Amino acid	Per 100 g of dried material	Expressed as g of N_2/100 g of dried material
Leucines	1·23	0·130
Phenylalanine	0·41	0·035
Tyrosine	traces	—
Alanine	0·67	0·105
Arginine	1·09	0·350
Threonine	0·220	0·026
Glycine	0·680	0·127
Serine	0·230	0·031
Glutamic acid	1·010	0·096
Aspartic acid	0·670	0·070
Methionine	0·068	0·006
Valine	traces	—

The nitrogen metabolism in the plant seems to be low as it contains 1·56% total nitrogen on dry weight basis. 0·98% nitrogen has been accounted for by estimation of amino acids. Histidine, lysine, and cysine were found to be only in traces and hence were not estimated. The number of free amino acids in the plant was practically the same as the total amino acids except for the τ-amino butyric acid which was detected in the free state.

The author is grateful to Dr. J. W. AIRAN, Principal, Wilson College, Bombay for his guidance.

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Résumé

L'examen de la *Nopalea cochinellifera* pour en déterminer la composition amino-acide a révélé que le métabolisme de l'azote est bas. Sur 1,56% d'azote total du tissu sec, la présence de 0,98% a pu être expliquée par la détermination, au moyen de la chromatographie sur papier, de la quantité d'amino-acides qui y est contenue.

Organic Acid and Carbohydrate Metabolism in *Nopalea cochinellifera*

The occurrence of organic acids and carbohydrates in chlorophyllous tissues of plants and their interconvertibility is a well established fact. BENNET-CLARK[1], in his review of literature on this subject, emphasized that succulent plants exhibit diurnal fluctuations in the acid content of their chlorophyllous tissues and thereby exhibit a special type of metabolism. He included plants belonging to *Crassulaceae, Cactaceae, Liliaceae,* as examples of this type of metabolism. Plants belonging to these families accumulate organic acids in their chlorophyllous tissues in dark and lose them on illumination. WARBURG[2] indicated the possibility of this type of metabolism in plants belonging to other families also, possessing strong cuticle.

WOLF[3] observed a reciprocal relationship between organic acids and carbohydrates in crassulacean plants.

KREBS[4] proposed a new theory to correlate the variation in organic acids and carbohydrates in plants.

The plant in the present investigation is a spineless cactus and has a close relationship with *Opuntia*. It has been fairly worked out in detail for its organic acid content, carbohydrate content, amino acid content, and enzyme systems and the present communication is a report of results regarding its carbohydrates and organic acids. and their variation over a period of 24 h.

Materials and Methods. Qualitative examination of the phylloclade of the plant for organic acids was done in the alcohol extracts of the plant. Circular paper chromatographic technique developed by GIRI and RAO[5] was used to identify organic acids; pentanol-formic acid as the developing solvent, and bromophenol blue, ammonical silver nitrate, and ammonium-vanadate as the spray reagents[6]. Sugars were identified in alcoholic extracts by the same technique using butanol; acetic acid; water = 4:1:5[7] for development of chromatograms, and aniline-hydrogen phthalate[8], aniline-diphenylamine phosphoric acid, α-naphthylaminephosphoric acid, and triphenyl tetrazolium chloride as spray reagents[9]. Titratable acidity of the plant was determined by the method of THOMAS and BEEVERS[10]. 5·0 g of the fresh phylloclade tissue was sliced before plunging it into 100 ml of boiling water. Boiling was continued for 20 min and after cooling it was titrated against 0·1 *N* NaOH using a few drops of phenolphthalein as indicator. The titratable acid number (T.A.N.) was expressed as the number of ml of 0·1 *N* NaOH required to neutralize the acid content in the boiled residue and liquid originating from 100 g of the fresh tissue.

Reducing and total sugars were estimated in the alcoholic extracts of the plant by the method of SOMOGYI[11].

These studies were carried out over a period of 24 h in January 1957 in Bombay.

Results. The following organic acids were found to be present in the plant; malic acid, citric acid, and traces of oxalic acid. Sugars-fructose, glucose, sucrose, maltose, and traces of raffinose.

The following Table gives the variation of organic acids during 24 h of a day.

Table I

Winter January Bombay	Time	Temperature °C	Malic Acid	Citric Acid	Oxalic Acid
	8·0 A.M.	21	+ + + +	+ +	—
	12·0 noon	28	+ + +	+	—
	4·0 P.M.	27·5	+	+	—
	8·0 P.M.	26·0	+	+	—
	12·0 midnight	22·0	+ +	+	—
	4·0 A.M.	22·0	+ + +	+ +	—

+ + + + = very prominent; + + + = prominent; + + = moderate; + = present; – = traces.

