only the lowest 4–5 range and the peak was also shifted to a lower range.

In *Brassica*, pollen stored for 16 days at < 10% RH covered the same frequency range as that of the fresh pollen; the number of pollen tubes in the median range, however, was higher in stored pollen. Frequency range of the samples stored for 16 days (at 40% RH), and for 55 days (in both the humidities) was only up to 12–14 units and 9–11 units respectively. As in *Crotalaria* the peak was shifted to a lower range (3–5 units) in these pollen samples. Thus, in pollen samples stored for longer periods, the proportion of shorter tubes was higher and the fastest growing pollen tubes were far shorter than those of the fresh pollen.

It is obvious from the results of both *Crotalaria* and *Brassica* that *in vitro* germinability does not necessarily reflect the ability of pollen to produce vigorous tubes. The vigour of pollen tubes was not reduced when the storage was confined to a limited period (7 days for *Crotalaria* and 16 days for *Brassica*), which would vary between species and between storage conditions. Interestingly the pollen of *Brassica* stored for 16 days at lower humidity showed better tube growth when compared to fresh pollen. This agrees with reports of improved germination in pollen grains of *Brassica oleracea*[9] and *Zea mays*[10] stored for a few days. Beyond optimal period, stored pollen showed significant reduction not only in per cent germination but also in tube length. For effective assessment of stored pollen grains it is therefore important to assess, apart from germinability, post germination processes, particularly the vigour of the tube.

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EFFECT OF ALCOHOL AND CHEMICAL EFFLUENTS ON SEED GERMINATION AND SEEDLING GROWTH OF BLACK GRAM

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POLLUTION of water resources by domestic and industrial wastes impairs quality of water. Polluted water is used for irrigation as the effluent waters and sludges contain plant nutrients and trace metals in small quantities which are essential for plant growth. However at higher concentrations they are toxic[1]. Trace elements including zinc hinder plant growth by binding co-ordinately with fixed positions of enzymic proteins[2].

The effluent of the Coimbatore Alcohol and Chemicals Factory, Periyapuliyur, Bhavani is used directly for irrigating crop fields or mixed with Bhavani river waters. The pollutants contributed by various processing units of this factory are rich in inorganic constituents like ammoniacal nitrogen (18 mg/l), chlorides (1270 mg/l), sulphides (26 mg/l), sulphates (1000 mg/l), flourides (0.63 mg/l) and sodium (5%). The effluent is also rich in suspended solids (12600 mg/l), dissolved solids (21180 mg/l), volatile solids (78865 mg/l) and traces of heavy metals (copper 0.5 mg/l and zinc 1.1 mg/l). The dissolved pollutants contribute to high B.O.D. (34.650 mg/l) and C.O.D. (113095 mg/l) values of the effluent. During collection the pH of the effluent was 4.7.

The seeds of *Vigna mungo* (L.) Hepper var. Co.5 were procured from the Tamil Nadu Agricultural University, Coimbatore. Selected healthy seeds, divided into batches of 20 each, were soaked in different effluent concentrations (1, 2.5, 5, 10, 25, 50 and 100%). One batch of seeds soaked in distilled

Table 1 *Effect of the effluent on seed germination and seedling growth of Vigna mungo (L.) Hepper var. Co.5*

Conc.	Germination (%)	Epicotyl length (cm)	Hypocotyl length (cm)	Root length (cm)	Number of lateral roots formed
Control	95	12.2 ± 0.9	6.1 ± 0 6	11.5 ± 1.1	20 ± 2.3
1%	95	12.7 ± 0.7	6.7 ± 0.8	12.5 ± 1.0	24 ± 0 6
2.5%	95	17.0 ± 0.9*	7.8 ± 0.3*	13.6 ± 1.1	27 ± 2.4*
5%	90	14.4 ± 0.7	7.6 ± 0.7	10.6 ± 1.0	25 ± 1.9
10%	85	14 0 ± 1.0	7.1 ± 0.5	8.8 ± 0.3	18 ± 1.9
25%	35	9.3 ± 1.5	6.7 ± 0.5	5.3 ± 0.9**	15 ± 1.0
50%	10	3.2 ± 2.2**	2.0 ± 1.4	3.0 ± 1.7*	7 ± 4.5**
100%	0	0	0	0	0

± Standard error; * and **, significant difference from the control at $P = 0.05$ and 0.01 levels respectively.

water served as the control. After 24 h of soaking the solutions were decanted and the seeds arranged in germination towels and allowed to germinate for 8 days at 25 ± 2°C. On the day of termination (8th day) of the experiment the seed germination percentage and seedling growth parameters viz. (i) the length of the epicotyl and hypocotyl, (ii) the root length, and (iii) the number of lateral roots formed were recorded. The average values of duplicate experiments are given in table 1. Employing the *t* test the significant differences of the seedling growth parameters were statistically evaluated at $P = 0.05$ and $P = 0.01$ (table 1) levels.

In black gram, the lower concentrations of the effluent (up to 2.5%) promoted seedling growth. Similar growth was observed earlier in *Cajanus cajan*[4] and *Oryza sativa*[5,6] treated with different industrial effluents.

The inhibition of seed germination and subsequent seedling growth at higher concentrations of the effluent might be due to the high levels of total dissolved solids which enrich the salinity and conductivity of the solute absorbed by seeds before germination.

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RUSSULA CRUSTOSA PECK—AN ADDITION TO INDIAN EDIBLE MUSHROOMS

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DURING our studies on the fleshy fungi of North-Western Himalayas, an edible species *Russula crustosa* Peck was collected which is described here as new to India[1]. The specimens have been deposited in the Herbarium, Department of Biosciences, Himachal Pradesh University, Shimla (HPUB).

Russula crustosa Peck, 39th Report, New York State Museum Nat. Hist. 41. 1886. Figure 1A–G.

Pileus 6–14 cm diam, convex when young, soon expanding and becoming plane with a shallow depression in the centre, sometimes subinfundibuliform in age; cuticle thin, slightly viscid when moist, but soon dry, dull, breaking into small crustose patches, yellowish brown to olive brown or greyish yellow[2]; margin incurved at first, becoming decurved to plane, prominently tuberculate-striate 0.5–1.0 cm from the edge inward. Taste mild. Odour nil. Lamellae adnexed to adnate, close, distinct, separable from the flesh, brittle, equal in length, often forked at or near