Extração e isolamento: dos tubérculos da *H. ampla* foi obtido um extrato etanólico bruto (2,8 g), o qual foi fracionado em subextratos hexânico, cloroformico e acetoetílico. O Humirianthol (56 mg) e o Acrenol (98 mg) foram isolados do subextrato cloroformico (570 mg), após ter sido submetido a cromatografía de coluna usando como eluente $CHCl_3$+MeOH (9:1).

Humirianthol: Sólido cristalino incolor com ponto de fusão igual 268,8 ºC, recristalizado em MeOH/$CHCl_3$/HEXANO. $[\alpha]_D^{20}$ =-156,9° $CHCl_3$:MeOH (9:1). Composição química determinada experimentalmente C=63,35%; H=7,13%; O=26,52%. Rf=0,62 [$CHCl_3$:MeOH (9:1)].

Espectro RMN ^1H a 400MHz em DMSO-d_6 -δ ppm = 4,98 (1H,d,4Hz); 5,35 (1H,s); 3,5/4,2 (2H,dd/dd, 9,5/4,0); 3,67 (1H,dd, 4,0); 0,82 (3H,s); 3,43/ 3,73 (2H,dd, 9,0/ 3,0/2,0); 1,25 (3H,s); 3,83 (1H,s); 1,28 (2H,m); 1,15/1,52 (2H,m/m); 1,81 (1H,dd,12,4/2,8Hz); 5,84 (1H,d,5Hz); 4,92 (1H,dd,4/6Hz); 2,29 (1H,dd,6/ 2Hz); 1,70/ 1,98 (2H,m/m); 1,60/1,65 (2H,m/m).

Espectro RMN ^{13}C a 100 MHz em DMSO-d_6 - δ ppm = 178,17; 145,58; 116,38; 96,16; 85,26; 77,41; 75,08; 71,05; 71,04; 49,8; 48,1; 43,8; 36,21; 31,91; 29,80; 28,3; 27,9; 24,9; 18,3; 15,04.

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Chemical investigation of *Spigelia anthelmia* Linn. used in Brazilian folk medicine as anthelmintic

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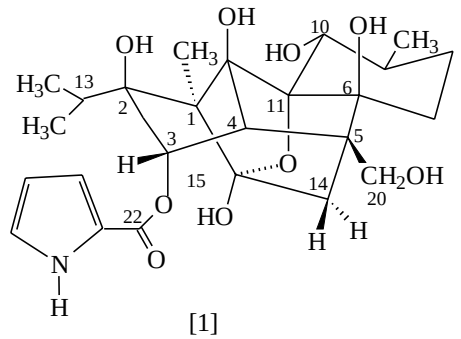
Abstract

An ethanol extract of aerial parts of *Spigelia anthelmia* was submitted to vacuum column chromatography being eluted with hexane, chloroform, ethyl acetate and methanol. The four extracts were assayed for anthelmintic activity against *Haemonchus contortus*, the main nematode in caprines. The ethyl acetate extract showed the strongest anthelmintic activity and the chemical study of this extract revealed as main constituents the alkaloid spiganthine and 3,7-dihydroxy-3',4'-dimethoxyflavone.

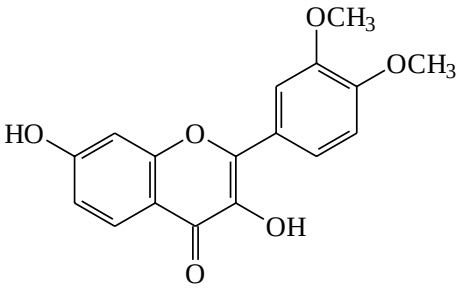
Spigelia anthelmia Linn. (Loganiaceae), popularly known as lombrigueira, is used in the Brazilian folk medicine as anthelmintic[1]. In the German Homeopathic Pharmacopoeia, an extract of aerial parts of *Spigelia anthelmia* is official as a remedy for neuralgic and cardiac disorders. Previous phytochemical/ pharmacological investigation has described the isolation of the alkaloid spiganthine that demonstrated cardioavascular activity[2]. Another research group reported the presence of two volatile alkaloids, isoquinoline and actidine isomer, and three quaternary alkaloids, choline, benzoylcholine and 2,3-dimethylacrolyl choline that are also involved in the cardiotonic activity of the plant besides some widely distributed phenolcarboxylic acids and flavonoids. Spiganthine has a similar structure to ryanodine a type of compounds known for their insecticidal activity[4,5].

The presence of nematodes in caprines in the Northeastern Brazil is one of the main causes of mortality of these animals. The control of this problem is performed using synthetic antihelmintics but the intensive and incorrect management of these products has led to the development of resistance to them. In the search for alternatives, the medicinal plant *Spigelia anthelmia* was used to evaluate its efficacy as anthelmintic and showed in the test of larvae immobilization a

significant action[6]. In this study the ethyl acetate extract of aerial parts of the plant that showed a strong activity against *Haemonchos contortus*[7], was submitted to a chemical investigation. The main compounds characterized in this extract were spiganthine [1], that was previously reported in this plant and 3,7-dihydroxy-3',4'-dimethoxyflavone [2], a compound not yet described in the genus.



[1]



[2]

Material and Methods

Ethanol (5 L) were added to the leaves and branches (3 kg) of *Spigelia anthelmia* and left for one week. After that time, the solvent was evaporated and the ethanol extract obtained was submitted to vacuum column chromatography being eluted with hexane, chloroform, ethyl acetate and methanol. The ethyl acetate extract was submitted to a silica gel column chromatography, being eluted with chloroform, ethyl acetate and methanol in mixtures of increasing polarity. The fraction eluted with (1:1) chloroform:ethyl acetate mixture yielded the flavonoid [2] and compound [1] was obtained with the eluent 5% methanol in ethyl acetate. The structures of compounds were determined by ^{1}H and ^{13}C NMR spectroscopy and comparison with published data[8].

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