Revista Brasileira de Farmacognosia
Brazilian Journal of Pharmacognosy
15(4): 292-293, Out./Dez. 2005
Received 09/21/05. Accepted 11/22/05

Artigo

Studies on the alkaloids of *Solanum* of northeastern Brazil

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ABSTRACT: In our continued studies on the genus *Solanum* for detecting a good source of soladodine, the steroid alkaloid potentially important for the manufacture of steroid hormones, as well as other compounds of potential therapeutic value, we investigated the fruits of *Solanum crinitum, S. rhytidoandrum,* and *S. jabrense* belonging to the subgenus *Leptostemonum* and *S. stipulaceum,* belonging to the subgenus *Brevantherum*, all of which are native of the northeastern region of Brazil and yielded solasodine in moderate to high yield.

Keywords: *Solanum crinitum, S. rhytidoandrum, S. stipulaceum, S. jabrense,* Solanaceae, alkaloids, solasodine.

INTRODUCTION

The genus *Solanum* is considered to be one of the largest among the Angiosperms and is comprised of about 1500 species (D'Arcy 1991) with at least 5000 published epithets (Nee, 1999). The genus is well represented in the northeast of Brazil with about 80 species which are widely distributed in the region. About 20 of these *Solanum* species are endemic to the northeastern region (Agra, 1999). Many *Solanum* species in the northeast are widely used in popular medicine and commonly known as "jurubeba" which is derived from the Tupi-guarani word "yu'beba", referring to the presence of prickles on some of them (Agra; Bhattacharyya, 1999). The presence of the steroidal alkaloid solasodine, which is potentially an important starting material for the synthesis of steroid hormones, is characteristic of the genus *Solanum*. Our continued interest (Bhattacharyya, 1984; Bhattacharyya, 1985; Barbosa Filho et al, 1991, Agra; Bhattacharyya, 1999; Silva et al., 2002) in the chemistry, pharmacology and chemotaxonomy of the genus *Solanum* led us to investigate four more species, three of which belonging to the subgenus *Leptostemonum* namely, *S. crinitum* Lam., *S. jabrense* Agra & M. Nee and *S. rhytidoandrum* Sendtn and *S. stipulaceum* Roem. & Schult. belonging to the subgenus *Brevantherum*, all of which are native of the northeastern region of Brazil. The fruits of all of these four species yielded solasodine which is the subject matter of the present study.

MATERIALS AND METHODS

Plant material

All the plant material were collected in northeastern Brazil and identified by M. F. Agra, the Head of the Botany Section of LTF-UFPB. The berries of *S. jabrense* (*Agra et al. 4743, 5257*) and *S. stipulaceum* (*Agra et. al 1948, 3845*) were collected from Maturéia, Serra de Teixeira, and those of *S. rhytidoandrum* (*Agra & Bhattacharyya 1759*) were collected from Areia, all in the State of Paraiba. On the other hand, the large fruits of *S. crinitum* (*Agra et. al. 2246*) were collected from Teresina, in the State of Piauí. The voucher specimens are deposited at the Herbarium Prof. Lauro Pires Xavier (JPB) and the duplicates are kept in the collection of references at LTF, both at the campus of the Universidade Federal da Paraíba, João Pessoa, Brazil.

Extraction and identification

The dried and pulverized fruits were repeatedly extracted with EtOH-H_2O-HOAc (90:8:2) until the last extracts were practically colorless. The combined extract was concentrated *in vacuo*, treated with 10% HOAc and then left for standing overnight. The product was filtered through a bed of Celite, the acid aqueous filtrate was basified with NH_4OH and left for standing overnight. The gelatinous precipitate was collected by filtration to give a mixture of glycoalkaloids. The alkaloid mixture was then refluxed with 15% HCl in EtOH for 3hr and subsequently left for standing overnight. The crystalline BHCl of the alkaloids were collected by filtration, suspended in 20% NH_4OH and heated for 1 hr. After cooling, the precipitated colorless solid was collected by filtration to yield a crude alkaloid fraction. The fruits of all four plants were treated in the manner described above. The crude alkaloid fraction from *S. crinitum* showed only one major spot on the TLC (Silica Gel plates, E. Merck, developed with 5% MeOH in $CHCl_3$ and visualized with Dragendorff reagent). The alkaloid fraction was crystallized from EtOH to give a colorless solid (2.0 %), m.p. 199-201°. The crude alkaloid fractions obtained from the fruits of *S. stipulaceum, S. rhytidoandrum,* and *S. jabrense,* yielded

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ISSN 0102-695X

upon crystallization white solids, all with mps in the range 199-201°C in 1.6, 1.6, and 1.0% yields, respectively.

RESULTS AND DISCUSSION

The white crystalline solids obtained from the crude alkaloids from all the four species, *S. crinitum, S. rhytidoandrum, S. stipulaceum* and *S. jabrense*, all melting in the range 199-201°C were identified as solasodine by comparison (mmp, IR, ^{13}C NMR) with an authentic sample of the alkaloid available in our laboratory. The crude alkaloid fraction of *S. stipulaceum* upon crystallization showed (TLC) in addition to solasodine the presence of a minor quantity of another more polar alkaloid in the mother liquor and further investigation is in progress. The crude alkaloid fractions of the remaining plants showed only one spot on TLC plates which proved to be that of solasodine.

ACKNOWLEDGEMENTS

The partial financial support of the CNPq in the form of fellowships (T.M.S. Silva and M.F.Agra) and CAPES (J.B.) are gratefully acknowledged. Thanks are also due to Dulce Goncalves de Oliveira for technical assistance and Prof. Delby Fernandes de Medeiros, the founder director of this laboratory for his constant encouragement and interest.

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