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IDENTIFICATION OF CHEMICAL COMPOSITION OF A FLOWER: TITHONIAROTUNDIFOLIA (MILLER) S.F. BLAKE

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Abstract : Tithonia rotundifolia (Miller) S. F. Blake1,2 , belongs to the family Asteraceae which is commonly known as “Mexican Sunflower”. It is found in Mexico, wastelands and on roadside in India. It is annual herb, distinguishable by the sub shrub habit. Its leaves are stiffly hairy and alternate and sunflower-like heads of petal–like orange ray florets and yellow disk florets. Its leaves are used in malaria. The present paper deals with chemical examination of the flowers of the plant, which has been found to consists of two free sugars viz. D-Xylose D-Galactose, and six amino acids viz-Glycine, Arginine Alanin, Histidine, Leucine, Valine and aglycone Taxifolin.

***IndexTerms* - Chemical Composition, Tithonia rotundifolia, Malaria.**

I. INTRODUCTION

Tithonia rotundifolia (Miller) S. F. Blake[1,2], belongs to the family Asteraceae which is commonly known as “Mexican Sunflower”. It is found in Mexico, wastelands and on roadside in India. It is annual herb, distinguishable by the sub shrub habit. Its leaves are stiffly hairy and alternate and sunflower-like heads of petal–like orange ray florets and yellow disk florets. Its leaves are used in malaria. Earlier workers[3] have isolated various compounds from this plant. The present paper deals with chemical examination of the flowers of the plant, which has been found to consists of two free sugars viz. D-Xylose D-Galactose, and six amino acids viz-Glycine, Arginine Alanin, Histidine, Leucine, Valine and aglycone Taxifolin.

II. EXPERIMENTAL

The air dried and finely powdered flowers (2 kg) of this plant were extracted with 95% Soxhlet extracter ethanol for 6 hours. The total ethanolic extract was concentrated under reduced pressure to give a brownish viscous mass, which was subjected to TLC examination yielded two spots indicating it to be mixture of two compounds, designated as A and B. These compounds were separated by column chromatography and studied separately. Compound B was found in very small quantity hence it was not possible to examine it further.

III. STUDY OF THE COMPOUND A

It gave Molisch[4] test suggesting its glycosidic nature. It was hydrolyzed with 10% ethanolic H_2SO_4 to give aglycone and sugar moiety(ies) and studied separately.

IV. STUDY OF THE AGLYCONE

It is white powder. It has m.p. 231-234 ^{0}C, m.f. $C_{15}H_{12}O_7$; $[M]^+$ 304; ^{1}H-NMR (300 MHz, $CDCl_3$) δ : 11.72 (1H, s, 5-OH), 10.43 (1H, s, 7-OH), 8.61 (1H, s, 4′ -OH), 8.90 (1H, s, 3′ -OH), 4.62 (1H, d, J 11.4 Hz, H-2), 4.32 (1H, d, J 11.21 Hz, H-3), 5.93 (1H, d, J 2.0 Hz, H-6), 5.39 (1H, d, J 2.6 Hz, H-8), 5.76 (1H, s, H-2′), 6.32 (1H, d, 7.9 Hz, H-5′), 6.72 (1H, d, J 8.1 Hz, H-6′); ^{13} C-NMR (75 MHz, $CDCl_3$) : δ , 84.2 (C-2), 71.9 (C-3), 197.9 (C-4), 162.8(C-5), 95.9 (C-6), 168.1 (C-7), 94.8 (C-8), 162.6 (C-9), 102.2(C-10), 127.6 (C-1′), 115.4 (C-2′), 146.5 (C-3′), 145.2 (C-4′), 116.2 (C-5′), 118.7 (C-6′). Thus it was identified as Taxifolin by comparison of it spectral data with reported literature values[5,6,7].

V. STUDY OF SUGAR MOIETIES

The aqueous hydrolysate obtained after hydrolysis of the compound A, was neutralized with $BaCO_3$ and the $BaSO_4$ was filtered off. The filtrate was concentrated and subjected to paper chromatographic examination using following solvent systems.

(1) n-Butanol : Acetic acid : Water (4:1:5 v/v)[8]

(2) s-collidine[8]

The developed chromatograms were dried in air and sprayed with aniline hydrogen phthalate reagent and kept 15 minutes to develop the colour. The identity of test sugars were confirmed by comparison of their Rf values with those of reported values. The results are given in following table-1.

Table 1- Analysis results of tithonia rotundifolia

S. No.	Sugar	R_f reported n-B:A:W(4:1:5)	R_f found	R_f reported s-COLLIDINE	R_f found
1.	D-Galactose	0.16	0.14	0.34	0.37
2.	D-Xylose	0.28	0.27	0.50	0.49

VI. IDENTIFICATION OF AMINO ACIDS

For the identification of amino acids the flower (2 Kg) of the plant was refluxed with 6NHCI for 12 hours. The hydrolysate was dissolved in water (100 mL), filtered and concentrated to dryness. The excess of acid was removed by evaporation and finally dissolved in 10% isopropanol and subjected to paper chromatography examination using n-B:A:W (4:1:5) and s-Collidine as solvent system and Ninhydrin as detecting reagent. The identity of amino acids was confirmed by co-chromatography with authentic samples. The results were recorded in Table-2.

Table 2- Solvent System Rf s-Collidine and n-B:A:W (4:1:5)

S. No.	Amino acids identified	R_f reported (s-Collidine)	R_f found	R_f Reported n-B:A:W(n:1:5)	R_f found
1.	Arginine	0.16	0.17	0.031	0.029
2.	Alanine	0.32	0.34	0.110	0.120
3.	Glycine	0.25	0.27	0.057	0.53
4.	Leucine	0.58	0.56	0.337	0.330
5.	Histidne	0.28	0.27	0.032	0.035
6.	Valine	0.45	0.43	0.241	0.25

VII. RESULT AND DISCUSSIONS

The results reported in above Table 1 to 2 showed the presence of two free sugars viz. D-Xylose D-Galactose, and six amino acids viz-Glycine, Arginine Alanin, Histidine, Leucine, Valine and aglycone Taxifolin.

VIII. ACKNOWLEDGEMENT

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