Antimalarial efficacy of stem bark extract from *Hintonia latiflora* in a *Plasmodium yoelii yoelii* malaria model

Norma Rivera[1*], José A. Hernández[1], Armando Zepeda[2], Perla López[3], Alberto J. Reyes[4].
1 Laboratory of Malariology, Department of Microbiology and Parasitology, Faculty of Medicine, National Autonomous University of Mexico (UNAM), Mexico City, 04510.
2 Department of Cellular and Tissue Biology, Faculty of Medicine, UNAM, Mexico City, 04510.
3 Department of Natural Sciences Autonomous Metropolitan University, Cuajimalpa, Mexico City, 11850.
4 National Herbarium of Mexico, Biology Institute, UNAM, Mexico City, 04510.
*corresponding author normariv@unam.mx

ABSTRACT

Hintonia latiflora (*Hl*) stem bark is used in some rural communities of Mexico to treat malaria, diabetes and gastrointestinal diseases. The efficacy of *Hl* stem bark methanolic extract (*Hl*MeOHe) in CD1 male mice infected with *Plasmodium yoelii yoelii* (*Pyy*) was tested. Plant material was obtained in a solid–liquid system for 72 h. The solvent was evaporated in vacuo to afford 10 g of extract. A 4-day test scheme was used. Oral doses of 1,200, 600, and 300 mg/kg were evaluated; oral chloroquine was used as positive control. Transmission electron microscopy (TEM) was used to identify ultrastructural changes on the asexual intraerythrocytic stages of *Pyy* treated with *Hl*MeOHe. None treated *Pyy*-infected mice died between 6 and 7 days post-infection (PI) with parasitemia over 70 %. *Pyy*-infected mice treated with 600 and 300 mg/kg showed a chemosuppression percentage of total parasitemia of 99.23 and 23.66, respectively, animals in both groups died 6 to 7 days PI with parasitemia over 45 %. With 1,200 mg/kg of *Hl*MeOHe, *Pyy*-infected mice, showed a 100 % chemosuppression of total parasitemia on 5 days PI and a 23 days survival time with a mean parasitemia of 23.6 % at the day of death (table 1). Body temperature of treated mice was significantly decreased (P<0.05) in a dose-dependent manner some minutes after dosing; the maximum effect was obtained with the highest dose 2 h after extract administration. Maximum extract dose decreases mice temperature up to 3 C° (table 2). TEM images showed morphological changes of parasite death (figure 2). The results obtained in this study showed that the infection outcome of *Pyy*-infected mice is affected by *Hl*MeOHe. Although the stem bark of *Hl* showed efficacy to treat murine malaria, its chemical composition and toxicity should be studied in detail for the benefit of those who consume it.

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RESULTS

Table 1. In vivo antimalarial activity of methanolic stem bark extract of *Hintonia latiflora* against asexual intraerythrocytic stages of *Plasmodium yoelii yoelii*

GROUP	No. of mice	Dose (mg kg^{-1}/PO/day)	Animals infected at 5th day	Chemosuppression % of total parasitemia (4-day suppressive test)	Chemosuppression % schizonts(4-day suppressive test)	Parasitemia at death time	Survival time (days)
*Hl*MeOHe	5	1200	0	99.84±4.91*	100*	23.6±1.63*	23
	5	600	0.18±0.02*	99.23±3.0*	100*	45±1.37*	6
	5	300	19.96±1.45*	23.66±1.51*	18.69±2.0*	64.2±2.95*	6
Chloroquine	5	15	0*	100*	100*	-	All mice cured
Pyy	5	-	32±1.84	0	-	83±3.31	6

Results are reported in mean ± standard error (SE)
*P<0.05 versus P. yoelii yoelii control group

Table 2. Mice temperature after oral treatment with *Hintonia latiflora* methanolic extract.

