



New species for EU aquaculture

Deliverable Report

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Lead Scientist preparing the Deliverable: Grigorakis K. (HCMR),

Other Scientists participating: Guerrero L. (IRTA), Bou R. (IRTA), Robles, R. (CTAQUA).

Objective: The objective of this Deliverable was to make a technical assessment of the selected species. This report presents: a general description of the products; the list of essential characteristics relevant for high quality consumption and intended use of the products; the methods and criteria for assessing the performance of the product in relation to those essential characteristics; principles and conditions for the production, control and packaging of the new products to guarantee quality of consumption.





Introduction

It is essential for the product development and especially in cases of advanced processing to have a full image of the principles applying, the criteria for ensuring quality and safety of the product. The control of the temperatures in case of refrigeration, of the water activity (in cases of dehydration) and the microbial control with chemical means (acidification of seafood) or oxygen deprivation are the basic tools for allowing product preservation. Each product has specific demands for obtaining optimum quality (FAO, 2001). These depend on the raw material quality, the product nature, the degree of processing and other conditions. For this purpose a technical assessment would be a tool providing a guideline for achieving optimization of procedures, for obtaining maximization of high quality and for controlling product development at the maximum level.

Within these frames, this technical assessment covers:

- a general description of the products
- the list of essential characteristics relevant for high quality consumption and intended use of the products;
- the methods and criteria for assessing the performance of the product in relation to those essential characteristics
- principles and conditions for the production, control and packaging of the new products to guarantee quality of consumption

Species

The specimens considered herein were those of farmed meagre (*Argyrosomus regius*), greater amberjack (*Seriola dumerili*), pikeperch (*Sanders lucioperca*), grey mullet (*Mugil cephalus*) and wild wreckfish (*Polyprion americanus*). Considering that wreckfish is not available as farmed fish, the possibility to create prototypes out of this species and conduct further consumer test is not possible.

Products -general description

The products created from these species included three different processing levels (minimum, medium, high). The product description appears in **Table 1**. The detailed manufacturing conditions and terms have been analytically described in deliverable D28.4 “Physical prototypes of new products from the selected species meagre, greater amberjack, wreckfish, pikeperch and grey mullet”. One important aspect is to calculate the technical yield of products, i.e. how many product items can be created per farmed fish specimen. The calculations can be done based on the used fish commercial sizes and the technical yields (filleting yield), and these elements can be obtained by making approximations to the actual technical yields measured and presented in Deliverable D28.3: “Report on product and process solutions for each species based on technological, physical and sensory characteristics”. The products technical yields are presented in **Table 2**. This information is valuable because it can be used in combination with the fish production costs and the product generation / processing costs in order to make calculations of total costs and pricing of the products.

**Table 1.** Product description. The processing level (1: minimum, 2: medium, 3: high), the ingredients incorporated in the products and the description of product are listed for each DIVERSIFY species.

	processing level	ingredients	description
Greater amberjack			
<i>Idea 13: Frozen fish filet that is seasoned or marinated</i>	2	<ul style="list-style-type: none"> • Greater amberjack fish fillets without skin, <ul style="list-style-type: none"> • honey, • soya sauce, • water, • lemon juice • sesame seeds. 	Frozen fish filet that is seasoned or marinated either traditional, Italian, Provence or Asian. The product is produced environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU. The product is in a sliding packaging, transparent vacuum-packed bag made of recyclable material, with clear pictures of the unfrozen product on the cardboard sleeve.
<i>Idea 30: Ready-made fish tartar with additional soy sauce</i>		<ul style="list-style-type: none"> • Greater amberjack fillet, • fresh onions <ul style="list-style-type: none"> • lime • salt • pepper • olive oil • soya sauce (Water, wheat, salt, sugar) • Sherry vinegar (Sherry vinegar, colour (E-150d), antioxidant (E-224) • mustard (water, spirit vinegar, mustard, glucose and fructose syrup, sugar, salt, modified starch <ul style="list-style-type: none"> • stabilisers (guar gum,xanthan gum), • flavourings • turmeric extract • preservative (potassium sorbate) • antioxidant (tocopherol-rich extract) 	Ready-made fish tartar with additional soy sauce for cold serving. Packaging is the golden tray that reflects the colours and physical appearance of the product and that could also be used for serving. Package contains information how the product was made. The product is produced environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU.



