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# NRCOG NEWS

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## From the Director's Desk

### Garlic - A Wonder Drug !

Is garlic a spice or a medicine? Is it therapeutic for the major diseases of our times? Most of us know garlic as a favourite seasoning in salad dressings and as a staple of French, Italian, Greek, Middle Eastern, Indian and Chinese cooking. But garlic is also a medicine, an unusually powerful and versatile one that has been used since the dawn of medicine.

From epidemiological studies of cancer in China and Italy to clinical trials on high blood pressure and high cholesterol in the United States, Europe, and Japan, garlic has come under intensive scientific scrutiny in the last ten years as a potential "wonder drug". Much of this research has investigated the effects of garlic on cardiovascular disease. This priority of research is probably inspired by the prominence of diseases, such as heart attack and stroke, the leading causes of death in the industrialized world.

In 1994, scientists while reviewing a collection of previous clinical trials of garlic concluded that it lowers cholesterol and blood pressure, two important risk factors for cardiovascular disease. Notably, normal dietary amounts of garlic did this without any side effects more serious than a garlic odor in a small percentage of participants. Conventional drugs for these diseases cause side effects such as dry mouth, insomnia, drowsiness, depression, and impotence. In head-to-head trial comparing garlic against the cholesterol-lowering drug bezafibrate, garlic was just as effective. This is good news for the 25 percent of men and women aged twenty-five to fifty-nine in the United States who have high cholesterol levels.

Scientists have also recently investigated the possibility that garlic can prevent or treat some kinds of cancer. As early as 1981, scientists noted that populations in China eating more garlic had less incidence of stomach cancer than those eating less garlic. By 1985, researchers experimenting with constituents of garlic had identified mechanisms that could inhibit tumors. Scientists have now found evidence for the cancer-preventing effects of garlic from such population research, from research on isolated cancer cells, and from animal research. Cancer is the second leading cause of death in the United States, and this research suggests that garlic may help prevent stomach, bladder, breast, colon, and esophageal cancers. Besides it offers good remedy for respiratory, cardiovascular and skin disorders. Many of these uses come from the antibiotic and immune stimulating effects of garlic constituents.
(As quoted in a book " Healing Powers of Garlic" by Paul Bergner)

The recent scientific studies indicate that many constituents of garlic have different functions as under. However, all constituents are not present in all forms of garlic.
(i) Antibiotic : ajoene, allicin, allylmethyl thiosulfinate, diallyl trisulfied and methyl allyl thiosulfinate.
(ii) Inhibition of cancer : ajoene, allicin allixin, allyl mercaptan, allyl methyl trisulfide, diallyl disulfide, diallyl sulfide, propyline sulfide & S-allyl cystein.
(iii) Detoxification : ajoene, allicin, aliin, allixin, allyl methyl trisulfide, diallyl disulfide, dimethyl disulfide, dimethyl trsulfide, dipropyl disulfide, methyl ajoene & S-allyl cystein.
(iv) Antioxidant : aliin, diallyl hepta; hexa; penta; tetra and tri sulfide, S allyl cysteine & selenium.
(v) Lowering blood sugar : allicin, allyl propyl disulfide.
(vi) Lowers cholesterol : Ajoene, Allicin S-allyl-cysteine, Diallyl disulfide.
(vii) Liver protection : diallyl trisulfide.
(viii) Improvement in immune : diallyl trisulfide system against AIDS.

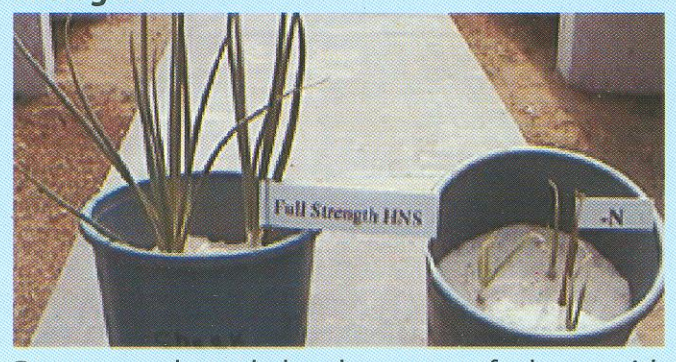
Garlic genotypes vary in chemical

compositions including pharmaceutical properties and flavoring compounds. Further, cultural practices and location of growing also exercise great effect on these vulnerable chemicals. NRC for Onion and Garlic has started research on identification and improvement of varieties with high yield and rich in medicinal properties. Further evaluation of medicinal status of garlic genotypes through cultural management is also on.

