



Evaluation Report for Category B, Subcategory 4.1 Application

Application Number: 2007-0305
Application: B.4.1 (Conversion to full registration without consultation)
Product: Vectolex WSP Biological Larvicide
Registration Number: 28009
Active ingredients (a.i.): *Bacillus sphaericus* (BTP)
PMRA Document Number : 1836219

Purpose of Application

The purpose of these applications was to convert the registration of Vectolex Technical Powder (Registration Number 28006), Vectolex WDG Biological Larvicide (Registration Number 28007), Vectolex CG Biological Larvicide (Registration Number 28008) and Vectolex WSP Biological Larvicide (Registration Number 28009) from conditional to full. These products were granted conditional registration in Canada and the detailed review supporting the conditional registration can be found in Regulatory Note REG2006-02, *Bacillus sphaericus* Strain 2362.

This document will present the evaluation of the information provided in support of the conversion of the registration of these products from conditional to full.

Chemistry Assessment

A chemistry assessment was not required for this application.

Health Assessments

A health assessment was not required for this application.

Environmental Assessment

Environmental effect studies previously submitted for the initial registration decision, suggested that *B. sphaericus* is of low toxicity to birds, mammals, honey bees, fish, chironomid larvae, mysid shrimp and unicellular algae and slightly toxic to amphipods. Some of these studies, however, suggested that *B. sphaericus* strain 2362 may be toxic to some terrestrial arthropods from dietary exposure at high concentrations. Shell deposition in oysters was also affected at high concentrations. Oysters may not feed at levels expected from application at the maximum rate. Consequently the PMRA requested replacement studies to properly define the host range of non-target terrestrial species, and to address the observed sublethal effects (disrupted feeding, body weight gain, etc.) in oysters.

Waiver rationales were submitted instead of the replacement studies. The rationales to waive the required testing were based on a reduction of the application rate as well as published literature, which indicated no adverse effects to these non-target organisms at the anticipated levels. Based on this information, the risk to non-target organisms from the maximum proposed rate of VectoLex CG Biological Larvicide, VectoLex WDG Biological Larvicide, and VectoLex WSP Biological Larvicide is expected to be minimal.

Value Assessment

A value assessment was not required for this application.

Conclusion

To mitigate the risk to non-target organisms, the labels will restrict the number of applications to 6 per treatment site per season, and increase the interval between applications from 1 week to 2 weeks.

The key risk-reduction measures that are required on the labels of VectoLex CG Biological Larvicide, VectoLex WDG Biological Larvicide, and VectoLex WSP Biological Larvicide addresses the potential risks identified in the initial environmental assessment.

The PMRA has completed an assessment of the submitted data and is able to support the full registration of Vectolex Technical Powder, Vectolex WDG Biological Larvicide, Vectolex CG Biological Larvicide and Vectolex WSP Biological Larvicide.

References

- 1370763 Broadwell and Baumann, 1987, Proteolysis in the Gut of Mosquito Larvae Results in Further Activation of the *Bacillus sphaericus* Toxin, J. Appl. Env. Microbiology. 53(6): 1333-1337, DACO: M9.6
- 1370764 Davidson, E.W., 1988, Variation in Binding of *Bacillus sphaericus* Toxin and Wheat Germ Agglutinin to Larval Midgut Cells of Six Species of Mosquitoes, J. Invertebrate Pathology. 53: 251-259, DACO: M9.6
- 1370765 Davidson, E.W. et al., 1987, Binding of the *Bacillus sphaericus* mosquito larvicidal toxin to cultured insect cells, Can. J. Microbiol. 33: 982-989, DACO: M9.6
- 1370766 Lacey, L.A. and Mulla, M.S., 1990, Safety of *Bacillus thuringiensis* sp. *israelensis* and *Bacillus sphaericus* to Nontarget Organisms in the Aquatic Environment, In Safety of Microbial Insecticides (M. Laird, L.A. Lacey and E.W. Davidson, Eds.) pp. 168-188. CRC Press. DACO: M9.6
- 1370767 Lysenko, O. et al., 1985, Five new mosquito larvicidal strains of *Bacillus sphaericus* from non-mosquito origins, J. Am. Mosq. Control Assoc. 1(3): 369-371, DACO: M9.6
- 1370768 VectoLex - *Bacillus sphaericus*, strain 2362: response summary, DACO: M9.6
- 1370769 Merritt, R.W. et al., 2005, Lack of effects of *Bacillus sphaericus* (VectoLex) on nontarget organisms in a mosquito-control program in southeastern Wisconsin: a 3-year study, J. Am. Mosq. Control Assoc. 21(2):201-212, DACO: M9.6
- 1370770 Nicolas, L. et al., 1991, Role of the gut proteinases from mosquito larvae in mechanism of action and the specificity of the *Bacillus sphaericus* toxin, Can. J. Microbiol. 36:804-807, DACO: M9.6
- 1370771 Sezen, K. et al., 2005, Investigations on Bacteria as a Potential Biological Control Agent of Summer Chafer, *Amphimallon solstitiale* L., J. Microbiol. 43(5): 463-468, DACO: M9.6
- 1370772 Stevens, M.M. et al, 2004, Factors affecting toxicity of *Bacillus thuringiensis* var. *israelensis* and *Bacillus sphaericus* to fourth instar larvae of *Chironomus tepperi*. J. Invert. Path. 86: 104-110, DACO: M9.6
- 1370773 Genter, F.J. et al., 1993, EPA, Fate and Survival of MPCA in Nontarget Aquatic Organisms, Dis. Aquat. Org. 16: 157-162, DACO: M9.9
- 1370774 Shell deposition study in Eastern Oyster - response summary, DACO: M9.9
- 1370775 Skovmand, O. & Guillet, P., 2000, Sediment of *Bacillus sphaericus* in Tap Water and Sewage water, J. Invert. Path. 75: 243-250, DACO: M9.9
- 1370776 Westphal, A.J. et al., 2003, Kinetics of size changes of individual *Bacillus thuringiensis* spores in response to changes in relative humidity, PNAS 2003; 100;3461-3466;doi:10.1073/pnas.232710999, DACO: M9.9
- 1370777 Yousten, A.A. et al., 1991, Fate of *Bacillus sphaericus* 2362 Spores following Ingestion by Nontarget Invertebrates, J. Invert. Path. 58: 427-435, DACO: M9.9.
- 1786221 Thiery and H. de Barjac, 1989, Selection of the most potent *Bacillus sphaericus* strains based on activity ratios determined on three mosquito species Appl. Microbiol. Biotechnol. 31:577-581, DACO: M9.5.2
- 1786222 Beaman, T.C, et al., 1988, Low heat resistance of *Bacillus sphaericus* spores correlated with high protoplast water content. FEMS Microbiology Letters 58:1-4, DACO: M9.9.

1803842 Mathavan, S., Velpandi, A. and Johnson, J.C. 1987, Sub-toxic effects of *Bacillus spahericus* 1593M on feeding growth and reproduction of *Laccotrephes griseus* (Hemiptera: Nepidae). *Exp. Biol*; 46(3):149-153. DACO 9.5.2.

ISSN: 1911-8082

© Her Majesty the Queen in Right of Canada, represented by the Minister of Public Works and Government Services Canada 2010

All rights reserved. No part of this information (publication or product) may be reproduced or transmitted in any form or by any means, electronic, mechanical photocopying, recording or otherwise, or stored in a retrieval system, without prior written permission of the Minister of Public Works and Government Services Canada, Ottawa, Ontario K1A 0S5.