<i>Idea 34: Fresh fish steak for grilling in the pan</i>	1	Greater amberjack steak	Fresh fish steak for grilling in the pan. Transparent packaging. The product is produced environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU.
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Grey mullet

<i>Idea 2: Thin smoked fillets</i>	2	<ul style="list-style-type: none">• thin smoked grey mullet fillets skin-on .• Salting mixture: prepare a mixture of pure sea salt and sugar in a proportion of 3:1.• Raw smoking material: pure oak chips.	Fresh thin smoked fillets from the same (or different) fish species, which can be used as a starter or incorporated within a sandwich/salad. The product is sustainably produced (containing ASC label). It is labelled as a premium product; the country of origin is EU. The packaging is a plastic tray where the fillets are laid covered with a transparent plastic, which allows visibility of the fillets and VP or MAP is used for shelf life prolongation. Ideas concerning the different uses of the fillets are included on the product's sleeve. This idea tries to assimilate classic smoked fillet products with the need of consumer for convenience.
<i>Idea 21: Fresh fish fillet with different 'healthy' seasoning and marinades</i>	1	Grey mullet fillets with extra virgin olive oil and ice salt: <ul style="list-style-type: none">• grey mullet (150 g)• 10 g extra virgin olive oil (obtained just by mechanical process)• 2g ice salt.	Fresh fish fillet with different 'healthy' seasoning and marinades separately packed that consumer can choose and vary depending on the occasion. This product is sold with recommendation for the appropriate vegetables and wine to accompany the dish. Product message: 'Not two same dishes in a row; 'You have it ready for you, healthy but still have the hectic lifestyle.' It is labelled as a premium product, the country of origin is EU.
<i>Idea 33: Ready-made fish fillets in olive oil</i>		<ul style="list-style-type: none">• Grey mullet fillet• extra virgin olive oil.	Ready-made fish fillets stored in olive oil with visible glass packaging. Product message: 'Tradition'. It is labelled as a premium product; the country of origin is EU.

Meagre



<i>Idea 1: Frozen fish fillets with different recipes</i>	1	<ul style="list-style-type: none">• Meagre fillets with skin (1200 g): 3 X 2 fillets (each averaging 400 g). alternatively: 2-portions X 300 g or less in order to satisfy consumer demands.	Frozen fish fillets divided in double portions; each packaging includes three or four 2-person portions from the same or different fish species packaged separately. The product is environmentally sustainable (containing ASC label). It is labelled as a premium product; the country of origin is EU. The product is included in transparent vacuum-packed bags (one for each 2-persons' portion) made of recyclable material where fish fillets are laid; each bag can be divided easily from the other; each 2-portion bag has a different recipe from the others within the same package; a picture of the prepared dish is included on each 2-portion bag.
<i>Idea 4: Ready to eat meal: salad with fish</i>		<ul style="list-style-type: none">• Mixed vegetables "mesclun" (75 g): the proposed mix consists of romaine lettuce,, endive lettuce, lamb's lettuce and radicchio in similar ratios.• Cherry tomatoes (35 g).• Vinegar-cooked meagre (45g): meagre fillets, cider vinegar, water.• Croutons (10 g): crunchy bread cubes made of wheat flour, vegetable oils (sunflower and palm), yeast, salt and malt wheat.• Mustard vinaigrette (35 g): Dijon mustard (water, mustard seeds, alcohol vinegar, salt, citric acid, potassium metabisulfite), oregano, honey, olive oil, lemon (juice and zest), black pepper.	Fresh ready to eat salad that includes fish as well as an accompanying sauce; fish and sauce are separately packed and included within the original package. The fish included is either a smoked fillet (provided in slices), or vinegar-cooked, or alternatively bottarga; thus, the dish can be eaten cold. The product is produced in an environmentally sustainable way (containing ASC label). It is labelled as a premium product; the country of origin is EU. The packaging (MAP) is composed by a bowl where the salad is placed; the fish pieces and the sauce are provided in separate transparent accompanying packages incorporated with the original bowl package. A transparent lid exists on the top to allow product visibility and the packaging has the picture of the ready meal on it.



