

Archived at <http://orgprints.org/13554/>

Quality aspects of processed organic baby food - Results of a case study from an expert consultation in the baby food industry in 10 European countries.



Kathrin Seidel
with contributions from Ursula Kretzschmar and Raffaele Zanolli

Project number: 1885

Project acronym: QACCP

Full project title: Quality analysis of critical control points within the whole food chain and their impact on food quality, safety and health

Start date of the whole project: 01.05.2007

Duration: 31.12.2009

Date of the survey: October 2007

Project coordinator: Johannes Kahl

Organisation of project coordinator: University Kassel

Revision: Draft 1 (20.12.2007)

Published by



About Core Organic QACCP

Quality analysis of critical control points within the whole food chain and their impact on food quality, safety and health (QACCP)

The overall objective of the project is to optimise organic production and processing in order to improve food safety as well as nutritional quality and increase health promoting aspects in consumer products. The approach will be a chain analysis approach which addresses the link between farm and fork and backwards from fork to farm. The objective is to improve product related quality management in farming (towards testing food authenticity) and processing (towards food authenticity and sustainable processes). The carrot is chosen as the model vegetable since it is processed for baby food; hence the results will be relevant for other vegetables.

- Identify and define critical and essential product quality parameters useful for the optimising of organic food quality
- Compare products from different farming practices (conventional and within organic)
- Performance of QACCP (Quality Analysis Critical Control Point, similar to HACCP methodology)
- Test the impact of the food chain (focusing on processing techniques) on the product quality and safety
- Test the impact of organic food on health

For more information on the project see http://qaccp.coreportal.org/?page_id=1

Contact: Johannes Kahl *Project co-ordinator:* University of Kassel, Germany, e-mail: kahl@uni-kassel.de

The editors gratefully acknowledge financial support from the Core Organic Funding Body: Federal Office for Agriculture, Berne, Switzerland.

The articles in this volume do not necessarily reflect the Core Organic ERANET's views and in no way anticipate the Core Organic ERANET's future policy in this area. The contents of the articles in this volume are the sole responsibility of the authors. The information contained herein, including any expression of opinion and any projection or forecast, has been obtained from sources believed by the authors to be reliable but is not guaranteed as to accuracy or completeness. The information is supplied without obligation and on the understanding that any person who acts upon it or otherwise changes his/her position in reliance thereon does so entirely at his/her own risk.

This publication represents the report about task 2 in work package 2. "Consumer and Processors Research on the quality of processed vegetable, in special baby food"

For further info see the project website at http://qaccp.coreportal.org/?page_id=1

Kathrin Seidel and Ursula Kretzschmar (2008): Quality aspects of organic processed baby food - Results of a case study from an expert consultation in the baby food industry in 10 European countries.

With contributions from Prof. Raffaele Zanoli and Prof. Ulrich Hamm

© May 2008, Research Institute of Organic Agriculture FiBL, Forschungsinstitut für biologischen Landbau (FiBL), Ackerstrasse,
CH-5070 Frick, Tel. +41 62 8657 272, Fax +41 62 8657 273, E-mail
info.suisse@fibl.org, website <http://www.fibl.org>

Language editing: Uebersetzungscnter Fuld@, Eduard-Spranger-Str. 4, 36093, Künzell Germany

Cover photographs: Thomas Stephan, © BLE, Bonn 2002, www.oekolandbau.de

Layout: Kathrin Seidel, Ursula Kretzschmar and Helga Willer, FiBL, Frick, Switzerland

Content

1	Introduction	4
2	Methodology	4
2.1	Criteria for the expert selection	5
2.2	Experts and responses	5
3	Results	8
3.1	Focus and presentation of the results	8
3.1.1	Introductory questions	8
3.1.2	Attributes of quality for vegetables e.g. carrot baby food (purée in jars)	8
3.1.3	Quality of raw materials	11
3.1.4	Influence of sensory aspects for the recipe	14
3.1.5	Processing – in order to improve quality	15
3.1.6	Consumers	20
4	Discussion and Conclusions	23
5	Summary	25
6	Annex I Processors survey questionnaire	26
7	Annex II Company characteristics	34

1 Introduction

Consumer demand for healthy, safe and high quality food is increasing (Magkos et al 2006)¹. Against this background, the demand for organically grown food has been growing rapidly. The market of organic food for babies and toddlers has also joined this development. Often with pregnancy, customers reflect about their eating habits and consequently encounter organic food for the first time, and organic baby food in particular. Organic farming comprehends the whole food chain from field to fork. Next to the sustainability and food safety (hazard) in food processing, the quality aspect is becoming more and more important. An analytical system to improve the quality needs to be established (QualityAnalysisCriticalControlPoint). This survey has been carried out in order to identify and define critical and essential product quality parameters, which are useful for optimising organic food quality within vegetable baby food processing. Not only aspects of food safety but also of nutritional and sensory quality and health were observed. The carrot is chosen as the model vegetable since it is common for the involved SMEs and is processed for baby food. The questionnaire was designed in a way that the most important and currently discussed aspects regarding food quality of processed organic vegetables have been taken up as well as opportunities for improving process quality.

The present work shows the general principles for the processing of organic food from the processors' point of view. In addition, problem areas regarding the question of product quality like raw material, processing techniques, storage, etc. are worked out. This case study is one of the selection criteria in the project to define the quality-specific critical control point for improving the carrot baby food with the involved SME. The results of the survey support the identification and definition of critical and essential control points as well as product quality parameters.

2 Methodology

A standardised questionnaire was prepared for the expert survey. The work was carried out in the form of a telephone interview. In this survey 17 experts in 10 countries (Germany, France, Switzerland, Austria, United Kingdom, Norway, Denmark, Netherlands, Italy and Finland) were involved and were asked to respond to an expert telephone interview. A uniform questionnaire and a simplified flow chart were the basis for the interview. The questionnaire and the flow chart were translated into English, French, Italian and German languages.

Before starting the expert round, a pre-test with one of the SMEs in Switzerland was completed in July 2007.

The expert telephone survey was completed with the assistance of national Core organic partners in September and October 2007.

¹ Magkos et al 2006

The standardised questionnaire included more general open questions and specific closed questions. The survey focused on identifying challenges with respect to maintaining food safety, providing satisfactory shelf lives and satisfying processors demands with respect to sensory and nutritional quality characteristics.

The survey was designed as follows:

- Specific questions about attributes of quality for vegetable baby food (in jars)
- Specific questions about quality of vegetable raw material (e.g. carrots)
- Specific questions about influence of sensory aspects for the recipe
- Specific questions about processing – in order to improve quality
- Specific questions about appraisalment of customers
- General questions about characteristics of companies

The questionnaire is attached at the end of the report in Annexe I.

2.1 Criteria for the expert selection:

The aim of the survey was to collect important information about the appraisalment of quality aspects from experts' point of view and to increase understanding for optimising quality within the process.

The body of experts was selected with all consortium members. The experts were technology specialists with experience in processing technologies used for vegetables in special baby food from the member countries of Core organic.

The expert panel was made up of representatives belonging to the following groups:

- Baby food companies (organic as well conventional) of the member countries from Core organic
- Processing or selling vegetable processed products (e.g. carrots)
- Technology specialists (e.g. of the department of quality and/or product development)

2.2 Experts and responses:

Within the Core organic survey on organic vegetable processing, baby food processors from 6 countries responded to the questions. All processors have their own processing lines and produce only organic (2 companies) as well as both qualities (organic and conventional) of baby food (4 companies). Additionally four experts were interviewed, who do not process baby food themselves. The answers of experts contribute important background information to this survey. We discussed with an organic consumer experts and with an applicant who had manufactured organically under his brand. The answers of "organic" experts were pooled together with these of organic baby food processor in the "organic" classification. The responses of a pre-

processing company (frozen vegetable products) and of another applicant of baby food are included in the group “processors/ experts”.

All processors and experts were selected and contacted by the project partners. Altogether, 17 experts were contacted by email or telephone. 10 people agreed to participate in the survey.

Four processors refused to answer our questionnaire. In order to avoid duplicate information about the same processing line, some of the contacted experts who did not produce baby food were omitted.

