



Organic farming: truth or myth, judge for yourself
La agricultura orgánica: verdades o mitos, juzgue Ud

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It is mentioned that there are various explanations and definitions of organic agriculture (OA) (ecological, biological agriculture)¹, but they all agree that it is a method for managing the ecosystem instead of using only agricultural inputs^{1,2}.

So-called OA^{1,3} has been sacralised in an uncritical way, both in the political and legislative sphere and in the media. It is imperative to rigorously evaluate its postulates and practices in the light of the best available science⁴, with an objective view. A good starting point to contribute to the debate is the European Union (EU) regulation on organic production and labelling of organic products (No. 8347/2007) of June 2007^{1,4} which states, "*organic production is a general system of farm management and food production that combines best environmental practices, a high level of biodiversity, the preservation of natural resources, the application of high animal welfare standards and production in accordance with the preferences of certain consumers for products obtained from natural substances and processes*"^{3,4}. In this light definition, the ambitious enumeration of good intentions, ideals that in principle can be embraced by any citizen, is contrasted with an explicit declaration that the aim is not so much the production of foodstuffs necessary for our species as a whole, but "*production in accordance with the preferences of certain consumers*"^{3,4}. It is clear from its advocates that organic food "*arises as an ideological movement of reaction*" to what they consider to be the excesses and problems resulting from the intensification and industrialization of agricultural production, the consequences of which are a litany of negative effects on health, the environment and society^{2,4}.

Organic food accounts for about 2 % of the world market, with prices around 50 % higher than conventional food². Although the expansion of OA in the world is relatively recent, reaching more than 30 million hectares, in 120 countries and 600000 production units^{1,2}, its beginnings date back to the last decades of the 19th and early 20th centuries, based on the



anthroposophical ideas of Rudolf Steiner and the empirical mysticism of Sir Albert Howard¹.

OA does not use any man-made chemicals, not only avoids the use of synthetic pesticides, but also avoids the use of chemical fertilizers. Organic farmers believe that pesticides are dangerous to humans and the environment². They claim that synthetic nitrogen is bad for soils, but it is known that any source of nitrogen always involves the same chemical element and is identical to any other^{2,4}.

In reality, organic farmers use "natural" pesticides such as sulphur, *Bacillus thuringiensis* and pyrethrins^{5,6} [insecticides extracted from chrysanthemum flowers, *Chrysanthemum cinerariaefolium* (fam. Compositae)]. Most apply more pesticides, more frequently than non-organic producers².

Studies^{3,4,7} concluded that organic fruits and vegetables were no more nutritious than their cheaper conventional counterparts, nor were they less likely to be contaminated by pathogenic bacteria such as *Escherichia coli* or salmonella (*Salmonella* spp.)^{4,8,9}.

People buy organic food to avoid exposure to harmful levels of pesticides. But that is hardly valid reasoning, although non-organic fruits and vegetables have more pesticide residues, with levels 99 % of the time not exceeding the conservative safety thresholds set by regulators^{4,8,9}. Moreover, the vast majority of pesticides described in produce occur "naturally" in common diets, through organic and conventional foods⁴. They determined that "99.9 % (by weight) of pesticides in the US diet are chemicals that plants produce to defend themselves, only 52 naturally occurring pesticides were detected in high-dose animal cancer tests, 27 of them rodent carcinogens, present in many common foods^{2,4}.

The conclusion was, natural chemicals are just as likely as synthetic versions to test positive in animal cancer studies, and "at low doses from most human exposures, the comparative hazards of these synthetic residues are negligible "^{2,4}. In other words, consumers of expensive organic foods, in order to avoid pesticide exposure, focus their attention on 0.01 % of what they consume^{2,4}.

Ironically, in Europe as in North America, the designation "organic" is itself a synthetic bureaucratic construct, and makes little sense. It prohibits the use of synthetic chemical pesticides, with some pragmatic exceptions⁴. For example, EU policy states that "flexibility rules" can compensate for "local climatic, cultural or structural differences". Where there are no suitable alternatives, some (strictly listed) synthetic chemicals are allowed⁴.

Similarly, in the United States, there is an extensive list of specific exceptions to the bans. But most "natural" pesticides, as well as pathogen-laden animal excrement, for use as fertilizer, are allowed².

Another reasoning for buying organic is supposedly better for the natural environment. But the low yields of OA in real-world environments-typically 20-25 % below conventional agriculture-place various demands on farmland and increase water consumption substantially². According to a recent analysis in the UK⁴, ammonia emissions, nitrogen leaching, and nitrous oxide emissions per unit of production were higher in organic systems than in conventional agriculture, as were land use and eutrophication potential, adverse ecosystem responses to fertilizer incorporation, waste and acidification⁴.

An anomaly of how "organic" is defined is its designation, it does not really focus on the quality, composition or safety of the food, rather, it comprises a set of acceptable practices and procedures that a farmer intends to use^{1,4}. For example, a chemical pesticide or pollen from genetically modified plants flying from an adjacent field into an organic crop does not affect the condition of the crop¹. EU rules are clear: food can be labelled as organic as long as "ingredients containing genetically modified organisms enter the products unintentionally" and represent less than 0.9 % of their content⁴.

In conclusion, many people who are seduced by the romanticism of OA ignore its human consequences⁷. Farmers' common sense indicates that, "weeds continue to grow, even in polycultures using holistic farming methods and, without pesticides, manual weed eradication is the only way to protect a crop". The heavy and burdensome work of manual weeding often falls on women and children⁷.

Of course, there should be organic products that you can buy, that you feel, and must have and can afford. But the reality is, buying non-organic is much more cost-effective, more humane and more environmentally responsible⁷.

The day will come when the level of biological, ecological knowledge at the cellular and molecular level will allow OA to be a success. But this level of knowledge is still decades away².

In the meantime, OA will continue to produce much lower, erratic yields than conventional agriculture with high yields². Hence the lower yields, organic production will force an expansion of the cultivated area, in order to obtain the necessary food².

With the current level of knowledge, no responsible authority or organization is in a position to recommend organic or low-yield conventional farming systems as a replacement for highly productive agriculture². In fact, a reduction in agrochemical consumption would

possibly lead to more erosion and cancer and reduce wildlife habitat². OA could not maintain the fertility of agricultural land and could not effectively protect it against erosion², nor help to eradicate the hunger suffered by 828 million people, not counting an increase of 150 million people since the outbreak of the Covid-19 pandemic¹⁰.

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Conflicts of interest

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