

SOFW

JOURNAL

11-2008

English Edition

International Journal for Applied Science
• Personal Care • Detergents • Specialties

A.M. Bohlmann

**A Valid Tool in Lice Prevention –
Ethyl Butylacetylaminopropionate**



A.M. Bohlmann*

A Valid Tool in Lice Prevention – Ethyl Butylacetylaminopropionate

Keywords: Ethyl Butylacetylaminopropionate, Lice prevention, re-infestation

■ The Epidemiology of Head Lice

The incidence of head lice in Germany is higher than in the sixties and has increased continuously during the last years. Reliable data on how many people get head lice each year worldwide are not available. However, head lice infestations of one to three percent in industrialized countries are estimated (1).

■ The Biology of Head Lice

Lice are parasitic insects that can be found on people's heads (*Pediculus humanus capitis*), and bodies (*Pediculus humanus corporis*). Human lice survive by feeding on human blood. Only the body louse is known to spread disease. However, secondary bacterial infection of the skin resulting from scratching can occur with any lice infestation.

The live cycle of the head louse has three stages: nits, nymph, and adult. Nits are head lice eggs. Nits are laid by adult female and are cemented at the base of the hair shaft nearest the scalp. The egg hatches to release a nymph. The nymph looks like an adult head louse, but is about the size of a pinhead. The adult louse is about the size of a sesame seed and has 6 legs, each with claws (Fig. 1).



Fig. 1 This photograph depicted a ventral view of a male body louse, *Pediculus humanus var. corporis*. (Source: CDC Public Health Image Library)

Preschool and elementary-age children, 3 to 11 years of age are infested most often. Females are infested more often than males, probably due to more frequent head to head contact.

Abstract

Today, the management of head lice continues to be a major task for parents, school personnel, and health care professionals worldwide. Head lice are most often found on school children. The most common way to get head lice is by head-to-head contact with a person who already has head lice. The traditional chemical treatment with insecticides may pose long-term health hazards. To reduce the use of insecticides and to reduce lost school days preventive solutions are needed. Ethyl Butylacetylaminopropionate (Trade Mark IR3535® from Merck KGaA) is a substance with excellent toxicological profile and used as highly effective Insect Repellent since 30 years in Europe. This substance shows in addition brilliant efficacy in prevention of lice infestation. *In-vitro* and *in-vivo* testing were performed to prove the efficacy of this substance in lice prevention. The *in-vitro* test showed that the lice impulse to escape appears to come sooner with IR3535® than with Deet (after 30 seconds 10% escaped). The *in-vitro* test showed that IR3535® prevented massive re-infestation in a highly infested environment (total number adult lice after 8 days: control group = 116, IR3535® group = 3).

■ How Lice are Transmitted

Lice do not fly or jump. Most head lice are probably transmitted when an infested person comes into close contact with another. Such contact can be common among children during play at school, home, sports or play activities. Head lice are not known to transmit disease. Lice and nits can also be transferred between people via infested brushes, combs, caps, hats, scarves, coats, bedding, towels, and upholstered furniture. Dogs, cats, and other pets do not play a role in the transmission of human lice.

■ Efficacy Testing of Ethyl Butylacetylaminopropionate in Lice Prevention

Studies with Ethyl Butylacetylaminopropionate were performed with head lice and body lice. The head louse is very sensitive to environmental conditions in laboratory tests and the death rate is high (2). Therefore, the body louse was used for *in-vitro* testing of Ethyl Butylacetylaminopropionate.

In-vitro Test

The laboratory test was performed under controlled conditions and Deet was used as reference repellent. Ethyl Butylacetylaminopropionate and Deet were tested as 20% solution in ethanol. The principle of the measurement was to measure the impulse of the body lice to escape from a fabric treated with insect repellent. The distance from treated fabric traveled by lice compared with a distance from fabric without repellent as a function of time was the object of observation. Every test (IR3535®, Deet and control) was repeated three times and 34 lice were used per test.