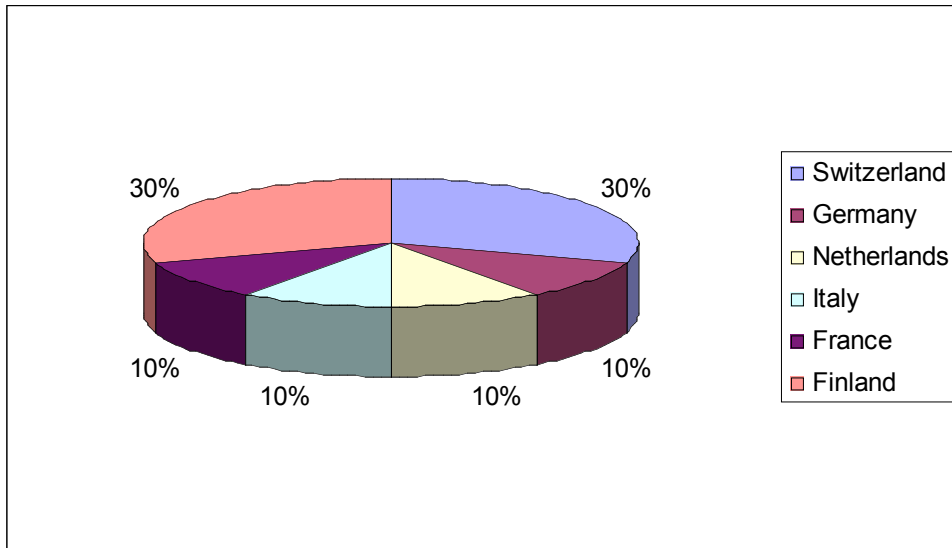


Figure 1: Attendance per country

Number of experts:

There are large variations between countries in terms of the number of vegetable baby food processors. Some countries do not have national companies, which produce baby food in jars (i.e. Austria). Currently, there are companies which do not produce baby food but offer it under their brand to the market.

Characteristics of companies

In order to generate more data about processors and experts, the survey contained some general questions about characteristics of companies. All of our interview partners are willing to be contacted again as an expert for further questions in this project.

Table 1: Product range of the interviewed companies

	organic	Both
Infant formula	2	4
Cereal-based products	2	4
Baby-food in jars (puréed fruit, vegetables, meat, fish, etc.)	3	6
Fruit and vegetable juices	2	2
Rusks and biscuits	2	1
Other infant products		1

Processors who specialise in organic baby food produce mainly under certified organic brands like Demeter and Bioland.

Market

All of the interview partners produce their products not only for their own national market but also for Western (3) and Eastern Europe (3) as well as for Asia (3). One processor even exports his baby food to Africa. For one of our SME², which produces in Germany, Italy is the main market, even though Italy has two national baby food processors. One of the leading companies of the baby food branch produces nearly worldwide, in about 40 different countries.

Retail segment

Most of the companies produce premium products. Only one interviewed processor sells baby food in the discount sector and produces exclusively for private labels.

Turnover and employees

In general, each baby food processor has an annual turnover which is higher than 10 million Euros. Four companies accumulate over 50 million Euros from the sale of their products.

Three medium sized businesses employ less than 100 people. One baby food processor employs between 100 – 500 employees and two companies have over 1000 fulltime positions.

² SME: small and medium sizes enterprises

3 Results

3.1 Focus and presentation of the results

The focus of the processor interviews was to identify points of application for optimising quality and to also gain additional information on the organic food processing sector, on consumers' expectations and on the baby food market.

The survey was performed in one round, because the interview group with 10 experts was very small and the experts could be contacted anytime for further questions.

The questionnaire consists of open and closed questions as well as of questions which can be answered by rating importance or risk. All results of rating questions are brought out in figures showing the average value for organic processors/experts and processors/experts (organic and conventional products).

This survey should be understood as a descriptive case study: results are of qualitative nature and cannot be generalised for the majority of baby food processors. However, it may provide some useful hints regarding critical points to be further investigated by the project.

3.1.1 Introductory questions

Specific open question about the motivation of SMEs (and others) for joining the project and their central problems and interests according to quality.

The primary interest of the SMEs in joining the project is an exchange of knowledge and information according to the quality, quality affecting parameters and ideas of possible processing improvements. A further main expectation with the Core organic project is to discover critical points in order to improve the quality, in particular the saving of the natural nutritional value.

3.1.2 Attributes of quality for vegetables e.g. carrot baby food (purée in jars)

From the processors and experts point of view, general understanding, expectations, and awareness of quality are collected within this block of questions. Different appraisals of quality between organic and conventional processing, product and recipe should be pointed out in particular.

The opening question asked for their characteristics of quality and the influence by legal regulations. No more than one processor defines quality of vegetable baby food by only legal regulations. Legal regulations of organic vegetable baby food tend to the Council Regulation (EC) No 43/2007³ and the Council Regulation 2006/141/EC⁴: For example for infant formula the use of

³ Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labeling of organic products and repealing Regulation (EEC) No 2092/91

⁴ COMMISSION DIRECTIVE 2006/141/EC of 22 December 2006 on infant formulae and follow-on formulae and amending Directive 1999/21/EC

minerals (trace elements included), vitamins, amino acids and other nitrogen compounds is legally required.

For most companies, the definitions of quality for their products are stronger and have additional criteria to the legal regulations. On one hand, they are used to characterise their product by own specifications regarding quality of raw material, the nutritional value or sensory aspects, as well as food safety topics. On the other hand, some processors adhere to higher standards, such as Demeter, IFS, TÜV, Bioland, BRC or ISO 9001:2000, which regulate the quality and/or processing.

Food safety aspects, such as the absence of contaminants, maximum nitrate content, traceability, conditions of storage etc. are mostly stricter than legal guidelines for organic as well as for baby food in general.

Criteria referring to the quality of raw material are the prime focus of most of the processors. For example, one company is very attentive to the traceability and quality of raw materials. The information of the level of certain contaminants and/or heavy metals in the soil is essential for them. Another interview partner mentioned that their farmers have to comply with the rules of agricultural environmental aid as well as the general food law. His company, therefore, has common meetings with the farmers where they discuss e.g. storage temperatures and its importance concerning the quality.

The interviewed companies confirm within their statements that they are aware of the sensible quality of their products and their higher claim of protection for consumers. Both organic and conventional processors understand their responsibility of quality and safety beyond the legal regulation beyond it. They are looking for additional aspects such as nutritional and sensory value (correct granulated consistency, taste) etc.

