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## OWC 2020 Paper Submission - Science Forum

*Topic 4 - Innovation in Organic farming: "thinking out of the Box"*

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### ORGANIC CONSUMERS' VIEWPOINTS TOWARDS NEW BREEDING TECHNIQUES IN ITALY

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**Abstract:** Despite the recent decision of the European Court of Justice to consider plant obtained by New Breeding Techniques (NBTs) as GMOs, there is still an intensive debate in Europe on the use of these new techniques in the organic farming. For this reason, understanding organic consumers' viewpoint towards NBTs is essential for the future of the sector. Following the Q method approach (Brown, 1980), a pilot study was conducted in Italy with 36 organic consumers. The balanced Q-sample, which accounted 48 statements regarding NBTs, was defined according to a 4 x 2 factorial design with six replications. Results demonstrated the presence of two relevant viewpoints towards the adoption of the NBTs in the organic seed and plant breeding sector.

**Introduction:** According to the four principles of health, ecology, fairness and care defined by IFOAM, organic agriculture promotes all production systems that respect the natural capacity of plants, animals and landscape, avoiding any use of synthetic fertilizers, pesticides and of genetically modified organisms. The concept of naturalness, which means rejecting inorganic inputs and implies the integrity of crops, was often mentioned to support the ideological and traditional position of organic supporters that are against the use of GMOs and, also, of the New Breeding Techniques (NBTs). The unpredictable consequences of genetic manipulation of plants represents the most important reason to reject all kind of genetic engineering. However, the use of NBTs could represent an opportunity for overcoming some limitations of the organic seed sectors and to provide a modern approach suitable for the organic farming in Europe. Despite the decision of the European Court of Justice, which has recently classified NBTs (including the plant genome-editing, cisgenesis and other precision breeding methods) as GMO the debate is still open. The aim of this study is to provide relevant viewpoints of organic European consumers toward the use of NBTs using Q methodology (Brown, 1980).

**Material and methods:** Q methodology (Brown, 1980) is a mixed-method used for the systematic study of human subjectivity. Q methodology allows to investigate the multiple viewpoints about the topic under investigation by grouping people using a *by-person* factor analysis. Each participant, who is expected to provide a diverse opinion toward a topic,

composes a Q-sort that is cross-correlated with the others and then factor analysed usually using the centroid factor analysis followed by a varimax rotation. According to this method, participants that have a similar viewpoint load in the same factor. The emerging factors are interpreted looking at their factor arrays and to the most distinguishing statements (i.e. statements placed in the composite Q sort in positions that are significantly different). Q methodology was developed in the field of psychology, but it is now applied in several areas of interest such organic agriculture, novel foods, GMOs, etc. (Zanoli et al., 2018; Hall, 2008). For this study, the Q-sample included 48 statements collected in social media (e.g. Twitter) regarding NBTs.

The balanced Q-sample was refined using the Fisher experimental design principles (Brown, 1980) according to a 4 x 2 factorial design (Effects: Environmental impact, Health, Regulations & Ethics, Competitiveness & Technology; Levels: Pro, Con) with six replications. The participant sample – P-sample - included 36 Italian organic consumers, occasional and regular, from three different cities (Ancona, Naples, Palermo). Participants were asked to sort the statements from those they most agree (+5) to those they to most disagree (-5) using a quasi-normal distribution.

**Results:** The number of factors to extract was selected according to the Brown's rule (1980): factor loadings that exceed  $\pm 0.372 - \pm 2.58 \times \text{standard error [SE]}$ ;  $SE = 1/\sqrt{n}$  (n° of statements) - are statistically significant, Table 1. The two factors extracted accounted the 50% of the study variance and 35 participants (1 Q sort was not assigned). Factor 1 accounted 18 Q-sorts and the 26% of the variance. This factor is dominated by people that excluded the use of NBTs in the organic seed and plant breeding sector. They did not find any real distinction with the conventional GM breeding. Looking at their most distinguishing statements, they focussed more on those dealing with ethical and regulatory aspects of NBTs. For example, they believed that NBTs can favour only big companies and were introduced for blurring the use of GMOs in Europe. These consumers also retained that these breeding methods are not safe especially and for the environment. Factor 2 is “weakly” bipolar, accounting 17 Q-sorts (16 positively loaded and 1 negatively) and the 24% of the variance. Generally, participants represented by this factor were more willing to accept the use of NBTs. They focussed more on potential benefit associated to the use of innovations (e.g. on agricultural biodiversity, nutritional health, climate change) and believed that the use of NBTs simply accelerate modifications that could happen in nature. Despite their positive view regarding NBTs, they also declared some concerns about these new breeding methods. Particularly, these consumers retained that is important to test “case-by-case” any possible risk related to their use in order to guarantee a high level of food safety for all European consumers.

**Table 1 Most distinguishing statements for F1 and F2 (\*p<0.01)**

N	Distinguishing Statements	F 1	F 2
2 5	I don't support the use of these techniques because they could favor the concentration of seeds in few hands, today only the big multinational companies are able to work on GMOs due to the high approval costs.	5 *	0
4 2	For me crops obtained from these techniques reduce agricultural biodiversity.	4 *	- 1
3 0	From my viewpoint it is necessary that these techniques are tested for safety.	4	5 *
3	I believe that the use these techniques is necessary because they represent the key for reacting to climate change.	- 3	3 *
1 5	For me these techniques represent a better future for society.	- 5	2

		*	
9	For me, these techniques can be introduced in the organic market, since they can reduce risks for the environment and human health.	- 4 *	1
2 0	Globally, I accept these techniques because they simply accelerate modifications that could happen in nature.	- 3 *	2
1 1	I think that these techniques should be introduced in the seed market without any special authorization.	- 5	- 5 *

**Discussion:** Although the two factors clearly represented two opposite positions, there are some consensus between them. Both factors agreed that NBTs should be subjected to traceability and specific labelling for all European producers and consumers. Moreover, they both retained that even if NBTs will be used in the organic seed market, their products should be proven for safety and subjected to special authorizations. These means that all organic consumers involved in this study demonstrated some concerns about the possible use of NBTs in the organic farming presenting a high awareness about the potential risks and also the potential benefits. Results of this study are consistent with those find in literature (Hall, 2008), which shown that the use of genetic engineering in agriculture can be associated to different levels of acceptance and concern. These findings might contribute to the overall GM and NBTs debate by providing interesting insight regarding the differing opinions at the European level. The pilot study showed extreme polarisation of mindsets across the participant sample. However, the purpose of Q methodology is to investigate the existence of multiple perspectives on certain topic. Therefore, before replicating the study at the EU level, there will be a need to enlarge the concourse and review the Q sample.

**References:** Brown, S.R., 1980. Political Subjectivity, Applications of Q Methodology in Political Science. New Haven, CT: Yale University Press.

Hall, C., 2008. Identifying farmer attitudes towards genetically modified (GM) crops in Scotland: Are they pro- or anti-GM? *Geoforum*, 39, 204-212.

Zanoli, R., Cuoco, E., Barabanova, Y., Mandolesi, S., Naspetti, S., 2018. Using Q methodology to facilitate the establishment of the 2030 vision for the EU organic sector. *Organic Agriculture*, 1879-4238.

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