TABLE—2. INTAKE OF Ca+Mg FROM THEIR MIXED CHLORIDE SOLUTIONS AT 20°, 30° AND 40°.

Clay Minerals	Intitial Conc. mg./25 ml	Adsorption (x/m) 20°	30°	40°
Kaolinite	24.32	22.59	22.62	22.60
	22.16	11.26	11.23	11.33
	6.08	5.61	5.59	5.60
	3.04	2.82	2.80	3.04
	1.52	1.41	1.42	1.50
Illite	24.22	22.63	22.61	22.59
	12.16	11.28	12.09	11 22
	6.08	5.63	5.59	5 57
	3.04	2.81	2.82	2.81
	1.52	1.30	1.40	1.40
Bentonite	24.32	27.77	22.81	23.69
	12.16	11.34	11.31	11.28
	6.08	5.66	5 66	5.63
	3.04	2.87	2.87	2.83
	1.52	1.45	1.46	1.41

The adsorption of calcium and magnesium by the three clay minerals under all conditions appears to be exothermic or their maximum intake is observed to be at 20°. This intake appears to occur in multimolecular layers as their adsorption values do not obey Langmuir's equation of adsorption.

References

1. R. E. GRIM, Clay Mineralogy, 2nd Ed. Mc-Graw Hill Book Co., N. Y., 1968.

Lupeol from the seed of *Lycospersicon esculentum*

V. K. SAXENA

Chemistry Department, University of Saugar, Sagar, M.P.

Manuscript received 11 October 1976 revised 26 April 1977, accepted 5 May 1977

LYCOSPERSICON esculentum[1] belongs to the family Solanaceae and is rich in Vitamins A and C.

Experimental

Dried and finely powdered seed of *L. esculentum* on extraction with petroleum ether (40 – 60°) in a soxhlet extractor and the extract on concentration (150 ml) yielded a greenish white deposit (0 9 gm). The deposit was dissolved in hot methanol and when cooled, a white mass (0 7 gm) was separated, which on crystallisation yielded a white crystalline compound m. p. 213.5°, C=84.43%, H=11.62%, molecular weight by semi-micro rast=399, molecular formula $C_{30}H_{50}O$, $[\alpha]_D^{28}=27°$ (in $CHCl_3$), m. p. of acetylated derivative 214°, $[\alpha]_D^{25}=47°$ (in $CHCl_3$), m.p. of benzoate derivative=264°. The compound gave positive Salkowsky reaction[2], Libermann—Burchard reaction[3], red colour with Noller's reagent[4], reddish violet colour in Brieskorn test[5], Tischugajen reaction[6] and yellow colour with tetra nitromethane[7] Ruzicka Thus it is identified as Lupeol. Mixed melting point determination with an authentic sample of *lupeol* also confirmed its identity as *lupeol*.

The identification of this compound is further supported by spectral data, U. V. (Methanol) $\lambda max = 200$ mμ I. R. (KBr)=3235 (M), 1640 (W), 1490 (W), 1382 (M), 1185 (W), 1105 (W), 1040 (W), 1 14(W), 985(W), 945(W)cm^{-1}, N.M.R. in $CDCl_3$ using TMS as internal standard, showed sighals at 4.64 and 3.18τ.

References

1. R. N. CHOPRA, S.L. NAYAR and I. C. CHOPRA, "Glossary of Indian Medicinal Plants", C. S. I. R. publication 1956, pp. 158.
2. E. SALKOWSKI, *Hoppe-Seylers Z.* 1908, 57, 521.
3. C. LIBERMAN, *Ber. dtsch Chem. Ges.*, 1885, 18, 1804.
4. C. R. NOLLER, R. A. SMITH, G. H. HARRIS and J. W. WALKER, *J. Amer. Chem. Soc.*, 1942, 64, 3047.
5. C H. BRIESKORN and BRINER, *Pharm. Acta. Helvat*, 1953, 28, 139.
6. TSCHUGAZEW, *Ref. Chem. Ztg.*, 1900, 24, 542.
7. L. RUJICKA and LIEBIGS, *Ann. Chem.*, 1929, 25, 471.

Chemical Examination of Stem Cuttings of *Pterospermum heyneanum* Wall

K. P. TIWARI*, R. N. CHOUDHARY and Y. K. SINGH RATHORE

Department of Chemistry, University of Allahabad, Allahabad-211002.

Manuscript received 21 December 1976, revised 28 March 1977, accepted 17 May 1977

PLANT. Pterospermum heyneanum (N. O. Leguminoseae). *Uses.* medicinal.[1] *Previous work.* Nil. *Present work.* Powdered, air dried stem cuttings were extracted with hot ethanol. The viscous mass obtained on concentration under reduced pressure was then extracted successively with petroleum ether, benzene, ether, ethyl acetate, acetone and methanol. The petroleum ether extract, on concentra ion, deposited a yellow solid which on chromatography over neutral alumina, followed by preparative T.L C. yielded a compound, m.p. 13'-7°, which was identified as β-sitosterol[2] (m.p., m.m p., superimposable IR).

