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Comparative *in vitro* Efficacy of Selected Medical Plants from Cholistan Against Gastrointestinal Helminthes of Sheep and Goats

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Abstract

Livestock infestation with gastrointestinal parasites reduces herd productivity in many tropical countries. Synthetic anthelmintics can control this problem but high prices, unavailability, side effects, or development of resistance lead to their very limited use in many pastoral systems. Traditional medicinal plants might therefore be a valuable alternative. Based on interviews with 100 pastoralists and 20 local healers in the Cholistan desert, Pakistan, we tested five medicinal plants that were said to be effectively used against gastrointestinal parasites in small ruminants, namely *Capparis deciduas* (P-I), *Salsola foetida* (P-II), *Suaeda fruticosa* (P-III), *Haloxyylon salicornicum* (P-IV) and *Haloxyylon recurvum* (P-V). Aqueous-methanol (70% : 30%) extracts were prepared of each plant at concentrations of 500, 250, 125, 62.5, 31.2, 15.6, and 7.8 mg dry matter per ml. Their anthelmintic activity was evaluated against adults of *Haemonchus contortus*, *Paramphistomum cervi* and *Trichuris ovis*, which are the prevalent helminthes in the region. Levamisol (0.55 mg ml⁻¹) and Oxytoclozanide (30 mg/ml) served as positive, and pure aqueous-methanol solution served as negative control. Results were expressed as the percentage (%) of worms that died during various intervals of time (0, 2, 4, 6, 8, 10, 12, 24 hours).

All plants showed maximum anthelmintic activity at a concentration of 500 mg ml⁻¹, and effectiveness decreased with decreasing concentration. All extracts exhibited minimum and maximum activity at 2 and 12 hours post application, respectively. While P-I was most effective against *H. contortus* (43.2% ±2.68 dead adults after 12 h), P-IV was least effective against this helminth (36.5% ±2.74). P-V showed maximum (42.0% ±2.89) and P-III minimum (26.4% ±2.67) anthelmintic activity against *T. ovis*. P-V also killed a maximum of *P. cervi* individuals (47.4% ±2.82), while P-II was least effective against this species (38.0% ±2.72). The average effectiveness of the positive and the negative control against the three helminthes was 87.4% (±3.92) and 18.6% (±3.87).

The results indicate that P-I and P-V are promising candidates for the ethno-botanical treatment of major gastrointestinal helminthes in small ruminants in Cholistan. Since pastoralists may not have easy access to methanol, the anthelmintic activity of purely aqueous extracts of these plants is currently investigated.

Keywords: Anthelmintic activity, ethno-botanical remedies, *Haemonchus contortus*, small ruminants, *Trichuris ovis*