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The following Table summarizes the findings regarding titratable acidity and carbohydrate variation in the plant over a period of 24 h in a day.

Table II

Winter January Bombay	Time	Temperature °C	Titratable acid number	Reducing sugars as glucose	Total sugars as glucose
	8·0 A.M.	21·0	82·12	24·8	63·0
	12·0 Noon	28·0	33·2	27·0	72·0
	4·0 P.M.	27·5	8·1	40·5	90·0
	8·0 P.M.	26·0	10·6	36·0	67·5
	4·0 A.M.	22·0	63·1	31·5	63·3

Reducing sugars are expressed as mg of glucose present in 100 g of the fresh plant material.

Discussion. These observations are in agreement to the findings of BENNET-CLARK[1] and PUCHER *et al.*[12], who have shown that carbohydrates are the main sources of organic acids and hence act as their precursors. There is reciprocal relationship between the carbohydrates and organic acid content of the plant during different hours of the day. The temperature during different hours of the day seems to have a role in the accumulation of organic acids which is maximum at the lowest temperature. This observation is in good agreement with that of BONNER[13]. The variation in titrable acidity is mainly due to variation in malic acid content.

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Résumé

L'étude des variations de la quantité d'acide organique et d'hydrate de carbone dans la *Nopalea cochinelliferae* pendant les 24 h de la journée indique que les deux sont en raison inverse. Il semble que la température aussi joue un certain rôle dans leurs variations.

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Formation of Histamine in a Canine Mastocytoma

It has been well established by RILEY and WEST and their co-workers that mast cells contain histamine[1]. SCHAYER[2] showed that cell suspensions from peritoneal fluid of rats could form C^{14} labelled histamine from L-histidine labelled with C^{14} in the 2-position of the imidazole ring, and he also presented evidence that the mast cells of these suspensions were responsible for the histamine formation observed.

Recently we have had the opportunity to study, with the use of SCHAYER's methods, the rate of histamine formation in a mastocytoma from a dog. The tumor was located in the abdominal skin and had the appearance of a typical mastocytoma[3]. It was excised under thiopentone anesthesia and tissue samples were taken for histological examination, for determination of histamine content by bioassay[4], and for estimation of histamine forming capacity. For the latter the tissue (about 0·5 g in each sample) in minced form was incubated with C^{14}L-histidine (40 µg) at 37°C in an atmosphere of nitrogen. The volume of each sample was made up to 2 ml by 0·1 *M* sodium phosphate buffer (pH 7·4) containing aminoguanidine in a concentration of 10^{-4} *M*. After 3 h of incubation non-isotopic histamine was added to the samples to serve as 'carrier'. The proteins were precipitated with trichloroacetic acid and the histamine extracted from the samples and purified. The radioactivity of the histamine was then determined under standardized conditions. Parallel incubations with boiled tissue provided blank values. For details about the method see SCHAYER, DAVIS, and SMILEY[5] and KAHLSON, ROSENGREN, WESTLING, and WHITE[6].

The tumor was very rich in mast cells (220000 mast cells/cm³ tissue) and its histamine content was high (320 µg/g tissue). The histamine forming capacity was also considerable. The following values (expressed in µg of C^{14}histamine formed by 1 g tissue in 1 h, with correction for blank values) were obtained: centre of tumor 0·24 and 0·27, subcutaneous tissue in close vicinity of tumor 0·06. The relative histamine binding capacity[2] was calculated to be about 20. This rate of histamine formation is surpassed only by that in cell suspensions from rat peritoneal fluid[2], rat stomach[7], and rat fetuses[6].

The observations thus show that tissue from a mastocytoma of a dog had a high capacity to form histamine. This is considered additional evidence that mast cells form histamine and not merely store it.

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Zusammenfassung

Die Aktivität der Histidindekarboxylase in einem Mastozytom beim Hund wurde *in vitro* untersucht. Die Ergebnisse bestätigen die Ansicht, dass Mastzellen nicht nur Histamin speichern, sondern es auch bilden können.

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Necrosin und die Leukozytenphagozytose

Wir haben bereits mehrmals darauf hingewiesen, dass die phagozytäre Tätigkeit der Leukozyten vom entzündlichen Exsudat wesentlich stärker stimuliert wird als vom Blutserum und vor allem vom Transsudat. Die Untersuchung des Phänomens ergab, dass die bei Entzündung vorliegende erhöhte Phagozytose als Resultante mehrerer Faktoren in Erscheinung tritt[1]. Die phagozytosestimulie-

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