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Medicinal plants real or placebo properties? The case of Mimosa pudica empirically used in Cameroon to treat anxiety and depression

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In the columns of one paper of the World Health Organization published on 16th May, 2002, it appears that in the developing countries, over 80% of the population lives in rural areas. Generally, the content of the exchange of these populations is insufficient to help all the needs of daily life including access to modern medicines already very expensive in large cities. To solve the problems of health, these populations use medicinal plants. Often the therapeutic properties of these plants remain hypothetical or just placebos. Currently in Cameroon and elsewhere in Africa, Asia and South America, government efforts are growing in the direction of more rational and scientific use of medicinal plants. *Mimosa pudica* Linn. (*M. pudica*) is a plant empirically used in some countries to treat anxiety and depression. In the present study, two months old mice, Mus musculus Swiss were acutely treated by different doses of *M. pudica* (3, 10 and 30 mg/kg) and anxiety related responses evaluated by analyzing Stress-Induced Hyperthermia (SIH), Elevated Plus Maze (EPM), Elevated T Maze (ETM), open field and hole board parameters. The horizontal wire and rota-rod tests were then used to highlight possible myorelaxant properties of *M. pudica*. Finally, we investigated the effect of aqueous extract of *M. pudica* on regulation of Dorsal Raphe Nucleus (DRN) 5-Hydroxytryptamine (5-HT) neuronal activity using an *in-vitro* mouse brain slice preparation providing from adult male C57/BL6 mice. The decrease of SIH was observed with *M. pudica* (30 mg/kg) treatment. In the EPM, significant increase of open arms entries and percentage of time spent in the open arms with *M. pudica* (10 mg/kg) was observed. Neither diazepam (3 mg/kg) nor *M. pudica* (3 and 10 mg/kg) produced changes of motor activity. However the change of motor activity was observed with *M. pudica* (30 mg/kg). In the hole-board test, *M. pudica* (3 and 10 mg/kg) significantly increased the number and duration of the head-dips respectively. The anxiolytic properties of *M. pudica* as assessed using the EPM test were abolished by flumazenil (3 mg/kg), by bicuculline (5 mg/kg), and FG 7142 (10 mg/kg). Acute treatment with *M. pudica* extract also had an anxiolytic effect on behaviour in the ETM, specifically on inhibitory avoidance behaviour. In the horizontal wire test, both *M. pudica* (3 and 10 mg/kg) and distilled water allowed animals to grasp within 30 s. *M. pudica* (3 and 10 mg/kg) did not impair the duration of the time spent on the rota-rod. However at the dose of 30 mg/kg, up to 60 min, the *M. pudica* significantly reduced the time that animals remained on the rota-rod. Acute application of the extract alone had no effect on the activity of DRN 5-HT neurones. However, when co-applied with the GABAA receptor agonist THIP (4,5,6,7-tetrahydroisoxazolo[5,4-c] pyridin-3-ol), the extract enhanced the inhibitory effect of the THIP on DRN 5-HT neurones. This study indicates that *M. pudica* contains an effective psychotropic agent that acts via the benzodiazepine site of the GABAA receptor complex as an anxiolytic at low doses and as a muscle relaxant at higher doses. These results in part could justify and confirm the use of this plant extract as an anxiolytic agent.

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