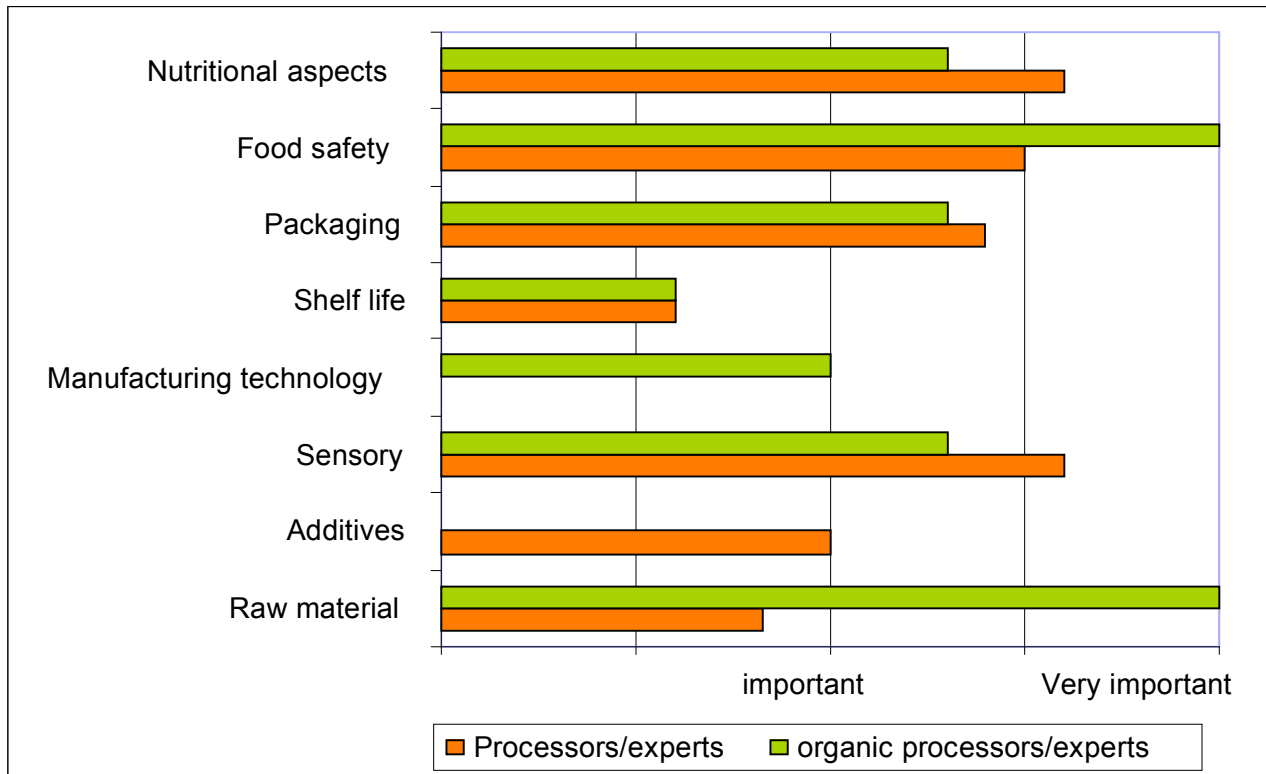


Figure 2: Important attributes of quality regarding processed ready to eat vegetable baby food (purée)

What food quality in general or organic food quality especially means is often a point of discussion. The range of important quality aspects for processed ready to eat vegetable baby food (purée) is one possible view on general food quality and can show only tendencies.

The figure shows that food safety aspects and raw materials are the main focus of organic processors and experts. In contrast, nutritional aspects and sensory value are central for processors and experts handling with both kinds of products. Packaging is an important attribute which alludes quality of food products in different fields.

The ranging of the attributes shows clearly that shelf life, manufacturing technology and additives are less important. If we are looking for explanations of this phenomenon, we find answers with regard to legal regulations and economical or technological restrictions. The use of additives is not permitted for baby food in jars and manufacturing technology is restricted by existing production lines. Shelf life stands for an attribute of quality which is influenced by food safety aspects and economical restrictions (i.e. logistic, target group). Often shelf life is contradictory to e.g. sensory aspects. One interviewed processor consequently assumed that organoleptic assessments are better after a short shelf life of max. one year than the normal 18 to 24 month shelf life for vegetable baby food in jars.

The obvious difference comparison between the assessment of organic and both ways of processing reveals that raw material is the most important aspect of organic processing. There are

hints that the use of organic raw material is increasing for conventional products (stricter regulations referring the content of residues).

In this context, traceability of organic ingredients, contract farming as well as farm audits gains more weight. Obviously, food safety is a very important quality aspect for all processors according to the legal regulations.

Other attributes of quality are maintained, for example hygiene, personal skills.

Differences between conventional and organic processed baby food in the recipe and process referring to the survey

The recipe is the most important part of processed foodstuff, so the ingredients in their quality and quantity are fixed; the way of processing (time, temperature, use of technical facility etc.) is described. The recipe often determines the final quality of the products.

Organic processes often avoid using additives, exclude the use of synthetic processing aids, follow a preferably gentle and natural processing schema and show rather big differences in recipe in contrast to currently popular food design products.

For baby food in particular, the creation of recipes is limited and simple combinations of ingredients are common. The applications of sugar or sweetener can be used by choice. Organic processors forgo the use of sugar, salt and sweetener.

Special aspects for organic recipes encompass the quality of organic raw material. No GMO and other derivatives, no residues and also, for meat, no use of animal drugs characterise the quality of organic raw materials. If the use of additives is necessary (i.e. infant formula, cereal based products), you will find in organic recipes a “purer” way of using additives or supplements (e.g. ascorbic acid used as an antioxidant, in conventional processing malic acid, organic citrus juice concentrate).

Question referring to differences in processing

It seems to be obvious that different ways of processing of organic and conventional raw materials may underline the special characteristics of the products. Customers would expect that further differences exist within processing. Also Council Regulation (EC) No 834/2007 speaks of the organic principle of gentle processing.

In conclusion to the interviews, organic and conventional baby food processors and experts stated that there is no practical difference in the processing.

3.1.3 Quality of raw materials

The quality of raw material is in food processing a crucial factor of the quality of the end product.

Form of delivered raw materials (carrots)

After harvesting, vegetables have to be transferred into adequate storage conditions until they are used as raw materials in processes. Primarily vegetables pass through diverse pre-processing stages, which increase the shelf life as well as conserving the quality of the raw ma-

material. Figure 3 shows the most common forms of vegetable raw materials for baby food production

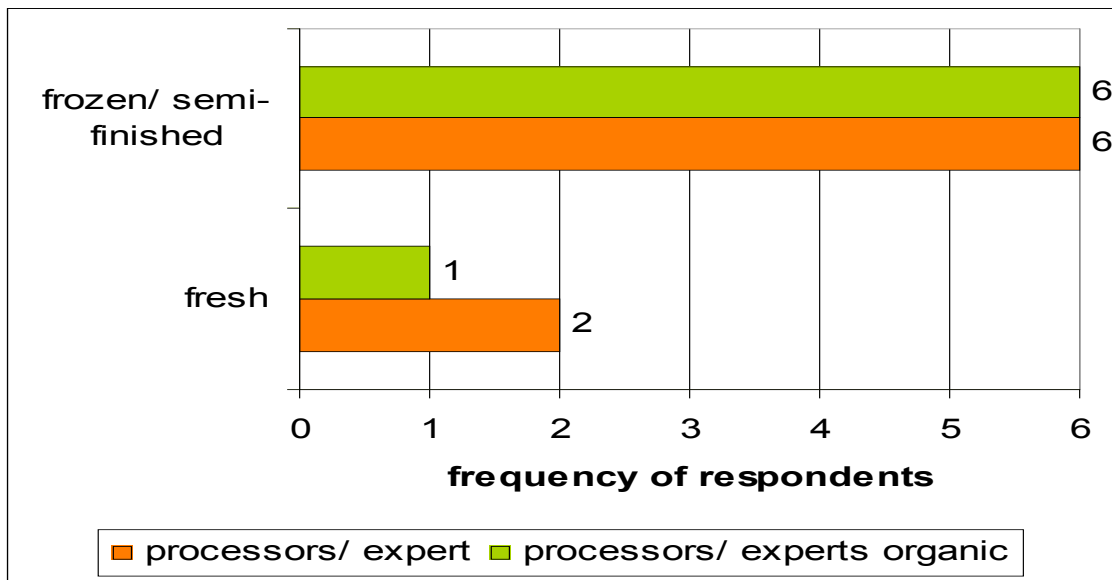


Figure 3: Use of different kinds of raw material

A recognizable trend used by conventional as well as organic baby food processors is the outsourcing of pre-processing steps. An increasing number of European baby food processors receive semi-finished frozen vegetables. In most of the cases pre-processing cover washing, dicing, peeling and freezing. Because of the characteristics of carrots as raw material there are several treatments for their pre-processing. Some baby food companies process carrots in fresh and also in semi-finished frozen form. Processing fresh carrots depends on variety, storage conditions (time, temperature etc.) as well as on availability. The use of freeze-dried raw materials was also mentioned by one company.

As a cause for using this form of raw materials, most of the interviewed persons stated an easier and more convenient handling (controlling, mixing and storage) of semi-finished (frozen) raw material. Shape and technical parameters lead to a standardised, constant ingredient during the whole year, which may have a good nutritional quality. In the majority of cases fresh vegetables could be harvested and pre-processed during one day. The quick manufacturing is particularly important in minimizing the production of nitrites and maintaining the taste. Another argument referred to the hazards of contamination from the soil in the processing building, which can be avoided using semi-finished, frozen raw material.

