formula:



Abamectin B1a (80%): R = $CHCH_3$

Abamectin B1b (20%): R = CH_3

ATTACHMENT II

REVIEW OF PRODUCT CHEMISTRY, OPPTS 830 SERIES

Chemical Name (IUPAC, CAS)	Abamectin
Chemical Number (CAS; PC Code)	CAS No. 71751-41-2 PC Code:122804
Registration/Symbol No.	81598-R
Type of Product (T, MP, EP)	94.0 % TGAI
DP Barcode	D310856
Reviewer	Debra Rate
Branch Chief	Deborah McCall

Table 1: Manufacturing and Impurity Data for the Rotam Abamectin Technical.

GLN	Requirement	MRID	Status[1]	Details and/or Deficiency[2]
830.1550	Product Identity & Disclosure of Ingredients	CSF(dated 21/MAR/2005) 463850-01	A	The nominal concentration of the AI (94.0%) concurs with the product label claim and is supported by the 5 batch analyses to be with in the certified limits.
830.1600 830.1620	Starting Materials & Manufacturing Process	463850-01	A	The registrant has provided specifications of the starting materials and common commodities that are used to produce the subject product. The subject product is produced in an integrated system through a semi-continuous, batch process.
830.1670	Discussion of Impurities	463850-01	A	An adequate explanation of the known and potential impurities found in the technical product has been provided. Known impurities of toxic concern are also listed on the CSF.
830.1700	Preliminary Analysis	463850-02	A	The registrant has provided 5 batch analysis for the TGAI.
830.1750	Certification of Limits	CSF(dated 21/MAR/2005) 463850-01	A	The registrant based the upper certified limits on the results obtained from the 5 batch analyses, the manufacturing history, and the standards set forth in 40CFR§158.175(b)(2).
830.1800	Analytical Methods	463850-03	A	Method was submitted for determination of the %AI in the product. HPLC / UV (254nm) was used for the %AI determination. The method was validated for precision, linearity and accuracy.

[1] A = Acceptable; N = Unacceptable (see Deficiency); G = data gap; U = Upgradable data; N/A = Not Applicable.

Table 2: Physical and Chemical Properties of Rotam Abamectin Technical

GLN	Requirement	MRID	Status	Result or Deficiency
830.6302	Color	463967-01	A	Pale Yellow
830.6303	Physical state	463967-01	A	Crystalline Powder

Table 2: Physical and Chemical Properties of Rotam Abamectin Technical

GLN	Requirement	MRID	Status	Result or Deficiency
830.6304	Odor	463967-01	A	Odorless
830.6313	Stability to normal and elevated temperatures, metals, and metal ions	463967-01	A	Half-Life = 35.6 days when exposed to air and fluorescent lighting at ambient temperatures.
830.7000	pH	463850-05	A	pH = 6 (1% w/v suspension)
830.7050	UV/Visible Absorption	463967-01	A	245.3 nm
830.7200	Melting point	463967-01	A	159.0°C with decomposition
830.7220	Boiling point	463967-01	A	Not determinable, decomposes on melting above 145°C. Method: Siwoloboff method.
830.7300	Relative Density	463967-01	A	1.137 g/ml @ 20 ^{0}C
830.7370	Dissociation constants in water	465425-01	A	The dissociation constant of the TGAI was analyzed through titration methodology by measuring the direct pH in aqueous solution at 20°C. It was no possible to determine the dissociation constant of the TGAI in water, since no equivalent titration point was obtained with HCl or NaOH solutions.
830.7550	Partition coefficient	463967-01	A	P_{ow} = 3.35 x 10^6 @ 25 ^{0}C
830.7840	Water solubility:	463967-01	A	5.3 ± 1 mg/L
830.7950	Vapor pressure	463967-01	A	6.3 X 10^{-7} Pa @ 25 ^{0}C

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830.1800. Enforcement analytical method: (MRID No. 463850-03)

Analytical Method for Determination of the% abamectin in the subject product. [MRID No. 463850-03]

Reagents and Standards:
Methanol, HPLC grade
Double distilled water
Abamectin, known purity
Dibuthylphalate, reagent grade

Apparatus and Operating Conditions:

Chromatograph:	HP 1050 equipped with quaternary pump, on-line vacuum degasser, autosampler, a column heater, and UV detector.
Column:	Spherisorb ODS2, 125 X 4 mm, 5 μm film thickness.
Wavelength:	254 nm
Flow rate:	1.0 ml / min
Injection Volume:	5 – 20 μl
Solvent Program:	Isochratic
Stop Time:	15.0 minutes
Oven Temperature:	30°C
Mobile Phase:	80% methanol / 20% water. The mobile phase should be filtered prior to use using a 0.2 μm membrane filter.

Retention Times:

Abamectin B1a:	14.7 – 15.2 min
Abamectin B1b:	11.6 – 12.0 min

DCR for MRID # 46385001-03, 05711

Page_____ is not included in this copy.

Pages 7 through 11 are not included.

The material not included contains the following type of information:

_____ Identity of product inert ingredients.

_____ Identity of product impurities.

✓ Description of the product manufacturing process.

_____ Description of quality control procedures.

_____ Identity of the source of product ingredients.

_____ Sales or other commercial/financial information.

_____ A draft product label.

_____ The product confidential statement of formula.

_____ Information about a pending registration action.

_____ FIFRA registration data.

_____ The document is a duplicate of page(s) _____.

_____ The document is not responsive to the request.

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.