

RESEARCH LETTER

Ovicidal efficacy of high concentration dimeticone: A new era of head lice treatment

To the Editor: Nontoxic compounds that kill head lice, such as the silicone oil dimeticone, are promising approaches for control.^{1,2} Here we present ovicidal efficacy of high concentration dimeticones in a comparative bioassay.

Head lice were obtained by dry combing in a community in Fortaleza (Brazil). Lice with hair strands were placed in a plastic chamber that was covered with mesh and placed on the skin of investigators, allowing blood feeding of lice. Every 24 hours, eggs were collected. We tested ovicidal efficacy of three dimeticone products of different compositions (NYDA, G. Pohl-Boskamp GmbH & Co KG, Hohenlockstedt, Germany; Jacutin Pedicul Fluid, Almirall Hermal GmbH, Reinbek, Germany; and EtoPril, Dr. August Wolff GmbH & Co KG Arzneimittel, Bielefeld, Germany [the latter also marketed as Hedrin]), 0.5% permethrin alcoholic solution (Infectopedicul, Infectopharm Arzneimittel & Consilium GmbH, Heppenheim, Germany), 0.3% pyrethrum (Goldgeist forte, Eduard Gerlach GmbH, Lübbecke, Germany), and two plant-based pediculicides (mosquito LäuseShampoo, Wepa Apothekenbedarf GmbH & Co KG, Hillscheid, Germany and Paranix, Paracelsia Pharma GmbH, Waltrop, Germany [the latter marketed in the United States as Hair Clean 1-2-3]). Similar products marketed in the US are Nix (permethrin) and RID (pyrethrum extract). The US Food and Drug Administration approval process of NYDA is

ongoing. Eggs were exposed at 25°C to 29 °C and 52% to 69% relative humidity and observed for 14 days. Two stages were used: young eggs 1 to 2 days after oviposition and eggs 9 to 11 days after oviposition, containing mature embryos. For each compound, 49 to 70 eggs of both developmental stages were tested. Corrected hatch rates were calculated as (crude hatch rate test group)/(crude hatch rate untreated control group). Efficacy of a product was defined as (1 – the corrected hatch rate), expressed as a percentage.

Two dimeticones, one based on two different viscous dimeticones at a total concentration of 92% (NYDA) and the other being pure dimeticone (Jacutin), had ovicidal efficacy of 100% and 97.7% against young eggs, respectively (Fig 1). Against mature eggs, NYDA outperformed all other products (94.9% efficacy), with a significant difference to Jacutin (73.7%; $P = .016$) and the other pediculicides ($P < .001$). Four percent dimeticone (EtoPril) did not kill young or mature eggs (0% and 0.3% efficacy). Permethrin and pyrethrum showed some efficacy against young eggs (45.1% and 17.0%) but failed to kill mature eggs (both 0% efficacy). The efficacy of Paranix and mosquito was 54.3% and 19.4% (young eggs), and 62.5% and 48.9% (mature eggs), respectively. In the control groups, 87.5% (126/144) of young eggs and 76.2% (128/168) of mature eggs hatched.

A two-phase, high concentration dimeticone product performed better than pure dimeticone. The dimeticone of low viscosity in NYDA may function as

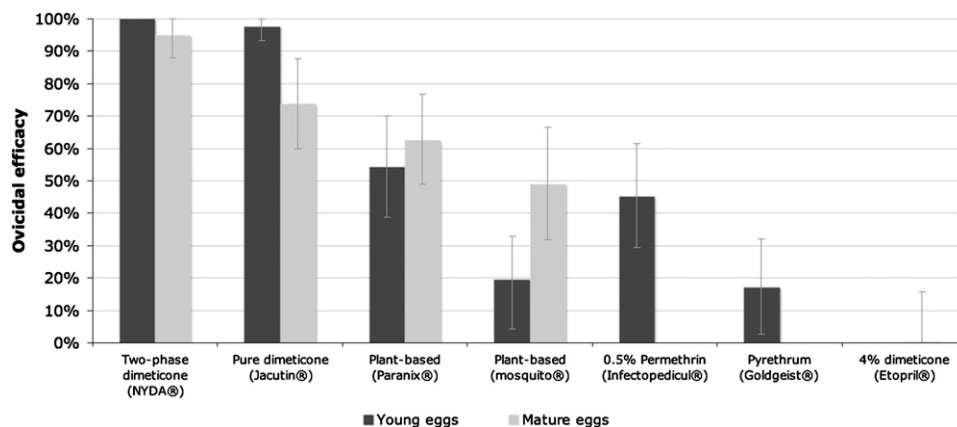


Fig 1. Ovicidal efficacy of seven pediculicidal products against young and mature eggs (60 minutes' incubation). 95% confidence intervals for efficacy were calculated according to an asymptotic formula.

a vehicle for the other dimeticone component of higher viscosity, facilitating entry into the aeropyles of eggs, similar to its entry into the spiracles of lice.³ Previous studies have shown efficacy of this product against adult lice,⁴ and in a clinical trial, efficacy was superior to 1% permethrin in aqueous suspension.¹ The reasons for the low ovicidal efficacy of the 4% dimeticone are not clear. A much higher rate of inhibited hatching was suggested in a recent clinical trial of 4% dimeticone,⁵ but the calculation may be an overestimate. Because of their high ovicidal efficacy, high concentration dimeticones are an excellent option for head lice management, and could be highly effective in areas with a high prevalence of resistant strains.

Jorg Heukelbach, MD, MScIH, PhD,^{a,b} Susanne Sonnberg, MD,^c Heiko Becher, PhD,^c Iana Melo,^a Rick Speare, MBBS, PhD,^b and Fabiola Araujo Oliveira, MD, MPH, PhD^{a,b}

Department of Community Health,^a School of Medicine, Federal University of Ceará, Fortaleza, Brazil; the Anton Breinl Centre for Public Health and Tropical Medicine,^b School of Public Health, Tropical Medicine and Rehabilitation Sciences, James Cook University, Townsville, Australia; and the Institute of Public Health,^c University of Heidelberg, Heidelberg, Germany.

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Conflicts of interest: Dr Heukelbach has been scientific consultant to G. Pohl-Boskamp GmbH & Co. KG, the manufacturer of NYDA. Dr Speare has been scientific consultant in the past to Emerald Forest Pharmaceuticals in trials on plant-based pediculicides, but currently has no links to the pharmaceutical industry. The other authors do not have any conflicts of interest to declare.

Reprint requests: Jorg Heukelbach, MD, MScIH, PhD, Departamento de Saúde Comunitária, Faculdade de Medicina, Universidade Federal do Ceará, Rua Prof. Costa Mendes 1608, 5 Andar, Fortaleza CE 60430-140, Brazil

E-mail: heukelbach@web.de

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