

# A NEW INSECT MOULTING HORMONE PHYTOECDYSTERONE TAXISTERONE – B FROM THE ROOTS OF TRICHOSANTHES CUCUMERINA(LINN)

Kumud Shrivastava

Chemistry Department, Govt. M. L. B. Girls P. G. (Autonomous) College Bhopal (M.P.) , INDIA

## Abstract:

A new phytoecdysterone has been isolated from *Trichosanthes Cucumerina* Line (Cucurbitaceae), which exhibits strong moulting activity. On the basis of chemical and physico-chemical evidences, it has been identified as; 3 epi-22 deoxy –ecdysterone (I). This is the first example of the presence of naturally occurring insect moulting hormone in this plant .

Key words: Phytoecdysterone, moulting activity, hormone, physico – chemical

*Trichosanthes Cucumerina* is credited to reputed therapeutic value<sup>1,2</sup> and some steroidal constituents have already been isolated from the fruits and roots of this plant<sup>3,4</sup> therefore the leaves of *T. cucumerina* were investigated resulting in the discovery of a new phyto - ecdysterone.

Air dried and powdered leaves were extracted with 50% ethanol under reflux and the solution concentrated under reduced pressure. The concentrate was treated with Chloroform : methanol (1:2) and the filtrate concentrated to yield a viscous mass and this when chromatographed on silica gel, eluting with chloroform:methanol (3:4) gave Compound (I), mp 115-118°, ( $\alpha$ )<sub>c</sub><sup>18</sup> +40.5, C<sub>27</sub>H<sub>44</sub>O<sub>6</sub>, M<sup>+</sup>: m/e = 464. It had peaks in IR at 3410 (OH), 1655 ( $\alpha, \beta$  unsaturated Carbonyl), 2955 (enone), <sup>1</sup>H NMR indicated the presence of 5 methyl groups (0.80, 0.90, 1.29, 1.21 and 1.23 ppm for 18-Me, 21-Me, 26-Me and 27-Me respectively), and signals at 5.02 (2-H), 5.85 (7-H), 2.0 and 2.12 (OAc) were observed. An additional signal at  $\delta$  = 4.05 (1M, J=8 Hz) was assigned to an  $\alpha$ -configuration at C<sub>3</sub><sup>5</sup>.

Compound I formed an acetyl derivative mp 105-107°C, molecular formula C<sub>31</sub> H<sub>48</sub> O<sub>8</sub> M<sup>+</sup>:548 which exhibited the NMR spectrum which had analogous to those of phytoecdysteroids.

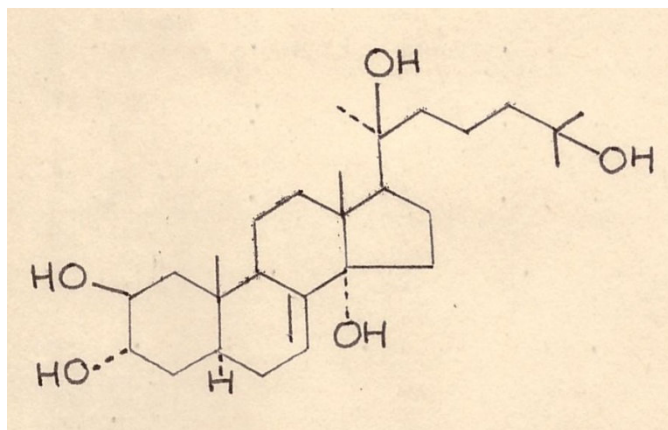
The assignments was done by comparison of its spectrum to that of an authentic sample of 22 -deoxyecdysterone (III)<sup>6</sup>.

Fine signals in the <sup>13</sup>C-NMR spectrum of the diacetyl derivative (II) of the compound were observed at (90.52 MHz, in CDCl<sub>3</sub> int. standard TMS), 38.2(C<sub>1</sub>), 67.5(C<sub>2</sub>), 39.3(C<sub>3</sub>), 34.0(C<sub>4</sub>), 50.5(C<sub>5</sub>), 200.0(C<sub>6</sub>), 121.0(C<sub>7</sub>), 164.0(C<sub>8</sub>), 33.2(C<sub>9</sub>), 38.0(C<sub>10</sub>), 20.0(C<sub>11</sub>), 31.0(C<sub>12</sub>), 47.0(C<sub>13</sub>), 84.9(C<sub>14</sub>), 30.8(C<sub>15</sub>), 29.8(C<sub>16</sub>), 52.2(C<sub>17</sub>), 17.7(C<sub>18</sub>), 23.5(C<sub>19</sub>), 75.1(C<sub>20</sub>), 26.6(C<sub>21</sub>), 44.5(C<sub>22</sub>), 18.9(C<sub>23</sub>), 44.8(C<sub>24</sub>), 71.5(C<sub>25</sub>), 29.6(C<sub>26</sub>), 29.5(C<sub>27</sub>).

<sup>13</sup>C-NMR spectrum of Compound II showed fine signals at 67.5, 39.2, 71.5 and 84.9 ppm were indicated of carbon attached to the oxygen functional groups.

The <sup>13</sup>C-NMR spectrum of II gave signals for 3-cat  $\delta$ =39.3 ppm which indicated  $\alpha$ -configuration at C<sub>3</sub> and differentiated it from the known compound 22 deoxyecdysterone (taxisterone), having B configuration at C<sub>3</sub>.

Signals in the mass spectrum of Taxisterone-B were at m/e 464 (parent, peak, weak), 446 (M-H<sub>2</sub>O)<sup>+</sup>, 210(M-3H<sub>2</sub>O)<sup>+</sup>, 392(M-4H<sub>2</sub>O)<sup>+</sup>, 377, 349, 309, 283, 109, (base peak C<sub>8</sub> H<sub>13</sub> O) and further supported its identity as; 3-epi-22-deoxyecdysterone (Taxisterone-B).



- |  |   |
|--|---|
| 1. R = R' = H                                    | 2. R = Ac, R' = H                                 |
| 3. R = H, R' = H and C <sub>3</sub> - OH $\beta$ | 4. R = Ac, R' = H and C <sub>3</sub> - OH $\beta$ |

Moulting test of Taxistrone-B when carried out on *Dysdercus similis freeman* (Heteroptera, Pyrrhgo) growth, revealed that it has potential moulting effect comparatively more than that of 22 -deoxyecdysterone (Taxistrone), thereby concluding the condition of C<sub>3</sub> $\alpha$ -OH group for high moulting activity.

**Acknowledgement:** We are thankful to the UGC for the financial assistance and R.R.L. Jammu Tawi (India ) for recording the spectras .

**References:**

1. R.N.chopra, S.LNayer, and Chopra "glossary of Indian Medicinal plants" CSIR Publication, New Delhi, p248 (1956).
2. K.R. kirtikar, B.D. Basu "Indian Medicinal Plants" Lalit Mohan Basu and Co., Allahabad, 2, 1112-1114,(1935).
3. Matasuno Takao and Nagata Seiichi, *Phytochemistry*, 10(8).1949-50(1971).
4. Konaoka Matao, Yoshizaki Masao and Fugino Hirolari, *Chem. Pharm. Bull.*, 30(7), 2570-4(1982).
5. K. Jemes, A.H. Manchanda J. Dougan and M.J Nagler, *Tetrahedron Letters*, 16,1475(1974).
6. Kimico Nakoni, Toshihiro Mohra,Toshiaki Tomimatsu nad Masaric Mishikawa, *Phytochemistry*, 21,2749-2751(1982).