The ether extract obtained was concentrated, dried, chromatographed over a column of silica gel. Elution with ethyl acetate, yielded another compound, molecular formula, $C_{15}H_{10}O_6$, m.p. 276-8°. It was

characterised as kaempferol by m.m.p., co-chromatography, microdegradation[3,4] and spectroscopic examinations[5].

Ethyl acetate extract on concentration gave a flavone glycoside, which when purified by column chromatography melted at 268° and analysed for $C_{22}H_{22}O_{11}$. On hydrolysis with mineral acid, it gave an aglycone $C_{16}H_{12}O_6$, m.p. 295°, and glucose. The aglycone has been found to be kaempferide (4′-methyl ether of kaempferol) by analysis, colour reactions, spectral data and preparation of derivatives. The glucose unit has been shown to be linked to 7-hydroxyl group by the study of spectral shift using aluminium chloride[6] and sodium acetate[7]. The presence of glucose in the pyranose form has been proved by periodate oxidation and the presence of a β-glycosidic linkage has been confirmed by its hydrolysis with emulsin. Work on other compounds isolated from *Pterospermum heyneanum* is in progress.

References

1. R. N. Chopra, S.L. Nayar and I.C. Chopra, "Glossary of Indian Medicinal Plants", C.S.I.R., New Delhi, 1956, p. 207.
2. P. S. Gupta, P. B. Dass and S. K. Saha, *J. Indian Chem. Soc.*, 1971, 48, 95.
3. E. G. Bate Smith and T. Swain, *J. Chem. Soc.*, 1953, 2187.
4. J. Chopin and H. Pacheco, *Bull. Soc. Chem. Biol.*, 1958, 40, 1593.
5. K. Peach and M. V. Tracey, "Modern Methods of Plant Analysis", Springer Verlag, Berlin, 1955, Vol. 3, p. 485.
6. R. M. Horowitz, *J. Amer. Chem. Soc.*, 1957, 79, 6561.
7. L. Jurd and R. M. Horowitz, *J. Org. Chem.*, 1957, 22, 1018.

Study of Thallium (I)-Glycollate, Lactate and Mandelate Complexes.

K. N. SAHU

Chemical Laboratory, Birla Institute of Technology, Mesra, Ranchi.

Manuscript received 22 September 1976, revised 11 April 1977, accepted 16 April 1977

THALLOUS complexes with glycollic, lactic and mandelic acids have not been cited in the literature. In the present investigation author has therefore chosen these complexes for the study of their composition and stability.

E. Merck thallous nitrate and B.D.H. (Analar) glycollic, lactic and mandelic acids are used for preparing the solutions in double distilled water. Conductance measurements are done with "DORON" conductivity bridge with 1000 cycle WTW oscillator and dip type conductivity cell. Absorbance measurements are done with the Beckman model DU quartz spectrophotometer using 5 mm light path absorption cells. All measurements are carried out at a temparature of 28 ± 0.5° and at a *p*H of 6.5.

The composition of the complexes are first studied by monovariation[1] method. 0.033*M* and 0.025*M* equimolar solutions were mixed keeping the volume of metal solution as 5ml and varying the volume of ligand solution making total volume equal in all the cases. Thallous ion forms 1 : 1 complexes with all the three ligands. The composition was further confirmed by Job's method[2] using conductance and absorbance as index properties. For conductance measurement 0.025*M*, 0.012*M* and for absorbance 0.05*M* equimolar solutions were employed.

The instability constant and hence the stability constant of the complexes are determined by Job's method[2]. For conductance measurement 'P' (Molar concentration of ligand/Molar concentration of metal solution) was kept at 1.5, 2.0 and 2.5 with C = 0.01*M*. For spectrophotometric study 0.02 *M* metal and 0.05*M* ligand solutions were mixed, and for each ligand readings were recorded at three different wave lengths according to suitability ranging from 245 to 280 nm.

The values of dissociation constants both by conductometric and spectrophotometric methods are in good agreement with each other and are reported to be 2.11×10^{-2}, 9.22×10^{-2} and 11.7×10^{-2} respectively for the thallous glycollate, -lactate and -mandelate complexes.

The change in the free energy of formation of glycollate, lactate and mandelate complexes by the equation $F = -RT \ln K$ are calculated to be −2.299, −1.421 and −1.279 K. cals per mole respectively at 28°.

References

1. I. A. Khan and D. Sen, *Proc. Indian Acad. Sci.* 1959, 49A, 226.
2. P. Job, *Ann. Chim.*, 1928, X. (9), 113.

Titrimetric Determination of Copper(II) with Thioglycollic Acid.

SAMEER BOSE, M. P. SAHASRABUDDHEY
and
KRISHNA K. VERMA

Department of Chemistry, Government Science College, University of Jabalpur, Jabalpur 482001.

Manuscript received 3 November 1976, revised 11 April 1977, accepted 16 April 1977

A method for the determination of copper(II) in aqueous solution is described based on the titration of a cupric salt solution with standard thioglycollic acid solution. Cupric ion oxidises thioglycollic acid to dithioglycollic acid with the simultaneous formation of cuprous mercaptide[1,2]. The latter compound