However, some missing information about life cycle-assessment as well as aspects of quality (i.e. nutritional value etc.) of different forms of raw material leaves the situation inconclusive.

Requirements of raw material (carrots) for your acquisition

The quality of the raw material is fixed within the specification. Most of the attributes which are important for the acquisition of raw materials are similar between organic and conventional specification.



Figure 4: Demands on quality of raw material

Food safety aspects like the content of nitrate and residues (pesticides and other contaminations) are ranged as the most important requirement of raw material. Besides these safety issues baby food processors attend to sensory quality like colour, taste, sweetness and structure. Often sensory value depends on the content of sugar or water which are two “not so important” attributes.

Companies who produce organic baby food are more sensible for circumstance of growing and harvesting as well as the variety of vegetables. For example Demeter products have the first priority for quality of the raw material in the conditions of growth and harvesting and afterwards in the variety etc. In particular the expectation according to the origin is focused on one hand on the farmers close to the factory, on the other hand on the availability in Europe. For some companies the origin depends on the printed declaration of origin on the packaging. The quality characteristic “freshness” is not so important due to pre-processed (frozen) raw material. In terms of grades classifications as “industrial quality” or “highest quality for processing” were described for conventional raw material. Furthermore, single companies look for the content of heavy metals, colour, pureness, packaging, transportation, traceability and the reliability of delivering.

Individual problems in acquisition of raw material

It is well known that, in the market for organic food especially, quality raw material is in great demand. The recent developments show a big gap between produced and requested quantities. The acquisition of favoured qualities (i.e. Demeter) and quantities, for a defined processing date requires an extraordinary effort. Constant quality over several productions together with stable prices is a problematic issue, too. Uniformity of raw material (sensory etc.) is hard to realise due to differences in growing periods e.g. the influence of the weather conditions on the nitrate content, so it is a challenge year after year. Besides problems with the complete traceability of raw materials, defined conditions of harvest and storage (e.g. how to keep raw material fresh, mycotoxins) issues which cannot be influenced were also brought up (e.g. plant diseases, unpredictable climate changes).

A successful solution of most of the problems is contract growing together with evaluated partners in order to ensure delivery of the expected quality and quantity.

3.1.4 Influence of sensory aspects for the recipe

The sensory quality is one of the most important aspects for organic food products to be successful on the market. Consumer expectations regarding the sensory quality are rather sensitive to variations.

Natural variations of raw materials affect quality (taste, amount of Beta-carotene, texture etc.)

Especially for higher quality products, such as organic products, an extraordinary sensory quality is seen as essential. One expert thought that in general the organic raw material has to be premium quality. Most of the producers have to accept different qualities of raw materials because of the limited market. If the processor fails to obtain good quality raw material, then there must be a “plan B” for what to do with the material if the quality does not meet the requirements of premium quality.

The first control of the incoming goods checked the quality and the sensory profile according to the specifications. Variations were tried to be balanced by mixing different charges. In this way semi-finished vegetables like frozen cubes get a more standardised sensory quality. Others acquire their ingredients by contract growing and dedicated crops trying to achieve uniformity of quality and taste. Varieties selected for the production of the fruit and vegetable based products are therefore imposed on farmers on fields with the appropriate characteristics.

All companies communicate natural variations to their customers and inform them on the label about possible variations of the quality of the product due to different characteristics of raw materials. Variations and diversity of product quality, for example the orange color of carrot puree, the fluid/firm consistence or the sweet taste seem to unsettle the mothers buying baby food.

Open question regarding a special strategy/policy of product-quality in respect to the use of additives and supplements

One way to balance these variations and ensure a standardised sensory quality could be brought out by using additives. The use of additives, supplements and processing aids is a de-

cisive aspect of organic process quality. On the one hand, the legal regulations give restricted possibilities for using them; on the other hand organic processors declare the claim to produce more naturally and authentically. If legal requirements postulate a special amount of vitamin C (i.e. carrot juice), organic processors meet the demands by the use of natural ingredients containing vitamin C, such as the use of organic Acerola cherry powder.

According to the opinion of one organic expert, the strength of organic food is based on the restricted use of additives and this is the surplus/added value for a consumer. This is an issue which cannot be compromised. Of course, this causes certain risks for the production, such as interruptions etc. (caused for example by variations in the raw material quality which cannot be balanced by food additives). But it can also force the producer and the processor to co-operate more closely: the processor gets knowledge of how not to lose the good quality of the raw material, can make improvements to the processes etc. And vice versa: it is important to the producer to acquire knowledge about the processes that raw material is meant to go through.

Nevertheless the policy of product quality differs between the interviewed processors. An organic producer stated that he would use supplements and additives if customers expected a special amount of vitamins etc. and yield to the economical market. At the moment this is not the case. For two other processors (both) and an expert, a sensory standardised baby food (by using additives) is more important than a sensory variable baby food (4 processors, 1 expert).

The claim for a constant quality argues for a standardised product which can have little variation within a certain range.

3.1.5 Processing – in order to improve quality

Gentle processing methods are important for organic baby food. QACCP points are searched out in order to improve the nutritional and sensory qualities of vegetable baby food. QACCP means optimising some processing steps to get benefits derived from high food quality.

Restrictions according to the processing

The processing step has several limits in consideration of optimising quality which are caused by procedural (e.g. Demeter processing rules, existing asset, logistic etc), economic (i.e. consumers, price etc.) or legal (regulations referring food safety) restrictions.

Economical and procedural limitations were named as boundaries of processing. For organic products, a limited number of customers are seen as an economic restriction. All baby food producers have existing processing lines, which makes fundamental procedural changes more difficult.

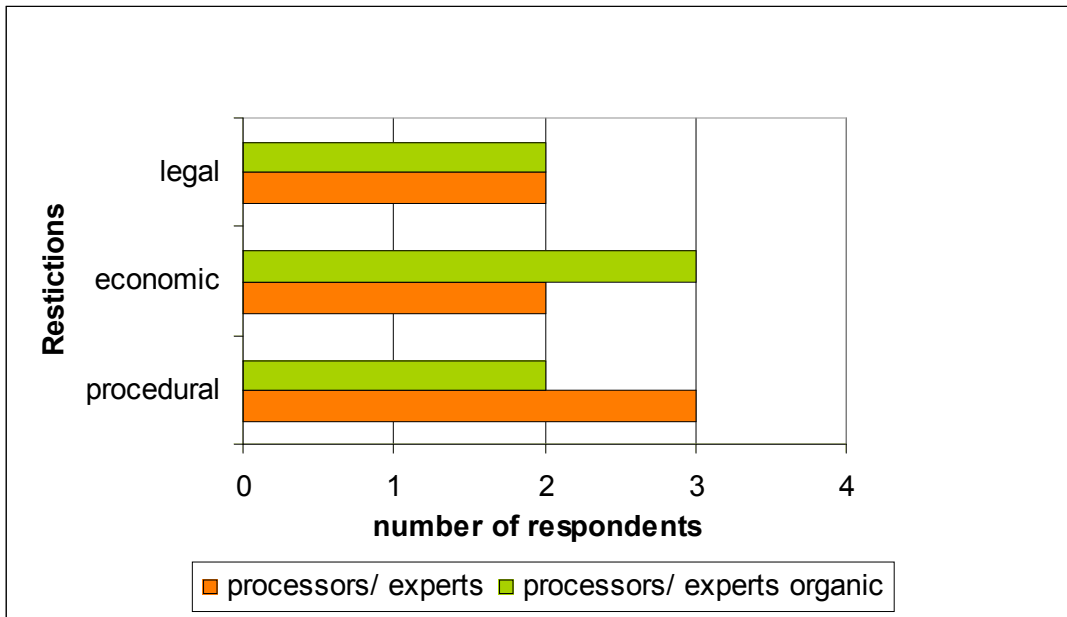


Figure 5: Restrictions according to processing

The most risky processing steps according to the quality

With the aid of a simplified flow chart (Appendix 3) the most risky processing steps should be described and classified as CCPs of an existing HACCP system by the interviewed experts.