The result of the test was that the impulse to escape appears to come sooner with Ethyl Butylacetylaminopropionate (10% after 30 seconds) in comparison to Deet (no movement during the first 30 seconds). This rapid movement was confirmed after 2 minutes, when only 36% (Deet 56%) of the lice remain on the treated fabric. After 32 minutes observation, 6% of the lice exposed to Ethyl

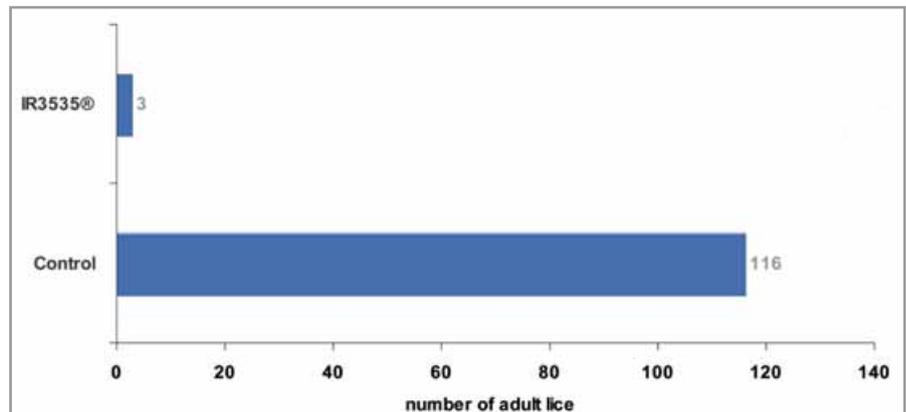


Fig. 2 Lice collection after 8 days

Butylacetylaminopropionate are only still on the fabric (Deet 1%). The general conclusion of the *in-vitro* test was that both substances have approximately the same performance.

In-vivo Test

During the *in-vivo* test the ability of Ethyl Butylacetylaminopropionate to prevent re-infestation were examined. 60 heavily infested volunteers (males and females) aged from 4 to 30 were included in the study. The volunteers showed infestation with an average of 28 lice per person. First, a treatment with a commercial anti-lice shampoo for 3 minutes was performed with all volunteers. To determine re-infestation, the volunteers were separated into three groups. Group 1 received a preventive treatment with Ethyl Butylacetylaminopropionate twice in one week. A 20% solution in ethanol of IR3535® was used for treatment. The control group (group 3) was not treated with any preventive agent.

After eight days, all volunteers were examined again. The determination of nymphs was interpreted as a result of an inadequate anti-nit action of the shampoo. The finding of adult lice was interpreted as a result of inadequate repellent action.

Only three adult lice were counted in group 1 treated with IR3535®. In the control group without preventive treatment 116 adult lice were collected from the volunteers. This result shows a high-

ly significant difference between the Ethyl Butylacetylaminopropionate group versus control group (Fig. 2). The preventive effect of IR3535® against head lice infestation could be proven.

■ Summary

Ethyl Butylacetylaminopropionate showed in both studies high efficacy in lice prevention. Due to high efficacy and excellent toxicological profile, Ethyl Butylacetylaminopropionate is a valid tool in lice prevention.

Literature

- (1) Joachim Richter et al.: Head lice – handling the resurgence of a parasitosis. Dtsch Arztebl 2005; 102(36): A-2395 / B-2016 / C-1909 Medizin
- (2) Anabella Gallardo et al.: Differential testing laboratory conditions for *Pediculus humanus humanus* and *Pediculus humanus capitis* (Phthiraptera: Pediculidae). Poster Section 9.04 ICE 2008, Durban Southern Africa

* Author's address:

Dr. Anja-Martina Bohlmann
Merck KGaA
Frankfurter Straße 250
64293 Darmstadt
Email:
Anja-Martina.Bohlmann@merck.de