

# Antibacterial activity of Venda medicinal plants

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## Abstract

Crude methanol and water extracts of 36 plants, employed in the treatment of diseases of probable bacterial etiology by the Venda people, were screened for antibacterial activity. *Combretum molle*, *Peltophorum africanum*, *Piper capense*, *Terminalia sericea* and *Zanthoxylum davyi* were the most active and presented MIC values  $\leq 1.00$  mg/ml.

## 1. Plants

Thirty-six plants, collected in Venda, South Africa, were identified by Dr N Hahn, Head of Soutpansbergensis Herbarium as well as by the South African National Biodiversity Institute (Tshwane). Voucher specimens are deposited in the Soutpansbergensis Herbarium.

## 2. Use in traditional medicine

Plants for investigation were selected on the base of their ethnomedical application in the treatment of diseases of probable bacterial etiology [1].

## 3. Previously isolated constituents

*Terminalia* spp. contain tannins and saponins [2] and the compound anolignan B [3], tannins are present in *Combretum* spp. [4], *Peltophorum africanum* [5], *Cassine transvaalensis* [6] and tannins and coumarins in *Ximenia caffra* [7].

## 4. Tested material

Water and methanol extracts [8].

## 5. Studied activity

Antibacterial activity determined by the plate-hole diffusion and broth microdilution methods [9] and [10].

## 6. Used microorganisms

*Escherichia coli* ATCC 1175, *Staphylococcus aureus* ATCC12600, *Staphylococcus epidermidis* (clinical isolate) and *Pseudomonas aeruginosa* ATCC 9027.

## 7. Results

None of the extracts showed activity against the Gram (-) organisms, *E. coli* and *P. aeruginosa*. MIC values obtained against the Gram (+) microorganisms are reported in Table 1.

**Table 1.** Antibacterial activity of the Venda plant extracts

Plants	Family	Plant part	Solvent	<sup>a</sup> MIC (mg/ml) microorganism	
				<i>S. epidermidis</i>	<i>S. aureus</i>
<i>Azelia quanzensis</i> Welw.	Fabaceae	Bark	Methanol	–	–
			Water	–	–
<i>Albizia versicolor</i> Welw. ex Oliv.	Fabaceae	Bark	Methanol	–	–
			Water	3.25	–
<i>Asparagus falcatus</i> Thunb.	Asparagaceae	Root	Methanol	–	–
			Water	–	–
<i>Brackenridgea zanguebarica</i> Oliv.	Ochnaceae	Root	Methanol	3.00	3.00
			Water	6.50	6.50
<i>Bridelia micrantha</i> (Hochst.) Baill.	Euphorbiaceae	Bark	Methanol	4.00	4.00
			Water	1.25	5.00
<i>Burkea africana</i> Hook.	Fabaceae	Bark	Methanol	3.40	6.75
			Water	2.50	2.50
<i>Capparis tomentosa</i> Lam.	Capparaceae	Root	Methanol	–	–
			Water	–	–
<i>Carissa edulis</i> Vahl.	Apocynaceae	Root	Methanol	–	–
			Water	–	–
<i>Cassine transvaalensis</i> (Burt. Davy) Codd	Celastraceae	Bark	Methanol	1.26	2.53
			Water	17.22	17.22
<i>Catharanthus roseus</i> G. Don.	Apocynaceae	Root	Methanol	–	–
			Water	–	–
<i>Combretum molle</i> R.Br. ex G. Don	Combretaceae	Root	Methanol	–	1.00
			Water	–	–
<i>Combretum paniculatum</i> Vent.	Combretaceae	Root	Methanol	2.77	1.85
			Water	14.44	14.44