Beside some steps is a coloured pie chart, which shows the ranking according to the risk factor for a loss of quality.

Fresh raw material seems to be the most risky processing step. According to the cultivation of the fresh raw material, some very risky CCPs exist in the form of residues, heavy metals and nitrates as well as sensory variations. Further on, the pre-processing to semi-finished raw material contains two other hazardous points in soil contamination and delivery.

Bottling and sterilisation are of fundamental interest for food safety aspects. Therefore the detection of metal, broken glass or other contaminants (i.e. foreign material which is not held within the filter) should avoid risks for the quality.

One expert added here the storage logistics and its follow-up.

Starting points for the optimisation/improvement of quality

After the identification of risky steps according to quality the interviewed processors mentioned opportunities to optimize quality. The following table shows opportunities for optimising quality in respect of single processing steps. Organic processors in particular see chances for improved quality in the kind of raw material as well as in a better solution for sterilization.

Table 2: Processing steps for the optimisation of quality

	Number of respondents	How would you optimise the quality
Raw material fresh	5	Possible solutions for organic processors: Variety, storage conditions – time; harvest, circumstances of growing Possible improvements for an expert (both): variety, origin, right growing conditions, ripeness;
Raw material semi finished (e.g. deep-frozen, diced, pulverised carrots)	4	Processors (both): Pre-processing: freezing, constant quality, selection Expert: definition of the semi preparation ("raw, done, well done" size of the dice etc.)
Washing (i.e. submerged vs. spraying)		
Peeling (i.e. mechanical, with enzymes, with steam etc.)		Mechanical
Cutting		
Cooking	1	Processors/ experts: Time and temperature
Mixing		
Bottling		
Preserving		
Sterilisation	6	Organic processors: Optimising of F-data (6-10) (clostridium sporogenes 5D concept → preserve, proportion of temperature and time can optimise the amount of nutritional value Processor: other sterilisation, Temperature and time reduce "It is possible to use a sterilization process with aseptic packaging. This means that the product and the container are sterilised separately and then mixed in an aseptic environment. This process allows lower temperature in thermal treatment and then a better quality of the product."
Others		Processor (both): the time from raw material to the end product is important for the quality Organic expert: Cultivation, primary production growing conditions seeds etc.

Barriers for improving the known quality-relevant processing steps

The realization of improvements has various and individual barriers in companies. Some problems regarding the organization and logistics of the company were mentioned in almost the same manner as economic causes (often insufficient). For example: a seasonal plan of processing is very difficult to realise, so semi finished products become more important.

Another barrier to improving quality can be seen in the requirements of customers. For example, the customers prefer a safe product with 3 years shelf life. “What about the nutritional value after 3 years? one organic processor asked, “because the development of an infant is faster than the 3 years of shelf life of the product.”

Within the general quality management there are continuous improvements. However, many entrepreneurs do not want to make “over/super-quality” if the customer/client does not want to pay for it. It is a question of price-quality ratio.

The following figure Nr. 6. shows opportunities to optimise quality in respect to aspects of product quality. It’s obvious that an improved product quality has its roots in changes of process quality.

Important attributes regarding the optimisation/ improvement of the quality of organic ready to eat carrot baby food

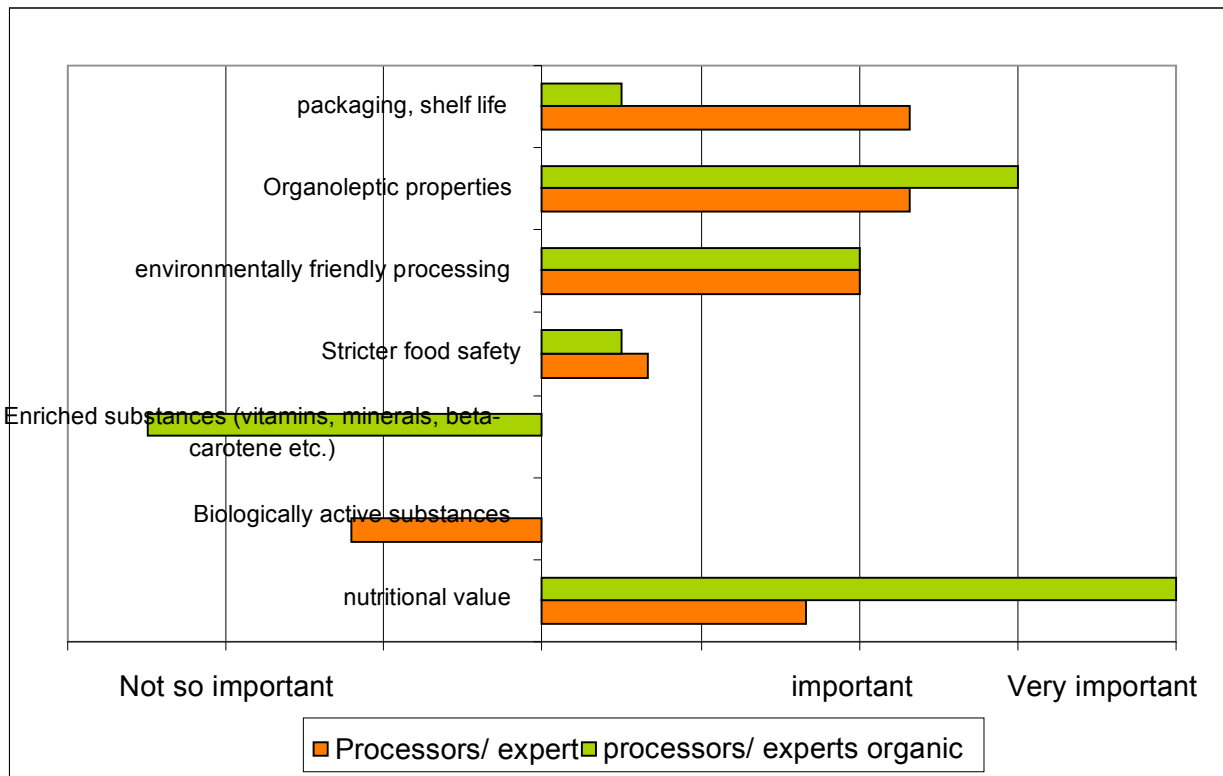


Figure 6: Possible attributes for the optimization of quality

Organic processors saw the aspect “nutritional value” as the most important characteristic to increase the quality of organic baby food and stand out of the market. Organoleptic properties (this means sensory aspects) also ranked highly among qualities for optimisation of quality in organic and conventional products. In addition, environmental friendly processing is capable for development for organic and conventional interview partners. Some programs are in place, not only for organic production. Environmental friendly processing means to save raw material, energy and water and in a later stage to save money. For that reason there is a great interest in

new technologies. Packaging and shelf life are important attributes for processors and experts producing organic and conventional baby food. Making the product as natural as possible was the main topic for one organic company.

Biologically active substances and enriched substances (vitamins, minerals, beta-carotene etc.) got a low ranking for aspects to improve quality. There is an antithesis between the appraisal of organic processors which see a plus of nutritional value as an increase of quality, but do not pay attention to substances influencing the nutritional value.

Improving nutritional value with the use of fresher products with a shorter shelf life

Another working point is minimizing shelf life for fresher, more nutritionally valuable and healthier baby food. In connection with shorter shelf life, there are a lot of changes for distribution. Different logistical processes, shorter time for selling, changes in trade and presentation of the product, as well as, economical barriers were named. In addition, shorter shelf life creates changes in bottling and preserving processes in order to still fulfil food safety aspects (i.e. microbiological contamination). Next to logistical and processing changes, consumers also have to modify their expectations regarding baby food. This is a challenge for marketing. The following statement was raised: "It might be difficult to educate the consumers to use new shorter shelf life products. There is a need to make clear that the use of the product is different. For example baby food is typically consumed while travelling etc."

More convenient baby food can be chilled products which consider the organoleptic aspect. They can have a shelf life of about 30/40 days, but food safety problems can appear (maintenance of the cooling chain).

Fresher products can also mean decreasing the time between harvest and consummation. At the moment semi-finished raw material could be stored over two to three years before processing and a similar period of storage is guaranteed. Altogether this means that a period of about six years can pass between harvest and consummation.