## Nutrient deficient studies in onion

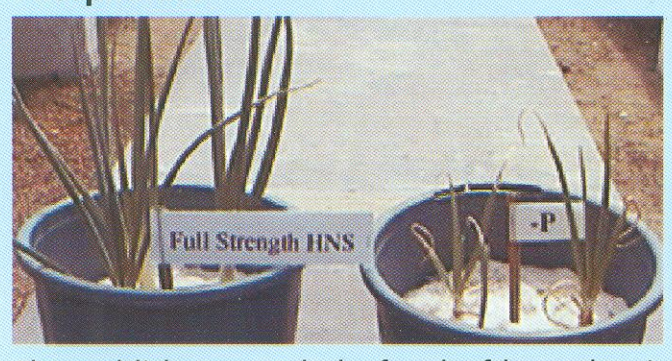
Onion crop yielding 30 t/ha removes 85 kg N, 42 kg P2O5 and 130 kg K2 O/ha from the soil. Besides Sulfur, Calcium and Magnesium is also taken by onion crop in sizable quantity. Unlike in cabbage, cauliflower, tomato and other vegetables the hunger signs in onion have not been studied in detail so far. For proper understanding of typical deficiency symptoms of major nutrients a comprehensive trial has been started. The visual deficiency symptoms of different nutrients are described here under.

**Nitrogen:**




Poor growth and development of plants with few thin leaves; stunted appearance. Chlorosis followed by drying of outer leaves.

**Phosphorus:**




The reddish to purple leaf or leaf base that is common in other vegetables was not seen in onion. Plants with few leaves and stunted growth. Yellowing and drying of outer leaves.

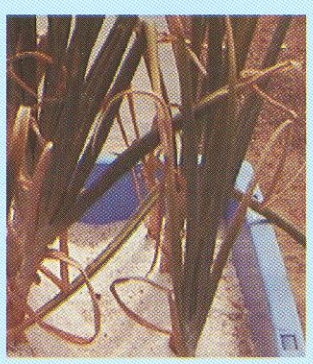
**Potassium:**


Poor growth of plants showing stunted appearance. Drying of leaves from the tips was prominent. In later stages the dried portion showed outward curling. Tip drying was more pronounced in outer whorls.

**Sulphur:**


Young plants with thin, pale coloured leaves. Moderate tip drying.

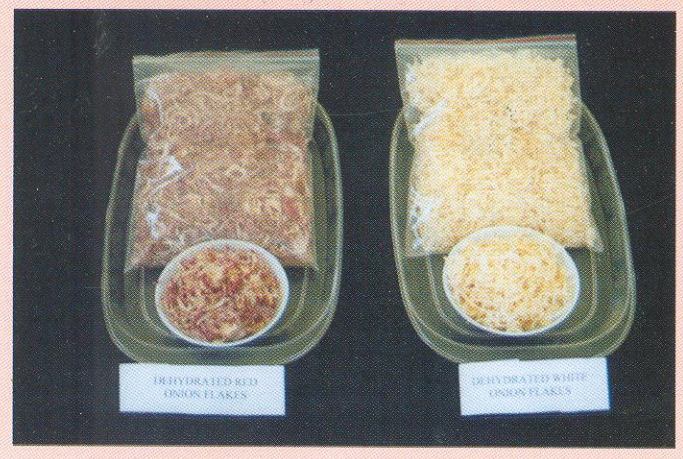
**Calcium:**



Haphazard chlorotic patches on the outer leaves which later on show complete drying.

