RESEARCH NOTE

The Chemical Control of Vectors of Leishmaniasis

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The elimination of infected dogs and chemotherapy, the only measures used by Brazilian National Health Foundation (FNS) to control American Visceral Leishmaniasis (AVL), are not being enough to control the transmission of this endemic disease in Brazil. This statement is based on data reported by FNS (1993, *Manual de Controle de Calazar*, CENEPI, Programa Nacional Controle Leishmaniose, Brasília, 24pp.), showing an average of 1000 new cases each year, during the past ten years. However this number is increasing since 1986 showing 1500 new cases in 1990. This picture is still worse if we consider that these are only officially reported cases. The urgency for complementary methods to control transmission is also illustrated by what is being recognized as the urbanization of the disease or, by another point of view, the ruralization of suburban areas of big cities in the endemic areas.

To cope with this situation some people in charge of decision making regarding leishmaniasis control are recommending insecticide applications, however without guidelines on when, what, and how to use this kind of products. There were only assumptions referring to the reduction of sandflies population after the use of insecticides (mainly DDT) in malaria control programmes (WHO 1990 Tech. Report Series 793, 158pp.).

Preliminary results obtained in our laboratories on the exposition of *Lutzomyia longipalpis* adults to insecticides belonging to the main chemical groups, i.e., organochlorines (DDT), organophosphates (chlorpyrifos and malathion), carbamates (propoxur) and pyrethroids (deltamethrin) showed the susceptibility of these insects to all the products studied (Table). Adults of both sexes were exposed to treated filter papers accordingly to the WHO technique for bioassays of small haematophagous insects (WHO 1970 Techn. Rep. Series 443:106-113). Filter papers were treated in our laboratory by dissolving the technical insecticide in acetone and then in mineral oil. The exceptions were malathion 8.3% SRES and chlorpyrifos-ethyl. The first, wich is as Slow Release Emulsifiable Suspension, based on polyvinyl acetate polimer (PVA) developed in our laboratories (AM Oliveira Filho 1989 *Mem Inst Oswaldo Cruz 84*: 409-417), was dissolved in water; the second, was formulated as a commercial product named Dursban MC, containing 72% chlorpyrifos-ethyl in methylene chloride, which was then dissolved in acetone and mineral oil. The remaining insecticide plus the oil, after the evaporation of solvent, was weighed and the dose in mg a.i./m^2 of paper surface calculated. Insects were exposed during 1 hr to the treated surface and then removed to a clean cylinder containing an untreated filter paper. Readings were performed 1 hr after the transference. Knocked down insects were taken as dead, if they didn't

TABLE

Percentages of mortality of *Lutzomyia longipalpis* adults exposed during 1 hr to insecticide impregnated filter papers in the WHO kits for bioassays of small haematophagous insect. Readings were done 1 hr after the transference of insects to non treated with filter papers

Insecticide (formulation)	Dose mga.i./m^2	Number insects tested	% Mortality 1hr post-treatment
DDT	642.0	23	100
Tech. 99.9%[a]	428.0	15	0
Chlorpyrifos	214.0	15	40
Tech. 98%[a]	21.4	4	25
Malathion	214.0	32	68
Tech. 98%[a]	21.4	15	0
Malathion	630.0	8	100
(SRES 8.3%)[b]	380.0	49	40
Propoxur	214.0	16	100
Tech. 93%[a]	21.4	31	47
Deltamethrin	10.5	13	100
Tech. 99.9%	2.1	27	83

[a]: technical product diluted in mineral oil + apropriate organic solvent.
[b]: slow-release emulsifiable solution developed by NPPN.

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recover thereafter.

Results obtained showed that much lower doses than recommended for field spraying for the control of vectors of other endemic diases, e.g. malaria and chagas, are enough to kill all the sandflies almost immediately after the exposition to the treated surfaces. As expected the pyretrhoid was effective in the lowest dose (10.5mg a.i./m^2) when compared to other groups. These observations agree with the results from A Falcão et al. (1988 *Mem Inst Oswaldo Cruz 83*: 395-396) on the susceptibility of *Lu.longipalpis* to deltamethrin, where 10mg a.i./m^2 were enough to kill 100% of females exposed to treated filter papers on the same WHO test kits we used.

Propoxur was efficient at 214 mga.i./m^2 approximately 1/5 to 1/10 of the doses usually recommended for other vectors control. DDT (642mga.i./m^2) and malathion SRES (630mga.i./m^2) showed activity at 1/3 of the doses usually employed. The advantage of the SRES formulation is that it was designed for long persistence (18-24 months), showing a large residual effect even in the peridomicilium conditions where unprotected places shows no permanence of the insecticide effect when in conventional formulations (e.g. wettable powders, emulsifiable concentrates, flowables or concentrated suspensions).

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