In vitro and in vivo antifungal activities of the eight steroid saponins from Tribulus terrestris L. with potent activity against fluconazole-resistant fungal.


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Antifungal activity of natural products is being studied widely. Saponins are known to be antifungal and antibacterial. We have isolated eight steroid saponins from Tribulus terrestris L., namely TTS-8, TTS-9, TTS-10, TTS-11, TTS-12, TTS-13, TTS-14 and TTS-15. TTS-12 and TTS-15 were identified as tigogenin-3-O-beta-D-xylopyranosyl(1-->2)-[beta-D-xylopyranosyl(1-->3)]-beta-D-glucopyranosyl(1-->4)-[alpha-L-rhamnopyranosyl(1-->2)]-beta-D-galactopyranoside and tigogenin-3-O-beta-D-glucopyranosyl(1-->2)-[beta-D-xylopyranosyl(1-->3)]-beta-D-glucopyranosyl(1-->4)-beta-D-galactopyranoside, respectively. The in vitro antifungal activities of the eight saponins against six fluconazole-resistant yeasts, Candida albicans, Candida glabrata, Candida parapsilosis, Candida tropicalis, Candida krusei, and Cryptococcus neoformans were studied using microbroth dilution assay. The results showed that TTS-12 and TTS-15 were very effective against several pathogenic candidal species and C. neoformans in vitro. It is noteworthy that TTS-12 and TTS-15 were very active against fluconazole-resistant C. albicans (MIC(80)=4.4, 9.4 microg/ml), C. neoformans (MIC(80)=10.7, 18.7 microg/ml) and inherently resistant C. krusei (MIC(80)=8.8, 18.4 microg/ml). So in vivo activity of TTS-12 in a vaginal infection model with fluconazole-resistant C. albicans was studied in particular. Our studies revealed TTS-12 also showed in vivo activities against fluconazole-resistant yeasts. In conclusion, steroid saponins TTS-12 and TTS-15 from Tribulus terrestris L. have significant in vitro antifungal activity against fluconazole-resistant fungi, especially TTS-12 also showed in vivo activity against fluconazole-resistant C. albicans.

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