## Processing for value addition in onion

Reduction in bulk by dehydration minimises the transportation and storage costs as well as seasonal price fluctuations. Processing of onion demands special quality onion. White onion with globose shape and high TSS (>18%) is the prime requirement. Besides genotype, colour, size of bulbs, method of drying influences recovery and quality of processed products which in turn affects the overall quality and cost of the end product. Different studies were conducted at N RC Onion and garlic with two onion varieties, white and red each, different grades of bulbs i.e. A, B, C, and doubles; and methods of drying viz., sun drying, solar drying




and cabinet drying. The results revealed that white onions gave higher percent recovery (11.17%) of dried flakes than the red onion (10.12%). The colour and overall acceptability was better in white onion flakes than red onion flakes. The cost of production under experimental conditions was higher (Rs.53.89/kg) in white onion flakes than red onion flakes (Rs.47.36/kg).

Among the different grades, 'A' grade bulbs gave highest percent recovery of fresh flakes as well as dehydrated flakes than other grades. The colour, overall acceptability and percent rehydration were not significantly affected by the grade of bulb. As far as the percent waste portion is concerned, it was highest in double onions (28.7%) due to twin bulbs and multi-centers. The cost of flakes was highest in 'A' grade bulbs followed by B grade bulbs while it was lower in 'C' grade & double bulbs. This was due to higher prices of A and B grade bulbs. The peeling and cutting cost was higher in C grade and double bulbs.

Among the various methods of drying, cabinet drying was significantly superior to the rest of the methods in respect of overall acceptability of the flakes, time required for drying (22 h.) and lowest moisture per cent (6.8%) in the flakes. The sun drying and solar drying took longer period of 84 and 60 hours respectively for drying. The moisture percent in sun-dried flakes was 10.2%, while it was 8.8 % in solar dried flakes. As far as the cost of product is concerned, Cabinet drying was found most expensive than other two methods. Overall, cabinet drying is the best method for small-scale dehydration of onion. But sun drying and solar drying could be the cheaper option if the product is to be used within a short span.

## Foundation Day of NRCOG celebrated

The foundation day (16 June) of National Research Centre for Onion and Garlic was celebrated. Nearly 70 farmers, non-officials and local authorities were invited for the programme. Dr. S.S. Dhumal, Director, Horticulture Training Centre, Talegaon Dabhade, Pune was the chief guest of the function. Dr. K.E. Lawande, Director, NRCOG briefed the achievements of the NRCOG in the field of onion and garlic research for catering the needs of onion and garlic growers of Maharashtra and other neighboring states. He also lauded efforts of scientists and the staff in achieving the targets within a short span of 4-5 years. Farmers were briefed about the experiments in the field and storage structure. A Kisan Gosht was conducted

to clear the problems relating to onion and garlic cultivation, production and post harvest handling. On the eve Dr. S.S. Dhumal delivered a special lecture on "Protected cultivation - present status and future prospects". The lecture was very informativeto the scientists and other members of the staffand farmers as well. On this occasion, NRC for Onion and Garlic felicitated the former colleagues.

## SRC Meeting

SRC meeting was held on 10-11 June 2004 under the chairmanship of Dr.K.E.Lawande, Director. The concerned scientists presented results of experiments. New trials with technical programme were proposed and finalized after thorough discussion.

## Distinguished visitors

Dr.Shanti Wilson Wijeratnam, Chairman, Institute of Post Harvest Technology, 114, Wijerama Mawaha, Colombo 07, Sri Lanka visited on 25 March 2004.

Dr. Glen Ruttencutter, Director and Mr. Antonio Carlos Pierlo, Manager, Seminis Vegetable Seeds, Woodland, CA, USA visited on 30 March 2004.

Dr. M.H. Mehta, Chairman, Gujarat Life Sciences & Chairman, Kutch Agri Dev. Consati.,(Ex-Vice Chancellor, GAU), Baroda visited on 14 May 2004.

1689 number of farmers visited the centre during Jan-June 2004.

## Training to the Officers

NRCOG offers training to the officers of state agriculture, horticulture departments, extension personnel and onion & garlic growers. The training comprises of the following modules.

1. Onion and garlic production technology.
2. Integrated nutrient and water management.
3. Integrated pest and disease management.
4. Post harvest handling and storage.
5. Marketing and export of onion and garlic.

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