NUTRITIONAL EFFICIENCY OF ORGANIC CROP PRODUCTION

<u>K. Karkalis</u> and G. Arapis Laboratory of Ecology and Environmental Sciences Agricultural University of Athens Iera odos 75, 11855 Athens, Greece

Abstract

Many studies exist in the literature that compare nutritionally relevant compounds in foods produced using organic as well as conventional methods (1-7). The present study evaluates the differences between the nutritional efficiency of organic crop production versus conventional production, and the overall effect of organic agriculture on food quality. A positive benefit of organic agriculture can be expected due to the achievement of a good ecological balance between soil, plants and animals, and also by the use of organic pesticides and fertilizers instead of synthetic ones (1) (2).

Organic crops when compared with conventional, are found to present higher levels of vitamin C, less nitrate, less total protein, higher levels of plant secondary metabolites (phytochemicals) and a higher proportion of essential amino acids in the protein (3). In most cases major importance has been given to the mineral composition of crops and organic production has a higher mean mineral content. In fact, figure 1 shows the mean percent additional mineral content in organic crops by mineral for some of these minerals. In addition, there may be less of the toxic heavy metals in organic crops than in conventional ones (4). The above findings are in agreement also with a literature review conducted by the German government (5). It is also clear that the increasing diversity of crop species produced in an agricultural ecosystem will enhance nutritional adequacy and variety (6) (7).

Therefore, a balanced diet based on the greater variety and quality of organic products, could provide important nutritional benefits. However, further research is needed in order to better evaluate the positive effects of organic agriculture on the nutritional quality of diet, both in developing countries, where more variation in the diet is necessary, and in developed countries, where less additives and pesticide residues are required.



Figure 1. Mean percent additional mineral content in organic compared to conventional crops (4).

Keywords: minerals, nutritional efficiency, organic crops

Bibliography

- Brandt, K. 2007. Issues paper: Organic Agriculture and Food Utilization. International Conference on Organic Agriculture and Foof Security (3-5 May 2007). FAO. [Online] May 2007. [Cited: 6 2, 2008.] http://ftp.fao.org/paia/organicag/ofs/OFS-2007-4-rev3.pdf.
- 2. Magkos, F.; Arvaniti, F.; Zampelas, A. 2003. *Organic food: nutritious food or food for thought? A review of the evidence*. International Journal of Food Sciences and Nutrition, Vol. 54, pp. 357-371.
- Ali, M. & Tsou, S. 2000. The integrated research approach of the Asian Vegetable Research and Development Center (AVRDC) to enhance micronutrient bioavailability. Food and Nutrition Bulletin, Vol. 21, pp. 472–481.
- 4. Worthington, V. 2001, *Nutritional Quality of Organic Versus Conventional Fruits, Vegetables, and Grains.* The Journal of Alternative and Complementary Medicine, Vol. 7, Nr 2, pp. 161–173.
- 5. Woese, K., et al. 1995. A comparison of organically and conventionally grown foods—Results of a review of the relevant literature. J Sci Food Agric, Vol. 74, pp. 281–293.
- 6. Brandt, K. and Kidmose, U. 2002. *Nutritional consequences of using organic agricultural methods in developing countries.* (Eds. Cakmak I, Graham RD, and Welch M). Impacts of Agriculture on Human Health and Nutrition in Encyclopedia of Life Support Systems (EOLSS), Developed under the Auspices of the UNESCO. Oxford : Eolss Publishers.
- Johns, T., Smith, I.F. and Eyzaguirre, P.B. 2006. *Agrobiodiversty, Nutrition, and Health.* (Eds. Hawkes C and Ruel MT). Understanding the links between agriculture and health. Washington : International Food Policy Research Institute, p. 12.