New packaging materials

Common packaging material for baby food is glass-jars, which are well accepted by customers. The product is well packaged in an environmental friendly manner, resalable and uses technology that is established in preservation.

In the view of processors, new packaging possibilities have to be safer (migrations of cups) and higher quality, to fit in the technical, system-dependent process, resalable (attention plastic is also reclosable) and should be more convenient. For environmentally friendly properties more or too much packaging material should be avoided.

Another processor mentioned that different packaging concepts can cause new problems with safety aspects (e.g. migration of packaging, penetrability of packaging). They also see several problems regarding additional costs for new packaging lines together with insufficient quantities of selling products.

3.1.6 Consumers

In this section we wanted to know where the processors see the most important expectations of quality according to the consumers' point of view. In a separate consumer study, also conducted in this project, the effective consumer expectation is worked out.

Three most important feedbacks from the consumers

Consumers' (in that case we speak about buyers') feedbacks given in a direct way is a good instrument for evaluating the quality of products. For carrot baby food in jars in particular, the following comments, hints and demands were collected: varying consistency/texture is understood as a negative feedback, which should cause an optimisation of this point.

In the opinion of the consumers, it is important not to use salt, sugar and spices, as well as additives. In contrast a good taste and good compatibility are positive feedbacks of consumers to the processors. The feedback of an organic processors show a high sensibility for a constant quality of the product, (not too fluid) as well as assurance of exemption of contaminates.

Only the comments of consumers of organic baby food offered under a private brand have a high evidence of sensitivity for taste and nutritional value ("carrots are costive"). They also look for variety of raw material (hybrid or seeds from plants of pure lines).

Another processor sees the first request by consumers in the use of vegetables suitable for children.

Important expectations of quality according to the consumers

Figure Nr. 7 shows an appraisal of the important quality aspects and expectations of consumers in an expert and processor's view. Most of the processors appraise the expectations of their consumers according to food safety, nutritional aspects and environmental friendly packaging as most important. Additional communication and marketing of the product, convenience and origin could be important for the consumers as well. The appraisal of only organic processors notes a high awareness of organic buyers for sensory qualities, the avoided use of additives as well as nutritional and safety aspects.

Organic processors and experts saw nutritional aspects, food safety, sensory and additives as expected attributes of quality by their consumers.

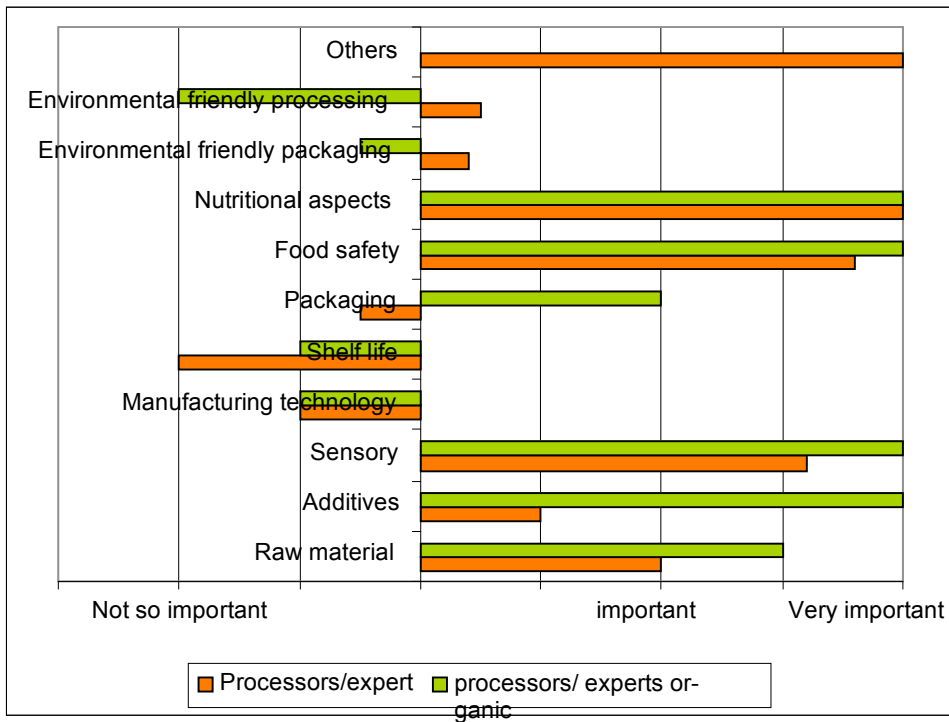


Figure 7: Expectations of consumers referring quality in experts and processors view

Realistic directions of innovating vegetable baby food

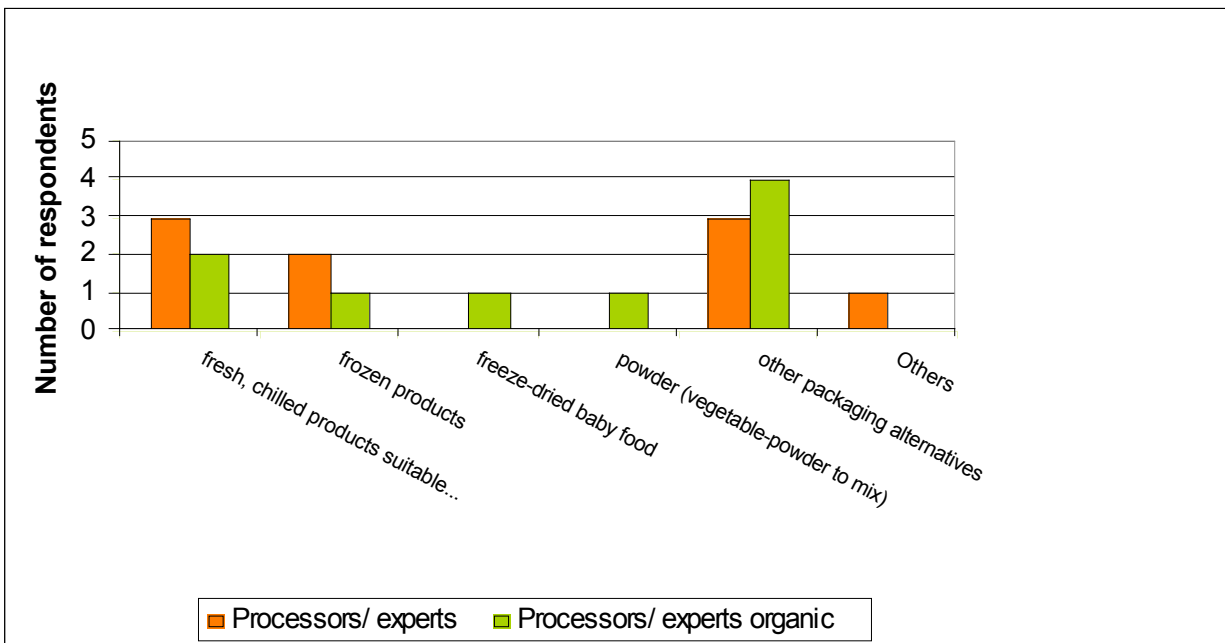


Figure 8: Direction of innovative baby food

Other packaging alternatives got the highest votes alongside fresh, chilled products suitable for immediate use. So more convenient alternatives, with shorter shelf life and new packed products are in the main focus for innovations of the baby food branch. For organic baby food fresh, chilled products suitable for immediate consumption seem to be the best innovation. The im-

plementation of such new products is seen as difficult because of preserving technology and logistic solutions.

Improvements can go in the direction of aseptic packaging; in one processor's view the best innovation idea would be a fresh product with aseptic packaging. Currently there is no technology to do so.

In one SME's point of view powder has an intensive taste (a higher amount of natural aromas) and is a good idea for innovation.

Innovated packagings as well as frozen vegetable pure cubes (mixtures of different vegetables) are new products in the opinion of one expert. In addition, other seasonal products can give the children an opportunity to learn that flavours are different during the year.

The direction and the success of product innovations of baby food is a question of trade and market.

