Once these biological properties and its safety are proved, this wildly growing plant (St. John's wort of Indian origin) could compete in international markets.

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Nitrate content in wheat leaf blades

To boost the yield of crop plants, excessive doses of nitrogen fertilizers are applied. This results in accumulation of nitrate in the vegetative parts. The content of accumulated nitrogen varies with the environmental conditions, cultivar, and age of the plant. Further, the accumulation of nitrate is likely to be particularly high under low-light conditions, and in the winter-grown crops. Presence of higher nitrate content in leafy vegetables and forage/fodder plants is of concern, as these are consumed by human beings as well as animals[1,2]. Nitrate though is hardly toxic as such, its reduction to nitrite by bacteria in the stomach poses threat to human health, as the nitrite causes methaemoglobinemia, particularly in infants. Further, in combination with amines, nitrate also acts as a source of the carcinogenic nitrosamines[2].

To reduce the nitrate content in the leaves, the various strategies include:

(i) Looking for genotypic differences in the level of nitrate accumulation for the same level of applied nitrogen. Such differences have been reported for several crops[3,4].

(ii) Steingrover *et al.*[5], on the basis of their studies in spinach, suggested that harvesting should be carried out in the afternoon when the nitrate content in the leaf blades is low. It was further suggested that the petioles should be removed as they have four- to five-old higher nitrate content than the leaf blades.

(iii) Considering that the enzyme nitrate reductase (NR) catalyses the rate limiting step in the sequence of reactions involved

Table 1. Nitrate content (μmol g^{-1} dry weight) of leaf blades at different stages of growth in high and low NR wheat cultivars

	Days after sowing								
Variety	16	23	30	39	49	60	70	79	88
Low NR	380.3	218.0	245.8	151 8	14.8	101.2	13.2	14.4	18.3
High NR	267.7 (29.6)	151.5 (30.5)	167.9 (31.7)	139.1 (8.4)	8.2 (44.6)	52.3 (48.3)	7.2 (45.4)	8.9 (38.2)	7.9 (56.8)
LSD ($P = 0.05$)	45.5	18.3	21.3	27.4	6.6	15.0	3.8	2.4	3.2

Figures in parentheses indicate per cent decrease in nitrate accumulation in the high NR cultivar over that of the low NR cultivar.

in the reduction of nitrate, Quillere *et al.*[6], on the basis of their studies in *Nicotiana plumbaginifolia*, suggested that over-expression of genes of NR help in reducing the nitrate content. The transformed *Nicotiana plumbaginifolia* plants, exhibiting 25–150% higher NR activity than the wild type, showed a drop of 32–47% in the nitrate content of the leaves. There was no change in the nitrogen content, protein and dry matter production.

(iv) Use of organic manures as an alternative to chemical fertilizers to reduce the nitrate content has been suggested by many, but there are contradictory reports on this[2].

The two wheat cultivars selected for the present study differed more than two-fold in their NR activity[7,8]. The field experiments were conducted on a sandy loam soil at the Indian Agricultural Research Institute, New Delhi, by following standard agronomic practices. Periodic sampling was done at 7 to 11 day intervals, taking 10 plants for each sampling. Dry weight of the plant samples was estimated after drying them in a hot air oven at 80°C to a constant weight. Downes'[9] improved hydrazine reduction method was adopted for estimation of nitrate in the leaf blades. The method was automated using a Technicon Auto analyser[10].

The high NR wheat cultivar recorded a significantly lower amount of nitrate accumulation in the leaf blades compared to the low NR cultivar throughout the ontogeny of the crop growth (Table 1). The decrease in nitrate accumulation ranged from around 30 to 56% at different stages of growth. Though the absolute amount of nitrate accumulation decreased towards the later stages of growth in both the cultivars, the per cent decrease in nitrate accumulation in the high NR cultivar over that of the low NR cultivar increased as the growth progressed.

The present study suggests that looking for genotypic variation in NR activity in the leafy vegetables and forage/fodder plants may be helpful to identify genotypes with low nitrate content. The studies are particularly important in view of the recent emphasis on diversification of the crops, i.e. increasing the area under vegetables and other horticultural crops, and on the agro-processing and exports wherein the specificity of the nutritional quality of the food material is important[11]. The present approach is beneficial provided, of course, the genetic variability to the extent available in wheat is present in these crops as well because the high NR cultivars, besides showing a decrease in nitrate content, exhibit an improvement in nitrogen harvest and dry weight[7,8].

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An interesting observation on the epidermal digestive glands of *Nepenthes khasiana* Hk.f.

The carnivorous plants have always intrigued biologists. Nearly 20–30% of the vascular plants contain glandular surfaces. These glands secrete many of the secondary products which have commercial value. A better understanding of the structure, cell biology and biochemistry of these glands may help in improving plant protection as well as finding additional compounds, secreted by these glands, with useful biological activity.

Heslop-Harrison[1] and Lloyd[2] studied the structure and morphology of secretory glands in the traps of insectivorous plants, particularly in *Nepenthes rafflessiama*. The present investigation is on the secretory glands of *N. khasiana* Hk.f., an endemic and endangered Indian insectivorous plant. The findings reveal that there are distinct digestive glands as well as a glandular epidermis, which are involved in secretion of enzymes for digestion.

The digestive glands are bodkin-shaped and have prominent neck distributed on the margins and inner surface of the epidermal flap. These glands through minute openings in their neck discharge the digestive enzymes along with glutinous fluid (Figure 1 *a* and *b*). The digestive glands are not connected with vascular bundle, and their outer tangential wall is highly thickened with incrustation of inorganic substances. The digestive enzymes have been located inside the globules present intracellularly in the inner and sub-epidermal layers of the pitcher, and their number ranges from 1 to 10 per cell, occasionally these globules are seen inside the digestive glands as