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PENNY JOHNSON reports that hydroponics produce does have healthy benefits compared to other growing methods, provided that the fertiliser program is well managed.



Is hydroponically grown produce better for you?

This question has been asked by several organisations in Australia and overseas. As yet, there is no conclusive evidence that produce grown hydroponically is more nutritious or healthy than produce grown by any other method, although some small studies indicate that it may be possible.

What studies have been done in Australia?

Professor Ron Wills, Deputy Dean at the University of Newcastle, has studied hydroponically grown produce for several years within the faculty of Food and Technology. He was approached by industry groups to carry out research on the nutritional value of hydroponically grown produce. However, he turned the project down. Professor Wills believes that the health benefits of a particular tomato or lettuce variety will be the same no matter how it is grown "provided there is adequate care and fertilisation during growth". Based on this theory, he believes that research funding would be better spent in other areas.

"I didn't think it would be worthwhile so I advised the industry groups not to fund the research."

Rick Donnan, Vice President of the Australian Hydroponics and Greenhouses Association, agrees that the nutritional balance of particular produce is not dependent on the growing method.

"The root system of a plant basically supplies only water and mineral nutrients to the plant. It's the upper part of the plant, through photosynthesis, that provides all the other types of compounds to the plant and its fruit regardless of where the plant's roots are growing."

However, Rick also believes that hydroponically grown produce has more of a chance of being good for consumers' health because there is no contact with the ground. This reduces the risk of getting disease organisms from soil and manure in the produce.

"In practice, the major health problems from vegetables have been associated with the external contamination of produce, rather than from what's been inside them," he commented.

"Many countries like Holland don't differentiate whether the produce has been grown by hydroponics or by any other method, they just concentrate on the quality of the produce. To produce a good vegetable product requires good horticultural practice and hydroponics is no different. It's not technology, it's just a different, if more sophisticated, horticultural technique. Therefore, hydroponic growers must have a good knowledge of their crop if they are to grow successfully. Hydroponics plants are often less stressed than in other systems which means that produce quality is more likely to be maintained consistently, especially in adverse conditions."

Rick went further to explain that it is possible to boost the taste and nutritional value of some hydroponic produce by increasing the strength of the hydroponic solution feeding the roots.

"Take tomatoes, in particular. It is possible to improve their taste by using higher strength hydroponic solutions," he said. "This not only helps push more mineral nutrients into the plant and fruit, but also increases the strength of the solutions inside the plant, consequently raising the strength of other beneficial compounds such as sugars, organic acids and vitamins. A well-grown hydroponic tomato does have a taste and nutrition benefit compared to those grown by other methods. The down side of this is that poorly grown hydroponic tomatoes will be inferior, as happened with ignorant entrepreneurial growers in Australia in the early 1980s."

"In the case of tomatoes, the taste and nutritional benefits are directly related to the variety and the length of time the fruit is allowed to ripen on the vine, regardless of what growing method is used."

Fruit picked green and gas ripened isn't as tasty or as good for consumers as vine ripened fruit, according to Rick. Another factor is that post-harvest handling must be suitable. For instance, tomatoes should be stored at about 12°C, not at much lower refrigerator temperatures."

What research has been done on the nutrition of hydroponics produce?

Research in Holland in the 1980s gives an indication of the influence of hydroponic nutrient solution strength on aspects of tomato quality. A rise in root environment solution strength from EC 2.6 to 3.5 mS/cm gave the following increases:

Shelf life in days 17.5 to 19.2

EC in fruit sap in mS/cm 5.8 to 6.2

Acids in fruit sap, mmol/L 75.0 to 84.0

Brix of fruit sap % (approx. sugars) 4.8 to 5.0

(Source: "Overview of nutrition in hydroponics", by Dr Cees Sonneveld, Australian Hydroponics Conference, Melbourne, 1993.)

Another nutritional study published recently claimed that hydroponics produce was higher in certain vitamins than field grown produce. The study was carried out in San Jose, California, by Plant Research Technologies Incorporated. Several varieties of tomatoes and sweet peppers were tested for vitamins A, B1 (thiamin), B2 (riboflavin), B3 (niacin), B6

(pyridoxine), vitamin C and vitamin E. The study showed a dramatic increase in vitamins and minerals in hydroponics, in some cases up to 50% higher vitamin content.

