critical cation activity ratios for several other grasses. The uptake potentials of a few crops is sketchy. However, the available literature indicates that beans, tomatoes, celery and setaria require K potetials ranging from −3600 cal $mole^{-1}$ to −2300 cal · mole[1–6] while the uptake potentials for potatoes and rye grass are −4156 cal $mole^{-1}$ and −5600 cal $mole^{-1}$ respectively. In the present study, Δ G optimum for sugarcane is −1610 cal $mole^{-1}$ (Table I) which is suggestive that sugarcane requires much higher K concentration in the ambient medium than the crops so far reported.

Rationale of K fertilization: Having known Δ G optimum for sugarcane and Δ GK for SNK soil, an attempt was made to fertilise the soil by drawing the buffer curve (Fig. 2). The actual fertilizer computations are shown in Table II. The derived K requirement was 246 kg/ha (Table II) and field responses for sugarcane have been observed upto 250 kg K/ha.

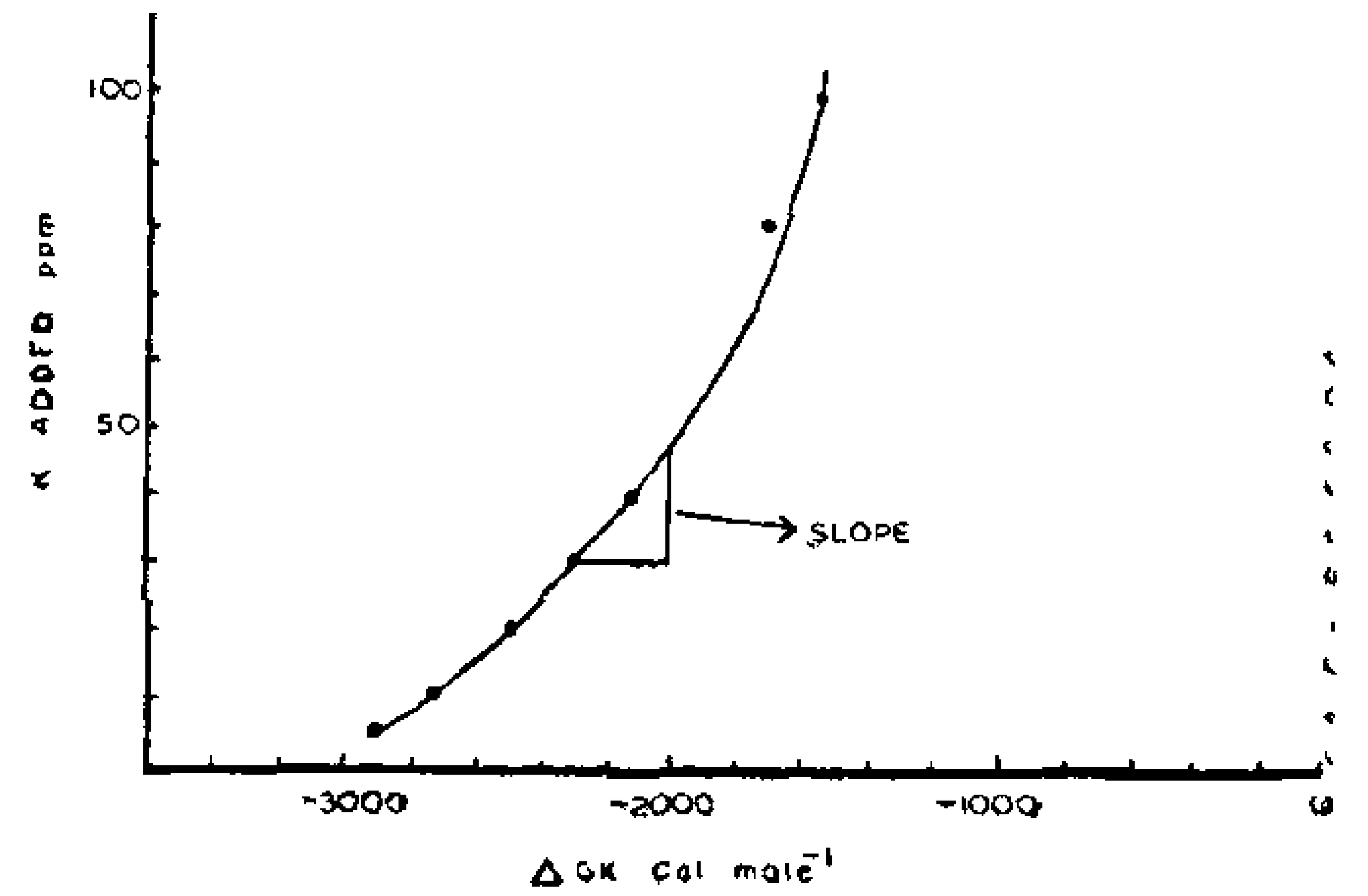

FIG. 2. Buffer curve showing relationship between Δ GK and K added in SNK soil.

