SHORT COMMUNICATION

Cabbage: A Rich Natural Supplement of Iodine

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Iodine is one of the most important trace elements in our body and it's deficiency causes a number of dreaded diseases like goiter, mental retardation, hypothyroidism and pregnancy-related problems. Iodine is not synthesized in our body, so it is always recommended to include iodine-rich food in our diet. Cabbage is an important source of iodine. A study was conducted to estimate the iodine concentration in 17 hybrids of cabbage under middle hill conditions of Uttarakhand. Hybrid Varun exhibited highest iodine concentration (7.41µg/100g) followed by CH-2200 (6.41µg/100g). The objective of the present work was to find out iodine-rich hybrids of cabbage, so that they can be used as a supplement of iodine.

Key Words: Cabbage (*Brassica oleracea*), Hybrids, Iodine supplement

Cabbage (*Brassica oleracea* var. *capitata*) is one of the important sources for supplementing iodine in the body (Key *et al*., 1992; Appleby *et al*., 1999). It belongs to cruciferous or mustard family. It is grown for the thickened main bud called head. This vegetable is full of nutrients and is low in calories. It is a rich source of some important elements like calcium, iron, iodine, potassium, sulphur and phosphorus. It is also loaded with a number of vitamins *viz*., A, B_1, B_2, B_6, C, E, K and folic acid. Cabbage is the cheapest and richest source of iodine and thus aids in the proper functioning of brain and nervous system. Iodine is necessary for the synthesis of thyroxin hormone. Goitrogenic compounds found in cabbage can affect the thyroid gland and slow-down hormone production. Fortunately, these goitrogenic compounds in cabbage are destroyed by heat. Cooking the vegetable properly will ensure that they do not affect the functioning of thyroid (Salunkhe and Kadam, 1998).

Owing to the importance of iodine (µg/100g) in human diet and cabbage being one of the important sources, 17 hybrids (Table 1) were selected for iodine estimation using Arsenic-cerium Redox method (Brown and Hutchinson, 1949).The work was carried out at Defence Institute of Bio Energy Research, Field Station, Pithoragarh. The hybrid samples were collected from different public and private seed companies and grown in open field in a randomized block design in three replications in the year 2011-12. The nursery was sown in 30 August, 2011 and seedlings were transplanted on 26 September, 2011. Net plot size was 6 m^2, spaced 50 cm between rows and plants apart. The observations were recorded on various horticultural and quality traits. The marketable heads were selected for iodine estimation on dry weight basis in three replications. Head of each hybrid was cut into small pieces, oven dried at 40°C and then ground to make fine powder. Iodine estimation was based on the principal of quantitative determination of micro amounts of iodine on catalytic reduction of microelements ceric (Ce^{+4}) to cerous (Ce^{+3}) by iodine. A suitable amount of dried sample (usually containing 0.04-0.08 µg of the iodine) was taken in a Pyrex test tube (15 x 125 mm). After digestion, incineration and extraction, the reduction of ceric to cerous is read in a spectrophotometer at 420 nm. Standard solution of KI (Potassium Iodide) containing 0.0-0.16 µg of iodine was run simultaneously. A straight line response is obtained by plotting concentration of iodine in µg against reading on spectrophotometer. Using this standard graph, the value for any sample was read. Data were recorded and analyzed statistically (Gomez and Gomez, 1984).

The iodine content of different cabbage hybrids is presented in Table 1. There were significant differences in the iodine content among the hybrids grown under mid-hill conditions of Uttarakhand Himalayas. The concentration range and mean of 17 samples were 1.60-7.41 and 4.55, respectively. Hybrid Varun exhibited highest iodine content (7.41 µg/100 g) followed by CH-2200 (6.41 µg/100 g) and Green Flash (6.40 µg/100 g). Iodine content of irrigated water and the soil, in which hybrids were planted, was also estimated at 1.23 µg/100 g and 5.59 µg/100 g (mean values), respectively. Iodine concentration

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Table 1. Iodine concentration in cabbage hybrids

Cabbage hybrids	Iodine (µg/100g)
Cabbage hy 1	5.34
Cabbage hy 2	2.73
Cabbage hy 3	4.29
Cabbage hy 4	1.75
Cabbage hy 5	4.51
Cabbage hy 6	4.95
Quisto	4.78
Kranti	3.33
DARL 802	4.00
DARL 801	5.80
CH 21	5.94
Green Flash	6.40
SIR	6.20
CH 2200	6.41
Speed 50	2.91
Krishna	1.60
Varun	7.41
CD @ 1%	1.629
CD @ 5%	1.211
CV%	15.997
SEM	0.420

in water and soil reflects the environmental iodine distribution and is also an important index of natural iodine intake by human beings. Iodine content of the plant is related to it's concentration in the soil as water taken up by plants gets evaporated from the leaves leaving behind iodine in the leaves. Since cabbage consists of leaves, the water lost through transpiration leads to iodine becomimg concentrated in the leaves. The range of iodine content in water, soil and cabbage in hill region was 1.10-1.36 µg/100 ml, 3.46-7.72 µg/100g and 1.59-7.41 µg/100 g respectively.

Food, soil and water are necessary for life and have a profound influence on human beings. Iodine has long been recognized as an essential micronutrient for human and livestock. The most common cause of iodine deficiency is the intake of iodine-deficient food. Besides many iodine supplements available in the market, cabbage can be one of the cheapest and richest source of iodine. The productivity of cabbage is much higher; with a yield potential of 500-600 q/ha especially if it is grown from hybrid seeds. Increased production through use of hybrid seeds can contribute towards global nutritional security.

References

Appleby PN, M Thorogood, JI Mann and TJ Key (1999) The Oxford vegetarian study: an overview, *Am. J. Clin. Nutr.* **70**: 525-531.

Brown HD and CS Hutchinson (1949) *Vegetable Science*. J.B. Lippincot Company, New York.

Gomez KA and AA Gomez (1984) *Statistical Procedure for Agricultural Research* (2nd Edition). John Wiley and Sons, New York, 680 p.

Key TJ, M Thorogood, J Keenan and A Long (1992) Raised thyroid stimulating hormone associated with kelp intake in British vegan men, *J. Human Nutr. Diet.* **5:** 323-326.