

Correspondence

An *in vitro* investigation of the antimicrobial activity of oxifulvic acid*J Antimicrob Chemother* 2000; **46**: 853–854C. E. J. van Rensburg^{a*}, A. van Straten^b and J. Dekker^c^aMedical Research Council Unit for Inflammation and Immunity, Department of Immunology, Institute for Pathology, Faculty of Medicine, University of Pretoria; ^bDepartment of Medical Microbiology, Institute for Pathology, Faculty of Medicine, University of Pretoria; ^cEnerkom (Pty) Ltd, Pretoria, South Africa

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Sir

Humic substances, of which 90–95% are fulvic acids, commonly account for 50% of the dissolved organic carbon in stream water. Humic acids are three to five times more abundant in soils than fulvic acids,¹ whereas fulvic acids are nine to 10 times more abundant in water than humic acids.² The application potential of fulvic acids in the treatment of human and animal diseases has not been investigated properly, possibly due to the difficulty of isolating fulvic acids from waters and soils in nature.

A South African company [Enerkom (Pty) Ltd] has developed a unique process to convert bituminous coal by controlled wet oxidation with oxygen in high yield to high quality humic and fulvic acids. To distinguish these coal-derived products from naturally occurring humic and fulvic acids, the former are called oxihumic and oxifulvic acid respectively. From a thorough analysis of oxifulvic acid by means of mass spectrometry (MS) and gas chromatography–MS (GC-MS) techniques, Bergh *et al.*³ identified some 50 different compounds. Most of these were carboxylic acids and ordinary physiological metabolites with no evidence of any toxic compound in the product mixture.

The effect of oxifulvic acid solutions on the growth of eight microbial pathogens was determined by the macrobroth tube dilution method.⁴ Oxifulvic acid, supplied by Enerkom (Pty) Ltd, was dissolved in water to a concentration of 240 g/L and further diluted in brain heart infusion

Table. *In vitro* activity of oxifulvic acid against eight microbial pathogens

Organism	MBC (g/L)
<i>Streptococcus faecalis</i> (ATCC 29212)	≤5
<i>Staphylococcus aureus</i> (ATCC 29213)	15
<i>Pseudomonas aeruginosa</i> (ATCC 27853)	10
<i>Escherichia coli</i> (ATCC 25922)	15
<i>Streptococcus pyogenes</i> ^a	10
<i>Klebsiella pneumoniae</i> ^a	≤5
<i>Proteus mirabilis</i> ^a	15
<i>Candida albicans</i> ^a	15

^aClinical isolate.

broth. All eight organisms tested were sensitive to oxifulvic acid at a concentration of 15 g/L (Table), *Enterococcus faecalis* and *Klebsiella pneumoniae* being susceptible to concentrations as low as 5 g/L.

It has been demonstrated in two pilot studies that oxifulvic acid is effective in the topical treatment of pyotraumatic dermatitis in cats and dogs⁵ and also inhibits contact hypersensitivity in mice. Oxifulvic acid did not produce any measurable toxicity in experimental animals during either acute or sub-chronic dermal exposure to 5.3% oxifulvic acid cream (results not shown). The antimicrobial properties, together with its anti-inflammatory properties, suggest that oxifulvic acid, applied topically, might be an effective and safe treatment for skin infections.

References

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