

**CONTRIBUTION À L'ETUDE DU STRYCHNOS  
USAMBARENSIS GILG, PRINCIPAL CONSTITUANT  
D'UN POISON DE FLÈCHE CURARISANT AFRICAÏN.  
[French Text]**

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University of Liège (Belgium), 1973**

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CONTRIBUTION TO THE STUDY OF STRYCHNOS  
USAMBARENSIS GILG, MAIN INGREDIENT OF  
AN AFRICAN CURARIZING ARROW POISON

1) *Strychnos usambarensis* is concerned with the composition of an arrow poison used in Africa for hunting. During a trip in Eastern Rwanda to collect some medicinal and poisonous plants, the author has observed this usage by Banyambo (small tribe living along the Akagera River on the border between Rwanda and Tanzania). The curarizing properties of some alkaloid fractions allow us to explain the activity of this poison so that curare can not any longer be considered as specific to South America.

2) By chromatography combined to a new process of extraction using freeze-drying to avoid the destruction of some unstable alkaloids, we have isolated eight alkaloids from barks of *Strychnos usambarensis* roots. These alkaloids were divided into three groups according to their polarity. The identification and the structural determination of these compounds were achieved by U.V., I.R., M.S., N.M.R. spectra.

3) Alkaloids of I<sup>st</sup> Group - Besides harman, found for the first time in Loganiaceae, we have isolated two new alkaloids (usambarensine and dihydro-usambarensine) of bis-indole type biogenetically derived from two tryptaminic and one monoterpene units as some alkaloids of Apocynaceae (*Ochrosia*) and Rubiaceae (*Uncaria*), two families very close to Loganiaceae from a chemotaxonomy point of view.

4) Alkaloids of II<sup>d</sup> Group - Besides a new anhydronium base (dihydroflavopereirine), we have isolated the N<sub>b</sub><sup>1</sup>-metho-derivatives of usambarensine and dihydro-usambarensine. These new products are very different from the formers through a quaternary ammonium function and a tertiary amine function, the facts explain their particular properties of solubility and extraction.

5) Alkaloids of III<sup>d</sup> Group - From this complicated mixture, we have isolated two bis-indole diquaternary alkaloids (C-dihydrotoxiferine and C-curarine). These potent products were previously isolated from Calabash-curare and some American *Strychnos*. It is the first time that these alkaloids are found in a *Strychnos* species growing outside America.

6) Furthermore, we have identified loganic acid and discussed the part that it could take in the biogenesis of various alkaloids.

7) Pharmacological experiments have shown that atropine-like activity of usambarensine and the curarizing properties of dihydrotoxiferine isolated from *Strychnos usambarensis*. Thus, this plant contains alkaloids acting either on smooth muscles (usambarensine) or on striated muscles (dihydrotoxiferine and curarine).

8) The main alkaloids of this *Strychnos* are bis-indole dimeric alkaloids either unsymmetrical or symmetrical. Their double presence in a plant form also an interesting observation. They belong to the newest indolic alkaloid group discovered during the "post-reserpine" period. These fascinating alkaloids are found indeed in Calabash-curare, *Catharanthus* (Vinca), Voacanga, *Geissospermum*...

9) Finally we have mentioned results of phytochemical screening on some thirty medicinal and toxic plants collected in Rwanda. These plants belong to various genera (*Acacia*, *Albizia*, *Anthocleista*, *Apodytes*, *Cassia*, *Cissampelos*, *Clematis*, *Dichrostachys*, *Fagara*, *Harrinsonia*, *Impatiens*, *Ipomoea*, *Kniphofia*, *Olea*, *Osyris*, *Parinari*, *Rhamnus*, *Rytigynia*, *Sesbania*, *Solanum*, *Strychnos*, *Thonningia*, *Tylophora*, *Ximenia*). Previously no plant of this country had been chemically studied.

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