Temperature (°C)	Control	MeOH (500mg/kg)	Control	MeOH (1000mg/kg)	Control	MeOH (2000mg/kg)
Basal	37.0	37.0±0.14	36.9	37.0±0.32	36.8	36.0±0.17
30 min	36.9	36.9±0.13	37.2	35.8±0.24*	36.4	31.4±0.24*
60 min	36.7	37±0.11	37.0	35.9±0.20*	36.0	30.5±0.29*
120 min	37.0	36.2±0.13	37.0	30.7±0.21*	36.0	27.5±0.44*

Data are means ± standard deviations of each experimental group
*P<0.05, compared with basal temperature

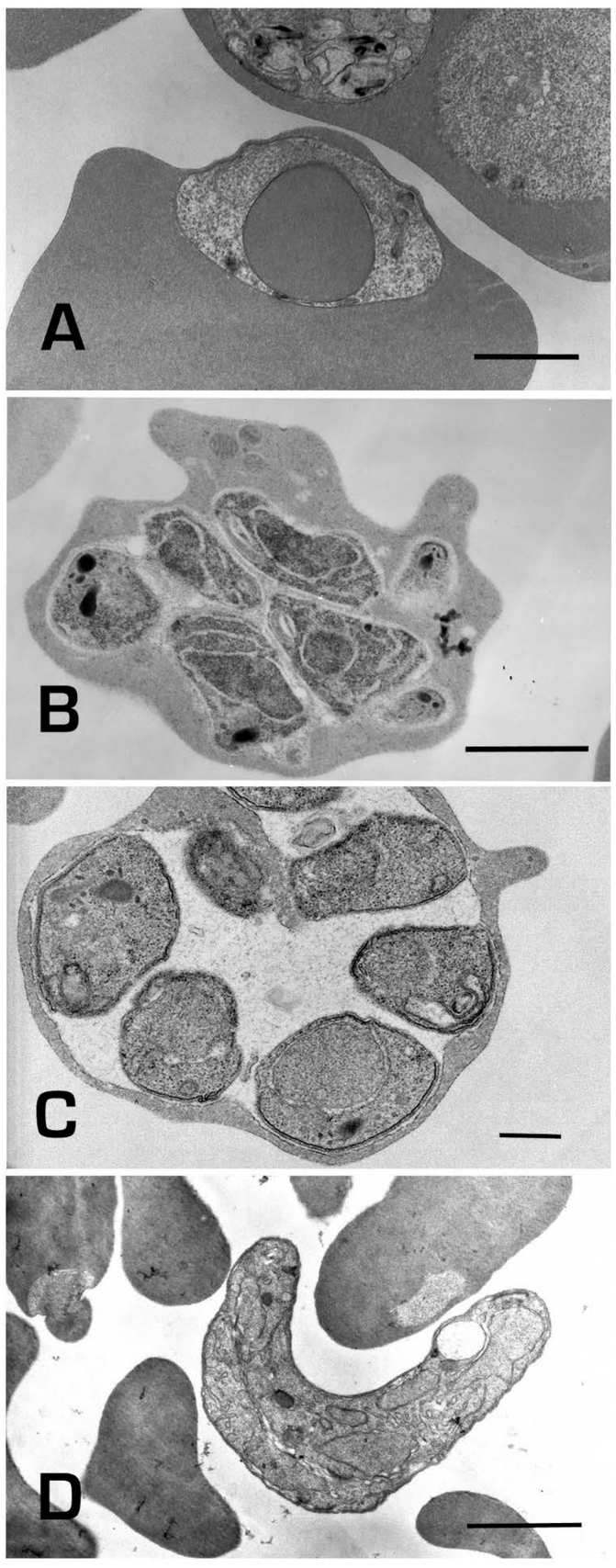

Figure 1. TEM images of non treated parasites, A, ring; B and C, trophozoites and D merozoite. Bars 1µm.