TABLE II

Scheduling K fertilization in Sankeshwar soil based on ΔGk and Δ G optimum for sugarcane

1. Initial Δ Gk	= −3920 cal $mole^{-1}$
2. Δ G opt for sugarcane	= −1610 cal $mole^{-1}$
3. Difference, *i.e.*, Δ Gk− Δ G opt.	= −2310 cal $mole^{-1}$
4. Slope at the inflexion point in graph 2 indicates	= −300 cal $mole^{-1}$
5. ∴ 2310 cal $mole^{-1}$ required	= 123·2 ppm K or 123 mg K/kg
6. A furrow slice of soil weighs	= 2·2 × 10 kg/ha
7. ∴ K required per hectare field of sugarcane	= 246·5 kg/ha

The chief advantage of fertilizing the crops based on the nutrient potential concept over the conventional soil-tests is that the former defines precisely ionic root environment and is neither influenced by soil-solution ratio nor by the nature of the electrolyte. The only disadvantage is that these approaches are time consuming but reliable short cut methods can be found.

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*Δ G exhaust = −RT ln AROK (Critical).

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A NEW POSTHARVEST DISEASE OF *ANNONA SQUAMOSA* L.

DURING the usual survey at Kurukshetra during August–September 1978, a new fruit rot disease of Sharifa (*Annona squamosa*) was observed. The disease was characterised by the discolouration of the fruits from fruit end portion. After 4–5 days, the discoloured area became brown to black and within a week the whole fruit started rotting. At a later stage, the fruit was covered with greyish black mycelium along with globular to spherical perithecia like bodies.

Isolations were done by the usual technique on P.D.A. plates. Fungus isolated was identified as *Colletotrichum* state of *Glomerella cingulata* (Stonem.) Spauld. and Schrenk. Colour of the colony was greyish black. Hyphae hyaline, creeping, septate, branched, 3·5–4 μ wide. Conidiophores branched, hyaline. Conidia formed abundantly, singly attached to conidiophores, cylindrical to oval, one celled having an oil globule in the centre, 15.5–16 × 3·5–4 μ.

Pathogenicity test was carried out by inoculating the fruit by Granger and Horne[1] method. To provide the maximum humidity, a pad of sterilized cotton was put on inoculated region (26). After 4–5 days typical symptoms were observed and reisolations proved the same pathogen.

The culture has been deposited in Commonwealth Mycological Institute, Kew-Surrey, England, (I.M.I. 234471).

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GROWTH POTENTIAL OF *SPIRULINA PLATENSIS* IN ANIMAL WASTES

COWDUNG gas plant is a one-step recycling system in which the dung is fermented to produce combustible fuel (methane) and the resultant slurry is of good manurial value. In an integrated system as suggested in Fig. 1, part of this slurry can be further recycled by interpolating algal biomass and fish production.