Barriers for innovated vegetable baby food products

Table 3: Possible barriers for innovated vegetable baby food

	Significant barrier	Moderate barrier	No barrier at all	Don't know
Strict food safety legislation	3	1	4	
No acceptance by the customers	5	3	1	
Limited processing technologies	4	1	2	
Loss of quality	2	2	2	1

The market for baby food products is seen as very sensitive for innovation. So the consumers are rather anxious and sensible in their buying habits. New products have to have a big plus of quality and a good communication strategy to become accepted.

4 Discussion and Conclusions

The challenge of the study was to identify and define critical and essential product quality parameters, which are useful for optimising organic food quality within vegetable baby food processing. For that reason, a processor survey was carried out. Next to food safety aspects, nutritional quality and health promoting aspects as well as sensory improvement were observed. This case study is understood as one of the selection criteria for defining the quality specific critical control points for the improvement of the carrot baby food.

The study had the following starting positions, which gave some limitations in the research:

Selection of experts:

In description the work allotted a written survey with a semi-structured questionnaire, which involves baby food processing experts from companies as well as independent experts in the 10 participating countries. The European vegetable baby food market is shared by about 25 companies (processors and traders), so the competition for market share is hard. A confidential basis for performing the interview was necessary, especially due to the fact that several open questions as well as questions referring to individual processing and secret recipes were contained in the questionnaire. Some processors disapproved of our questionnaire for that reason.

Nevertheless some interesting tendencies could be filtered out and attractive points to increase and optimize organic baby food quality could be collected. The survey shows that most of the processors follow higher quality standards as the legal regulations. This can be caused either by an anxious pretension to produce a rather high quality because of the sensitive consumers or because of the polypolistic market structure. Higher quality standards are in the main focus of the processors, especially for organic production. Raw material and food safety are most important attributes for organic baby food. In General nutritional and sensory aspects were ranged highly for quality of baby food.

Concrete differences between organic and conventional baby food in recipe or processing could not be found in the answers of the interviewed persons. In most of the cases the quality of raw material varies and the processing is equal in organic and conventional production. Not only consumer expectations but also Council Regulation (EC) No 834/2007 ask for different processing of organic products. Here further actions are needed to develop organic process quality to a higher, more remarkable level of food quality.

Searching for the most common form of raw material for vegetable baby food showed a big use of semi-finished (frozen) products. Organic products do not demonstrate differences in the use of fresh raw materials. An increasing use of semi-finished raw material is a recognizable trend. Influences of pre-processing, circumstances of storage and transportation on the quality of the product i.e. nutritional quality should be more investigated. Missing information about life cycle-assessment of different forms of raw material leaves the situation inconclusive, too.

Furthermore, most experts accept sensory variations of raw material and communicate these differences to their customers in declarations on the product. Additives to balance variations in taste, colour or smell were avoided by organic companies in particular. The strength of organic

food is based on less and natural additives and this added value for a consumer cannot be compromised.

As the spontaneous QACCP analysis shows, processors see the most risky steps according to quality in the area of raw material. As aforementioned sensory variations, the content of nitrates, residues, and heavy metals are qualitative risky characteristics. Besides influences of raw material, the quality of “cooking” and the adjustment of time and temperature could cause optimisation of nutritional and sensory quality. Changes of bottling and sterilization (e.g. temperature and time, use of aseptic packaging) could also be a possible QACCP. Though some possibilities of optimising quality were discussed, often restrictions/barriers are connected with these improvements. For example fresher products need a new logistics system or the use of other packaging material may lead to a new packaging line.

Interesting information was collected about the perception of customers' expectations by the processors. Food safety, nutritional aspects as well as environmentally friendly packaging are in the main focus of quality according to the consumers. The possible directions of innovations underline this tendency. Therefore, other packaging as well as fresh, chilled products received the most votes.

Organic baby food should withdraw from the baby food market and constitute a nutritional rich, environmentally friendly and safe product of high quality. A special overvalue should be produced within the processing. So this survey can conclude three points of actions to improve the process quality.

- Kind of raw material: fresh, pre-processed (semi-finished)
→ Nutritional, safety and sensory QCCP
- time and temperature load (table 2)
→ Nutritional and sensory QCCP
- Preserving/ sterilizations
→ Nutritional and safety QCCP

In order to check the grade of optimisation of these QCCPs, further investigations are needed. First of all, special pilot plant testing will be arranged together with different analyses. Afterwards improvements should be implemented in industrial baby food processing lines of our SMEs, which will be monitored for two carrot purée processes.

5 Summary

The processor survey shows the general principles and understanding of quality for the processing of organic food from the processors' point of view. In addition, possible problem areas regarding the question of product quality such as raw material, processing techniques, storage etc. are worked out. The results of the survey support the identification and definition of critical and essential control points as well as product quality parameters.

This survey can therefore conclude three points of actions to improve the process quality.

- Handling of raw material: transportation, storage, pre-processing
→ Nutritional, safety and sensory QCCP
- Cooking: time and temperature
→ Nutritional and sensory QCCP
- Preserving/ sterilizations
→ Nutritional and safety QCCP

Besides these QCCPs, organic baby food should break away from the baby food market and constitute a nutritional rich, environmentally friendly and safe product of high quality.

6 Annex I Processors survey questionnaire

CORE organic nr. 1885 QACCP

WP 2.

Processor expert survey

Survey

FiBL Kathrin Seidel, Ursula Kretzschmar

October 2, 2007

The interview will be done over the phone.

Please get in contact with your interview partner one week before. Arrange the date for you call and send him/her the flow-chart.

Your interview partner should work in the department of product development or quality.

Introduction

Introduce yourself as facilitator / member of the project group.

CORE organic QACCP should be presented as European research on food processing focused on baby food. The aim of the research is to investigate and describe QACCP (quality analysis of critical control point, health and sensorial aspects) and additional standard HACCP analysis. You, as a producer, are considered as experts to shed light on critical effects affecting quality.

The aim of the interview is to identify processor awareness, expectations and demands on the quality of organic processed vegetables.

Please try to be very sensitive in asking for confidential information.

If you know your interview partner personally, try to get more in-depth information.

Before starting the interview please make sure that your partner has the flow-chart.

O. Do you have the flow-chart I sent in front of you?

Yes Start the interview

No Send it again

Only for SME: Please give your motivation for joining the project and describe your central problems and interests according to quality.

Attributes of quality for vegetable e.g. carrot baby food (purée in jars)

Now we are going to speak in general about vegetable baby food in jars

1.1. Are your characteristics of quality only defined by legal regulations?

Yes

No

If no, please describe the further characteristics of quality:

--

1.2. Which attributes of quality regarding processed ready to eat vegetable baby food (purée) are important for you as processor?

Conventional vegetable baby food	Very impor- tant	important	Not so im- portant	Not impor- tant at all	Don't know
Raw material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Additives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sensory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manufacturing technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shelf life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Packaging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Food safety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nutritional aspects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*The next questions are only regarding organic vegetable baby food (purée).
Please ignore question 1.3. if you talk with a company producing only conventional baby food.*

1.3. Which attributes of quality regarding processed ready to eat organic vegetable baby food (purée) are important?

Organic baby food	Very impor- tant	important	Not so im- portant	Not impor- tant at all	Don't know
Raw material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Additives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sensory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manufacturing technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shelf life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Packaging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Food safety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nutritional aspects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1.4. Conventional and organic processed baby food differs mostly in the recipe.
Please mention four or five differences on impulse.

1.

2.
3.
4.
5.

1.5. Is the processing of organic and conventional baby food different, too?

Yes

No

If yes, please describe the differences:

--

Quality of raw materials

2.1. In which form do you get the carrots delivered?

fresh	<input type="checkbox"/> <i>Please ask for the time between harvesting and delivering</i>
freeze-dried	<input type="checkbox"/>
frozen	<input type="checkbox"/>
washed	<input type="checkbox"/>
diced	<input type="checkbox"/>
peeled	<input type="checkbox"/>
pulverised	<input type="checkbox"/>
Semi finished product	<input type="checkbox"/>
What kind of semi finished product? (e.g. deep-frozen, diced carrots)	<input type="checkbox"/>

2.2. Why do you use this form of raw materials?

--

2.3. Please rate the following requirements of raw material (carrots) for your acquisition.

	Very im- portant	important	Not so important	Not im- portant at all	Don't know
variety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
grade	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
freshness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
origin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

conditions of growing and harvesting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
sensory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
uniformity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
water content	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
sugar content	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
content of nitrate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
content of residues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2.4. What are the most important problems in acquisition from your point of view?