Plants	Family	Plant part	Solvent	<sup>a</sup> MIC (mg/ml) microorganism	
				<i>S. epidermidis</i>	<i>S. aureus</i>
<i>Dalbergia melanoxylon</i> Guill. et Perr.	Fabaceae	Bark	Methanol	-	-
			Water	-	-
<i>Dichrostachys cinerea</i> (L.) Wight et Arn. subsp. <i>africana</i> Brenan et Brummitt	Fabaceae	Bark	Methanol	-	-
			Water	-	-
<i>Ficus capensis</i> Thunb.	Moraceae	Fruit	Methanol	-	-
			Water	-	-
<i>Ficus sycomorus</i> L.	Moraceae	Fruit	Methanol	-	-
			Water	-	-
<i>Gladiolus dalenii</i> van Geel	Iridaceae	Bulb	Methanol	-	-
			Water	-	-
<i>Gyrocarpus americanus</i> Jacq. subsp. <i>africanus</i> Kubitzki	Hernandiaceae	Root	Methanol	-	-
			Water	-	-
<i>Hexalobus monopetalus</i> (A. Rich.) Engl. et Diels.	Annonaceae	Root	Methanol	-	-
			Water	-	-
<i>Lannea schweinfurhtii</i> (Engl.) Engl.	Anacardiaceae	Rootbark	Methanol	-	-
			Water	-	-
<i>Obetia tenax</i> (N.E.Br.) Friis	Urticaceae	Root	Methanol	-	-
			Water	-	-
<i>Parinari curatellifolia</i> Planch ex Benth.	Chrysobalanaceae	Bark	Methanol	-	-
			Water	-	-
<i>Peltophorum africanum</i> Sond.	Fabaceae	Root	Methanol	0.50	2.00
			Water	3.61	3.61
<i>Piper capense</i> L.f.	Piperaceae	Bark	Methanol	0.52	0.52
			Water	4.97	4.97

Plants	Family	Plant part	Solvent	<sup>a</sup> MIC (mg/ml) microorganism	
				<i>S. epidermidis</i>	<i>S. aureus</i>
<i>Rapanea melanophloeos</i> (L.)Mez.	Myrsinaceae	Bark	Methanol	–	–
			Water	–	–
<i>Rauvolfia caffra</i> Sond.	Apocynaceae	Bark	Methanol	–	–
			Water	–	–
<i>Rothmannia capensis</i> Thunb.	Rubiaceae	Fruit	Methanol	–	–
			Water	–	–
<i>Solanum aculeastrum</i> Dun.	Solanaceae	Fruit	Methanol	–	–
			Water	–	–
<i>Solanum panduriforme</i> Dun.	Solanaceae	Fruit	Methanol	2.00	–
			Water	–	–
<i>Syzygium cordatum</i> Hochst.	Myrtaceae	Bark	Methanol	3.75	3.75
			Water	2.50	2.50
<i>Tabernaemontana elegans</i> Stapf.	Apocynaceae	Root	Methanol	–	–
			Water	7.50	7.50
<i>Terminalia sericea</i> Burch. ex DC.	Combretaceae	Root	Methanol	2.50	5.00
			Water	1.00	2.00
<i>Warburgia salutaris</i> (Bertol.f.) Chiov.	Canellaceae	Bark	Methanol	–	–
			Water	–	–
<i>Ximenia caffra</i> Sond.	Olaceae	Root	Methanol	1.42	5.66
			Water	10.30	1.29
<i>Zantedeschia aethiopica</i> (L.)Spreng.	Araceae	Root	Methanol	–	–
			Water	–	–
<i>Zanthoxylum davyi</i> (I. Verd.) P.G. Waterman	Rutaceae	Bark	Methanol	1.00	1.00
			Water	6.50	–
<sup>b</sup> Ampicillin				0.16	0.16

(-) MIC not determined since screening of the crude plant extract showed no zone of inhibition.

<sup>a</sup> MIC: Minimal inhibitory concentration representing the mean value of three replicates.

<sup>b</sup> Standard positive.

## 8. Conclusions

Fifteen extracts were found to have activity against the Gram (+) bacteria. *C. molle*, *P. africanum*, *P. capense*, *T. sericea* and *Z. davyi* were the most active and presented with MIC values  $\leq 1.00$  mg/ml.

## Acknowledgements

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