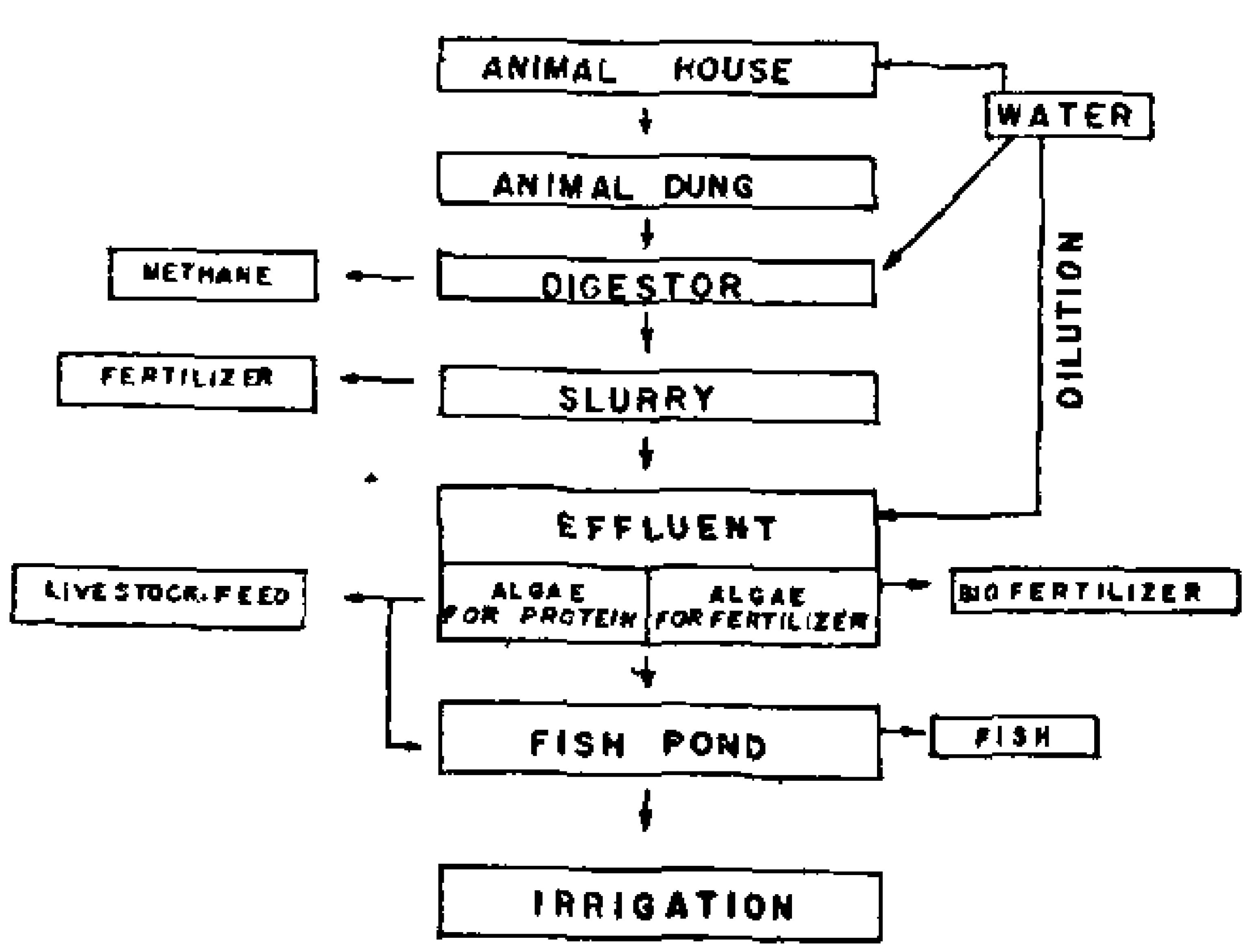

FIG 1. Schematic representation of an integrated animal waste recycling system.

The present report deals with the growth potential of the protein rich blue-green alga *Spirulina platensis* in the diluted slurry effluent from the cowdung gas plant and also in cattle urine. *S. platensis* contains 60–65% protein and all essential amino acids and vitamins with BV, TD, NPU and PER values of 68, 75, 52 and 2·07 respectively (*unpublished*). This alga has a safe history of usage and the biomass is amenable to simple cloth filtration.

Digested slurry effluent from a cowdung gas plant was filtered through cotton pads to remove the coarse suspended solids. It was diluted to 1, 2, 3, 5, 7 and 10% levels with water. Cattle urine was also similarly filtered and diluted. One set of flasks at each concentration level was supplemented with 18 g $NaHCO_3$/l. One ml suspension from an actively growing culture of *S. platensis* was inoculated into 50 ml medium contained in 250 ml flasks and the cultures were aerated at 32 ± 1° C for 10 days at 4,200 lumens/m². Growth was measured in terms of dry weight, after making necessary corrections for the blanks. All the cultures were unsterile.

TABLE I

Growth potential of Spirulina platensis *in the slurry effluent with and without added bicarbonate* (18 g/l)

Conc. slurry effluent	pH	Solids (g/l)	Nitrogen (mg/l)	Dry wt. alga (g/l)
1%	8·7	0·0684	25	0·23
1% + $NaHCO_3$	9·2			0·63
2%	8·7	0·1368	50	0·27
2% + $NaHCO_3$	9·3			0·74
3%	8·7	0·2052	75	0·33
3% + $NaHCO_3$	9·1			0·87
5%	8·7	0·3420	125	0·32
5% + $NaHCO_3$	9·1			1·08
7%	8·7	0·4788	175	0·38
7% + $NaHCO_3$	9·2			0·84
10%	9·7	0·6840	250	0·37
10% + $NaHCO_3$	9·1			0·94
Control	9·2		400	0·90

Tables I and II summarize the growth potential of the alga in the slurry effluent and cattle urine. The slurry effluent supported the algal growth at all dilutions even in the absence of any added bicarbonate, although bicarbonate addition stimulated the growth to the extent of that in the synthetic inorganic nutrient medium (control) (Table I). The reduction in the growth at higher concentration levels may possibly be due to the limitation in light penetration. Growth of *Chlorella, Scenedesmus* and *Euglena* has been observed to be supported by hog manure (3 g dry wt./l) and an yield of 3·2 g/l reported for *Chlorella*[1] is ten times more than any known record. Tchan and Webster[2] have advocated the use of a continuous