Why is it important to know the health benefits of hydroponically grown fruit and vegetables?

The attributes of hydroponics produce needs to be identified and marketed more aggressively according to Graeme Smith, President of the Australian Hydroponics and Greenhouses Association (AH&GA). The nutritional value of hydroponics produce could be an important marketing edge in a competitive and growing niche. Graeme says, "The reality is there is little marketing for hydroponically grown."

He believes this is particularly obvious when compared with the organic industry's marketing energy. Currently, members of the AH&GA are completing a proposal for government funding to boost the industry by hiring a full-time officer concentrating solely on industry development. This full-time employee would oversee all the projects necessary for future success of the hydroponics industry.

Graeme has been formulating practical ways to progress the industry so it is competitive.

"Hydroponic producers have been trying very hard to align with the organic growers, particularly since hydroponics is becoming more and more organically based."

He notes that there are many areas where hydroponically grown produce and organically grown produce are similar. Both industries are trying to achieve excellent quality, presentation, a longer shelf life, and better flavour.

"In America, the two industries [organic growers and hydroponics growers] are talking. However, Australia is very resistant to combining the resources of these two industries in a similar way."

Graeme Smith's comments come soon after the consumer publication Choice magazine published an article in their September 2000 issue on the nutritional value of organically grown produce. The relative nutritional content of produce grown by different methods has become a mainstream concern.

According to the Australian Consumers Association, there is no conclusive evidence to suggest that organically grown produce is nutritionally better or has less chemical residue than the traditionally grown produce. The magazine states "the jury's still out on the questions of nutritional superiority or chemical residues in organic produce."

A true identity in the marketplace

David Nebauer worked for the Central Coast Regional Development Corporation for two and half years as the Planning and Development Officer for the hydroponics industry there. He sees the biggest challenge facing the industry is establishing "a true identity for the produce in the market place."

He believes that before money and time are spent on nutrition studies, or developing organic methods of growing, resources should be spent creating an awareness of exactly what hydroponics is within our domestic market.

"Hydroponics has the opportunity to fill the gap between traditionally grown produce and organics. It's the low chemical alternative to traditional field cropping and uses IPM (Integrated Pest Management) to its maximum."

David suggests that a mark of description or certification would be useful to distinguish the hydroponics produce. However, he feels that sorting out the certification issues should be the job of the government, as the industry should be focusing on producing the very best produce.

"The proof of the pudding is in the produce itself, not the statistics," David Nebauer says.

As to government involvement in the development of a set of standards for the hydroponics industry, Graeme Smith believes that a comprehensive Industry Strategy Plan can only be developed once a person is hired full time through government funding.

How important is nutrition to the Asian market?

The Australian domestic market has a small but steady demand for hydroponically grown produce, but the real growth area has been recognised as being the export trade.

Grant Vinning, Managing Director of Asian Markets Research, has taken fifteen grower groups overseas to learn more about developing their export market. In the last few months he had visited Hong Kong three times, Japan four times, and Singapore six times. He has observed that if a product is marketed as being highly nutritious, it will be popular with Japanese consumers. In fact, anything that claims to be 'good for your health' is considered worth including in their lifestyle.

There are other important attributes to market to the Japanese consumer.

"In Japan, adding a personal touch to marketing the product is much more important than any quality assurance or certification program, or even the nutritional value. It is common in large supermarkets to have photographs of the producing farmer beside their farm. It gives a feeling of identification with the product," Grant says.

He has also noticed that different cultures place importance on different points. He says that in Taiwan, 'clean and green' means that the produce was produced in a nice clean factory, and that "the push for being green has limited marketing appeal."

He says that if the nutritional benefits of our produce are highlighted too much, the Asian buyers will begin to question the quality of the product they received previously. According to Grant, the buyers will think, "You mean to say the stuff before was unhealthy?"

However, Grant stresses that the most integral part of the success of Australian hydroponics in overseas markets is providing a consistent and good quality supply. He believes that until Australia can do that, the export market will remain small for this country.

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