Evaluation of processing technologies for organic food products

Short version of the assessment framework of the CorOrganic Projekt „ProOrg“
https://www.proorgproject.com/

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Before a new processing technology is introduced to produce an organic product, its compatibility with the organic principles must be verified. In an assessment, a comparison is made with the competing technology on the one hand, and a comparison with the unprocessed raw material on the other. This evaluation procedure was developed within the ProOrg project.

1. System boundary setting

A system analysis of the processing process, which should include a flowchart for the individual processing steps as well as the pre- and post-treatment of the product, shows which steps are to be included in the assessment and which can be neglected. Those steps that differ from the reference must be included as a matter of priority. This means, for example, that when comparing two preservation technologies such as HPP versus thermal treatment, the production of the juice does not have to be included if it is the same for both technologies. Consequently, already during the system analysis it must be determined which technology is to be used as a reference for comparison.

2. Evaluation matrix

For organic products, social and environmental sustainability, nutrient quality and sensory aspects were defined as cornerstones for the evaluation. Relevant criteria are assigned to each aspect. All criteria must be assigned indicators that possibly can be expressed by a measurable value.

Example:

Aspect	Criteria	Indicators
Nutritional quality	Concentration of micronutrients	Vitamin C
	Concentration of phytochemicals	Polyphenols

For all aspects criteria and their indicators should be determined. The selection of criteria and indicators is case-specific and must be based on the relevance for the aspect in the context under consideration. Indicators for which measured values from the scientific literature or own measurements are available are to be preferred. If no measurable values are available, an indicator can also be assessed qualitatively by expert opinion.

The various indicator values are normalised on a percentage scale. The indicator value from the reference processing technology is set to 100%.

Example: HPP treated apple juice vs. thermal pasteurisation (TP).

Aspect	Criteria	Indicators	Absolut HPP mg/100g	Absolut TP mg/100g	Norm HPP	Norm TP
Nutritional quality	Concentration of micronutrients	Vitamin C	9.700	1.400	693	100
	Concentration of phytochemicals	Polyphenols	3.250	1.690	192	100

The normalized values are then rated on a rating scale, e.g. between -2 and +2. The value from the processing with the reference technology is always set to the 0-line of the scale.

Example rating scale:

Rating scale	*Range of normalized value*
2= far better	>150
1= better	>100; ≤150
0= same	100
-1= worse	<100; ≥50
-2= far worse	<50

For the above example this means: In terms of nutrient quality, HPP performs far better than thermal treatment (value above 150%). The two steps, normalisation and transfer to the rating scale, are performed both for the comparison of the technologies and for the comparison with the untreated raw material.

3. Evaluation

Finally, indicators, criteria and aspects are weighted and finally aggregated to a single value. This aggregated value provides the assessment result for the organic product obtained with the new technology. The weights for the individual indicators within a criterion and the weights for the individual criteria within an aspect must be determined on a case-by-case basis. The weighting of sustainability, nutritional quality and sensory aspects should be based on a broad consensus among the stakeholders. The evaluation is carried out for the comparison of the two technologies as well as for the comparison with the untreated raw material. This results in an evaluation of the technology based on a technical/scientific assessment. As a final step in the decision-making process, the result of this assessment must be reviewed in terms of consumer acceptance and economic sustainability.