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Editorial: **Gin tonic revisited**

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Sunset in the tropics. On the verandah: lounging European expats, buzzing mosquitoes, peak biting time. Once settled and seeking comfort and consolation, dawdling the hours away with generous gin & tonics, talks and tales soon turn to malaria. One has to drink gin tonic in the diaspora. It keeps away malaria and, with a twist of lime, even prevents scurvy. It is good for health.

Stay cool and hark back to the febrifugal qualities of tonic water. It is sugar bubble water, flavoured with fruit essences and a small addendum of quinine. Quinine is an alkaloid isolated from the bark of cinchona trees and numerous legends exist on South American Indians' use of the bark prior to Francisco Pizzaro's conquista. In 1633, quinine's benefits were recognized in Peru by Antonio de Calancha, an Augustinian monk. The bark was given to the feverish Countess Anna de Chinchón, the Peruvian Viceroy's shivering and delirious wife and now, although erroneously misspelled by Carolus Linnaeus, bears her reputable name. Cinchona proved invaluable in treating malaria and the remedy was widely used in Europe in the 17th and 18th centuries for its alleviating properties in various aguish and other conditions.

The medicinal addition of tonic water to gin prompted the question whether the amount of quinine might be sufficient to exert inhibitory or toxic effects on the malaria-causing *Plasmodium falciparum* parasites and, thus, might prevent or even cure malaria. Willing to contribute to talks and tales and to battle cranky alibi myths, we made this an issue.

Five hundred to 1000 ml of tonic water, containing 58.3 mg/l quinine, was downed within 15 min by six healthy (voluntary!) candidates. Protein-bound and unbound plasma quinine concentrations were determined, by liquid-chromatography mass spectrometry (Kratzsch *et al.* 2003), after achieving the peak plasma concentration that occurs after 2 h. In accordance with values obtained in an earlier study on potential quinine-induced audiometric and visual disturbances (Worden *et al.* 1987), a mean plasma level of 0.62 mg/l (0.4–0.77 mg/l) was measured at 1 and 2 h after intake (experimental data available upon request.) 0.62 mg/l roughly corresponds to the minimum inhibitory quinine concentration of 0.68–0.89 mg/l (Breckenridge & Winstanley 1997; Pukrittayakamee *et al.* 2003), equivalent to an unbound quinine concentration of approximately 0.2 mg/l. The therapeutic range is unusually broad, from 0.2 mg/l to 2.0 mg/l, because of the varying drug susceptibility of different *P. falciparum* strains (Winstanley *et al.* 1993; Breckenridge & Winstanley 1997). As initial antimalarial treatment with unbound quinine plasma concentrations ≤0.5 mg/l within the first 12 h exerts suboptimal parasitocidal effects because of the short half-life of quinine, loading doses of quinine are part of the standard treatment regimen.

Considerable quantities of tonic water may, for a short period of time, lead to quinine plasma levels at the lower limit of therapeutic efficacy and may, in fact, cause transitory suppression of parasites. However, continuous levels that are appropriate for malaria prophylaxis cannot be maintained with even large amounts of tonic.

Dusk, verandah, mosquitoes – expats, please heed and keep well in mind: do not mistake loading quinine doses for loading doses of gin tonic. Stay cool and healthy.

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