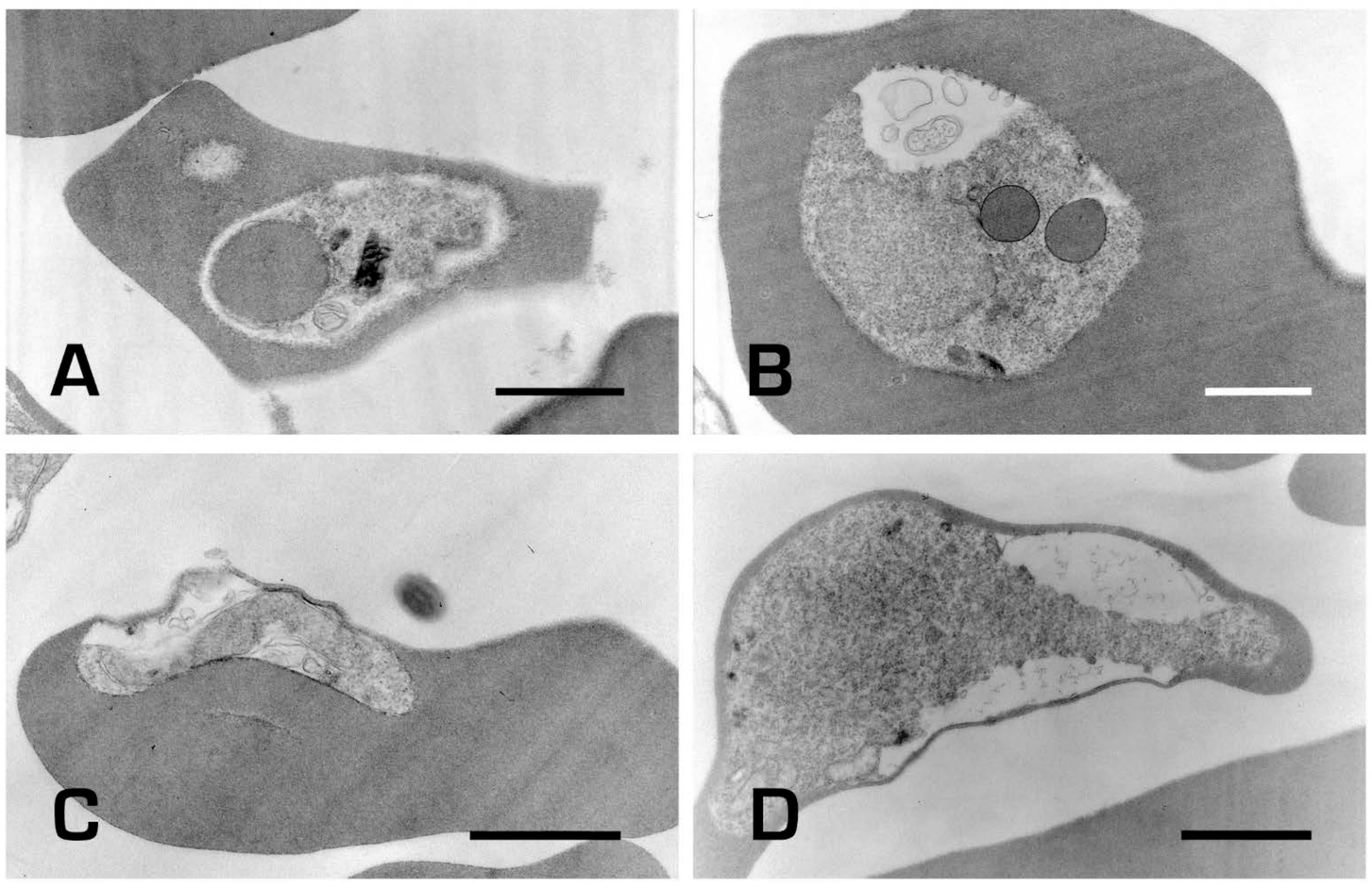

Figure 2. TEM images of treated ring parasites showed in general an amorphous shape and swollen plasma and cellular membranes, however, a complete disintegration of the cell membranes was never saw. Most of the parasites depicted vacuoles in their cytoplasm and ribosomal depletion. Bars 2 µm.