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## Effects of organic and conventional cultivation systems on plasma antibody status in humans

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Animal studies have shown effects of cultivation system on antibody production; for example a study by Lauridsen *et al.*<sup>(1)</sup> found a higher plasma IgG concentration in rats eating organic diets compared to conventional diets. In addition, Huber *et al.*<sup>(2)</sup> observed a stronger immune response, including higher antibody titers in chickens eating organically produced diets. Little is known about the effects of organic foods in humans. Thus the aim of the current study was to investigate plasma levels of antibodies in healthy adult men after intake of diets composed of plants cultivated in organic or conventional agricultural systems.

The plants used in the study originated from the VegQure<sup>(3)</sup> and CropSys<sup>(4)</sup> crop rotation experiments. The field trials included three different cultivation systems (OA: organic based on livestock manure, OB: organic based on green manure and C: conventional with mineral fertilizers) grown in two consecutive years (year 1 and 2) with two field replicates. Diet composition and experimental setup is described by Søltøft *et al.*<sup>(5)</sup> In brief, healthy adult men ( $n = 18$ , each year) were recruited to a double-blinded, cross-over, human intervention trial performed at the Department of Human Nutrition, University of Copenhagen, Denmark for two consecutive years. The interventions were performed as  $3 \times 12$  days dietary periods with 2 weeks wash out periods. Fasting blood samples were drawn at day 1 and 12, and plasma IgG, IgA and IgM was determined using ELISA.

Plasma IgG concentrations appeared higher in human subjects after consumption of the organic diets (OA: 8360  $\mu\text{g/mL}$  and OB: 8089  $\mu\text{g/mL}$ ) compared to the conventional one (7990  $\mu\text{g/mL}$ ). However, the difference was not statistically significant due to the high variability between individuals. Accordingly, no significant difference between cultivation systems was observed with regard to the concentration of the other immunoglobulins in plasma (IgM: OA: 937  $\mu\text{g/mL}$ , OB: 912  $\mu\text{g/mL}$  and C: 881  $\mu\text{g/mL}$ ; IgA: OA: 2891  $\mu\text{g/mL}$ , OB: 2746  $\mu\text{g/mL}$  and C: 2839  $\mu\text{g/mL}$ ). In conclusion, cultivation systems had no impact on the immune status, assessed as immunoglobulin concentration in plasma without an experimental challenge of the immune system.

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4. Olesen JE, Askegaard M & Rasmussen IA (2000) *Acta Agric Scand Sect B* **50** (1), 13–21.
5. Søltøft M, Bysted A, Madsen KH *et al.* (2011) *J Sci Food Agric* **91** (4), 767–775.