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New observations on the alkaloid composition of hallucinogenic snuff drugs yopo and epéna

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SEZIONE II

(Fisica, chimica, geologia, paleontologia e mineralogia)

Chimica. — *New observations on the alkaloid composition of hallucinogenic snuff drugs yopo and epéna*(*). Nota di DINO GROSSA, FRANCO DELLE MONACHE, FRANCO FERRARI e G.B. MARINI-BETTOLO, presentata(**) dal Corrisp. G.B. MARINI BETTOLO.

RIASSUNTO. — Lo studio di un campione di epéna, polvere allucinogena per inalazione preparata dai Bisashi-teri a partire da corteccia di *Virola* sp. consente di rilevare la presenza di un solo alcaloide la 5-o-metil-bufotenina.

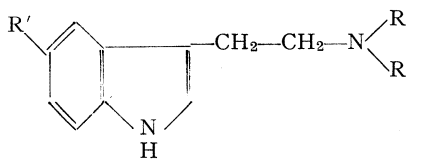
In base al confronto delle composizioni di vari campioni di polveri allucinogene si propone di limitare la denominazione di *yopo* alle preparazioni ottenute da semi di Leguminosae [*Piptadenia* sp. (syn. *Anadenanthera*), *Acacia* sp. *Mimosa* sp.] e quella di epéna agli allucinogeni preparati da corteccia di *Virola* sp.

In 1963 we have reported [1] the results of the alkaloid composition of snuff drugs collected by E. Biocca among the indian tribes of the upper Orinoco and Rio Negro basin [2].

According to the observation of various ethnologists [2] these snuff drugs, called generally *yopo* (or ñopo) and *epéna* (or ebéna) may be classified according the botanical material used, in two main groups i.e. " seeds " and " bark " preparations.

Both contain hallucinogenic alkaloids of the tryptamine and harmine groups.

In effect we have reported in a sample of *seed epéna* obtained by Mahekodo-teri indians of Rio Mavaca the presence of bufotenine, bufotenine N-oxide, N,N,dimethyl-tryptamine and N,N,dimethyl-tryptamine-N-oxyde [3].



Serotonine:	R'= OH	; R , R = H
Bufotenine	R'= OH	; R , R = CH_3
5-o-methylbufotenine	R'= OCH_3	; R , R = CH_3
Tryptamine	R'= H	; R , R = H
N,N-dimethyltryptamine	R'= H	; R , R = CH_3

In a sample of *yopo*, also prepared from seeds, studied more recently [4] and elaborated by Pixasi-teri (or Bisashi-teri) of the Upper Orinoco, bufotenine and 5-methyl-bufotenine were isolated. A number of sample of snuff drugs of different origin were also studied by Holmstedt and Lundgreen who have isolated tryptamine derivatives [5].

(*) Lavoro eseguito presso il Centro di Studio per la chimica dei recettori del CNR, presso l'Istituto di Chimica – Università Cattolica del S. Cuore, Roma.

(**) Nella seduta del 12 aprile 1975.

All the above results account for the hallucinogenic activity of these preparations.

In considering the ethnological reports on these snuff drugs a certain difficulty arises from the names *yopo* and *epena*, used indifferently and without marking the differences between the two types of preparation. This is probably due to the fact that both names indicate the word " snuff drug " respectively in the *canaima* and *yanoama* languages. Canaima live in the sabana and in the llanos, whereas the yanoama are located in the rain forest of the upper Orinoco basin.

Moreover both *yopo* and *epéna*, are reported in powder and in cake form; seeds preparations are considered to be less effective than bark preparations.

It may therefore be of interest to obtain more informations on these two snuff drugs.

One of us (D.G.) has recently followed the preparation of epéna among the Bisashi-teri of the Rio Ocamo, on the upper Orinoco.

The botanical material used to this purpose was they scratching of the bark of *Virola* sp., probably *Virola calophylla* (*Myristicaceae*). The material dried in the sun was gently heated over the fire and then grounded in small pieces and mixed with an equal amount of plants ashes. A dark brown cake is obtained which constitutes the snuff drug epéna [1].

Submitted to fractionation, according the previously reported procedure [3], the methanolic extract of the cake (3,5 g) gave a residue (520 mg, 15 %) which was purified on an Al_2O_3 column, eluting with $CHCl_3$ with increasing amount of CH_3OH (0,5–2 %). Eight fractions were obtained, the first show on TLC (solvent $CHCl_3$—CH_3OH 1 %) a single spot with positive Dragendorff reaction.

The alkaloid was separated (41 mg, 8% of the extract) and identified as 5-o-methyl-bufotenine by UV, IR and NMR spectroscopy in comparison with an authentic sample.

In the other fractions no alkaloids were detectable with Dragendorff reactive, but several spots appear on the chromatogram when a spray of phosphomolybdic acid is used (3% in CH_3OH).

These results are in accordance with the fact that *Virola* bark, which is known to contain 5-6% mainly 5-o-methyl-bufotenine [6] was used in the preparation of the snuff drug as witnessed by one of us (D.G.)

The presence of 5-o-methyl-bufotenine in the " bark epéna " confirms the observation that this preparation is more active than that of " seeds ". In effect 5-o-methyl-bufotenine is more active than other tryptamine derivatives as hallucinogenic [7].

If we compare now the above result with those previously reported on similar preparations of bark snuff drugs [5] we may notice that in some case also bufotenine and other tryptamine derivatives may be found in addition to the 5-o-methyl-bufotenine. This fact may be attributed to the alkaloid turnover in plant, and to the different species of *Virola* used.

(1) The colour may be different according to the preparation procedures.

On the basis of the above findings and of the more recent observations it is possible to reconsider the characters of these snuff drugs and to make a distinction among yopo and epena on the basis of the plant used in their preparation.

In effect the " seeds preparations " are obtained using as a main ingredient the seeds of a Leguminosa i.e. *Piptadenia peregrina* Benth. (syn Anadenathera), *P. macrocarpa*, *P. colubrina*, *Acacia* (Acacia ñopo) and *Mimosa*, which grows in the llanos and the sabana. Thees seeds are object of an invisible trade to the upper Orinoco basin. It has been also reported that these plant may be cultivated also in the rain forest in the indian " conucos " and are known as " pararo " [8].

Piptadenia peregrina and the other related species contains tryptamine derivatives as demonstrated by Fisk, Johnson and Horning [9].

The preparation of the seed snuff drug is based on the heating of the seeds on mild fire with a mixture of calcinated snail shells: a white cake is obtained which is used to prepare the powder for the snuff.

The " bark preparations " are made from various *Virola* species, which are known among Yanoama tribes as *epéna* or *yakoana* [7], [10].

Only the bark and the bark exudate of *Virola* is used for this purpose. It was also reported that *Virola* in addition to bufotenine derivatives may contain minute amounts of harmine derivatives which would potentiate the drug acting as mono amino-oxidase inhibitors [6].

Altough in the present time the name yopo and epena are promiscuously used to indicate snuff drugs, we propose in order to have a more effective classification to indicate as yopo (or ñopo) only the snuff drugs made from seeds. In effect the name yopo is originated from that of the plant called Ñopo (*Acacia ñopo*). The name epéna or ebéna should on the other hand be limited to the snuff drugs obtained from bark, that is from *Virola*.

The study of the alkaloids composition and contents of these snuff drugs accounts for their hallucinogenic properties.

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