Influence of sensory aspects for the recipe

3.1. Natural raw materials (carrots) often have variations in quality (taste, amount of Beta-carotene, texture etc.). How do you solve this problem?

For example: defeating this quality of raw materials, using additives (stabilizers, flavour, dyestuffs, antioxidants, vitamin-ingredients) to balance this variation, doing nothing, accepting it or balancing the variations within the production process (i.e. proportion water: carrot, contracting low standardizing etc.

3.2. Your company pursues a special strategy/policy of product-quality. What do you think about the use of additives and supplements?

In this case we are going to speak about additives like stabilizers, dyestuffs, antioxidants, preservatives etc. and supplements like vitamins, minerals, fibre etc. Please ask for differences compared to the legal regulations.

3.3. In your product policy is it more important to have

- | | |
|---|--------------------------|
| A sensory standardised baby food (by using additives) | <input type="checkbox"/> |
| A sensory variable baby food | <input type="checkbox"/> |

Processing – In order to improve quality

Gentle processing methods are important for organic baby food. So we try to find some QACCP- Points in order to improve the nutritional and sensory qualities of vegetable baby food. QACCP means optimizing some processing steps to get benefits derived from high food quality.

4.1. Are there restrictions according to the processing?

Yes

No

If yes, which ones:

- | | |
|-------------------------|--------------------------|
| procedural restrictions | <input type="checkbox"/> |
| economic restrictions | <input type="checkbox"/> |
| Legal restrictions | <input type="checkbox"/> |
| others | <input type="checkbox"/> |

4.2. We have sent you a simplified flow chart of a carrot baby food process. Where are the most risky processing steps according to the quality?

Please ask if these steps are CCPs of HACCP.

	Very risky	risky	Not so risky	Not risky at all	CCP
Raw material fresh	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Raw material semi finished (e.g. deep-frozen, diced, pulverised carrots)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Washing (i.e. submerged vs. spraying)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Peeling (i.e. mechanical, with enzymes, with steam etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cutting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mixing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bottling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preserving	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sterilisation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.3. Where do you see a starting point to optimize/improve the quality?
Quality here can also mean sensory aspects such as olfaction and taste, changes of colour, texture, ingredients etc.

	Optimization of quality	How would you optimize the quality
Raw material fresh	<input type="checkbox"/>	
Raw material semi finished (e.g. deep-frozen, diced, pulverized carrots)	<input type="checkbox"/>	
Washing (i.e. submerged vs. spraying)	<input type="checkbox"/>	
Peeling (i.e. mechanical, with enzymes, with steam etc.)	<input type="checkbox"/>	
Cutting	<input type="checkbox"/>	
Cooking	<input type="checkbox"/>	
Mixing	<input type="checkbox"/>	
Bottling	<input type="checkbox"/>	
Preserving	<input type="checkbox"/>	
Sterilisation	<input type="checkbox"/>	
Others	<input type="checkbox"/>	

4.4. Why have you not improved this step before now?

4.5. Which attributes regarding the optimization/ improvement of the quality of organic ready to eat carrot baby food (purée) can be important?

	Very important	important	Not so important	Not important at all	Don't know
Nutritional value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biologically active substances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enriched substances (vitamins, minerals, beta-carotene etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stricter food safety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
environmentally friendly processing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Organoleptic properties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Packaging, shelf life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

4.6. In order to improve nutritional value we thought of fresher products. Which barriers can exist for a shorter shelf life?

--

4.7. Which barriers can avoid the use of new packaging materials?

--

Customers

5.1. Please state the three most important feedbacks that you get from your customers.

1.
2.
3.

5.2. What do you think are important expectations of quality according to the consumers?

Organic baby food	Very important	important	Not so important	Not important at all	Don't know
Raw material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Additives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sensory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manufacturing technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shelf life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Packaging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Food safety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nutritional aspects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Environmental friendly packaging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Environmental friendly processing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5.3. What do you think is a realistic direction of innovating for vegetable baby food? fresh, chilled products suitable for immediate consumption

frozen products	<input type="checkbox"/>
freeze-dried baby food	<input type="checkbox"/>
powder (vegetable-powder to mix)	<input type="checkbox"/>
other packaging alternatives	<input type="checkbox"/>
others	<input type="checkbox"/>
no statement	<input type="checkbox"/>

5.4. We are thinking of innovated vegetable baby food products. You as an expert can assess which barriers we will find. Please rate the following statements.

	Significant barrier	Moderate barrier	No barrier at all	Don't know
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strict food safety legislation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No acceptance by the customers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Limited processing technologies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loss of quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7 Annex II Company characteristics

Company characteristics

We need some general information about the company.

Make sure that you only ask for information you cannot obtain from the company's homepage

A. What kind of baby food and which quality do you produce?

	organic	conventional	both
Infant formula	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cereal-based products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baby-food in jars (puréed fruit, vegetables, meat, fish etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fruit and vegetable juices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rusks and biscuits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other infant products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B. Which proportion does organic baby food production have in your company?

1% or less of the turnover	<input type="checkbox"/>
1 to 5 %	<input type="checkbox"/>
5 to 10%	<input type="checkbox"/>
10 to 50%	<input type="checkbox"/>
over 50%	<input type="checkbox"/>
100%	<input type="checkbox"/>
no statement	<input type="checkbox"/>

C. For which market do you produce?

only for your country	<input type="checkbox"/>
Western Europe	<input type="checkbox"/>
Eastern Europe	<input type="checkbox"/>
Asia	<input type="checkbox"/>
America	<input type="checkbox"/>
Africa	<input type="checkbox"/>
worldwide	<input type="checkbox"/>
others	<input type="checkbox"/>

D. For which retail-segment do you produce?

- | | |
|---------------------------------|--------------------------|
| premium products | <input type="checkbox"/> |
| discount products | <input type="checkbox"/> |
| private brand/ commission order | <input type="checkbox"/> |
| others | <input type="checkbox"/> |

E. Can you give us some general information about your turnover per year?

- | | |
|-------------------|--------------------------|
| 0 - 1 million € | <input type="checkbox"/> |
| 1 - 10 million € | <input type="checkbox"/> |
| 10 - 50 million € | <input type="checkbox"/> |
| over 50 million € | <input type="checkbox"/> |
| no statement | <input type="checkbox"/> |

F. How many people does your company employ? (equivalent to fulltime positions)

- | | |
|--------------|--------------------------|
| > 100 | <input type="checkbox"/> |
| 100 - 500 | <input type="checkbox"/> |
| 500 - 1000 | <input type="checkbox"/> |
| over 1000 | <input type="checkbox"/> |
| no statement | <input type="checkbox"/> |

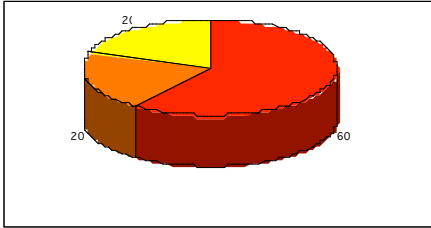
G. Can we contact you as an expert again after analysing this interview?

- Yes
- No

If you are interested in the results and publications of our research, we will give you a link to download the first results. The whole project will be finished in 2009.

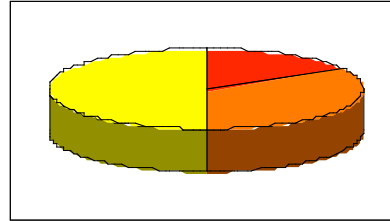
Thank them for their prompt answering of the questions and participation in this organic research.

Risky steps according quality



Fresh : Nitrates, residues,
heavy metals
Soil contamination

Raw material



Semi -finished:
delivering

Baby Food Processing