<i>Idea 6: Fish burgers shaped as fish</i>	3	<ul style="list-style-type: none">• Meagre fish meatEmmental shredded cheese (milk, salt, bacterial culture, microbial enzyme)• salt• black olives (water, olives, salt, thyme and oregano aroma, and stabilizer (ferrous gluconate)).	Frozen fish burgers shaped as fish. The burgers are ready to cook and prepared with a mild seasoning and can be incorporated in a sandwich or prepared as a part of a meal. Among the advantages of this product is the absence of bones and the attractive shape for children. The product is produced in an environmentally sustainable way (containing ASC label). It is labelled as a premium product; the country of origin is EU. The product is included in a transparent vacuum-packed bag or in a plastic tray with transparent plastic on the top. Information on fish for educative purposes (children) and playful gifts (e.g. sticker) are included in the packaging.
Pikeperch			
<i>Idea 9: Fish spreads / pate</i>	3	<ul style="list-style-type: none">• 100 g of cooked pikeperch (64.00%)• 55 g of emulsion (5.9 g of caseinate in 47 g hot water, sunflower oil (47 g) (35.20%)• 1 g of salt (0.64%)• 0.15 g of garlic powder (0.10%)• 0.1 g of cayenne pepper (0.06%).	Fish pate / spreads prepared using different recipes. Can be used as starter or incorporated in a sandwich. The product is sustainably produced (containing ASC label). It is labelled as a premium product; the country of origin is EU. The product is included in a tube to facilitate use, extraction of right amount of product as well as prolong shelf life (only outer part of the product will come in contact with air in each use). This idea was an attempt to utilize raw materials that are considered of less value or losses to create added value. Consumer convenience and existence of similar non-fish products were considered. Not something similar has been provided by the focus groups.
<i>Idea 21: Fresh fish fillet with different 'healthy' seasoning and marinades</i>	1	<ol style="list-style-type: none">1. Pikeperch with yoghurt sauce: pikeperch (150 g) and yoghurt sauce (25 g): yoghurt, lemon juice and lemon zest, garlic, oregano, salt.2. Pikeperch with virgin olive oil: pikeperch (150 g) and virgin olive oil mix (25 g): virgin olive oil, garlic, parsley, salt.	see idea 21 described under grey mullet



*Idea 30: Ready-made
fish tartar with
additional soy sauce*

- Pikeperch
- avocado (optional)
 - onions
- soy sauce (water, glucose-fructose syrup, sugar, 12% soya sauce (water, soy sauce, wheat, salt)
 - molasses, salt yeast extract, colouring, plant and spices extracts, lactic acid)
 - olive oil
 - water
- Worcestershire sauce (malt vinegar, alcohol vinegar, molasses, sugar, salt, anchovies, tamarind extract, onion, garlic, spices flavourings)
- lemon juice (in case that avocado is added)
 - ginger
 - sesame seeds
 - gelatine
- citric acid (in case that avocado is used; E-330)
- colourings (Tartrazine (E102), ponceau 4R (E124), patent Blue (E131), salt).

see idea 30 described under greater amberjack



Table 2. Products technical yield. Indicative fish commercial size and indicative average filleting yield are presented for each species. Based on the fish fillet quantity required for each product, the number of products per fish is calculated.

	fish commercial size (g)	filleting yield (%)	fish quantity per product (g)	nr of products per fish
Greater amberjack	10000	60		
<i>Idea 13: Frozen fish fillet that is seasoned or marinated</i>			400	15
<i>Idea 30: Ready-made fish tartar with additional soy sauce</i>			100	60
<i>Idea 34: Fresh fish steak for grilling in the pan</i>	2000g (smaller fish)	50	450-500	2
Grey mullet	500	35		
<i>Idea 2: Thin smoked fillets</i>			60-100	2-3
<i>Idea 21: Fresh fish fillet with different 'healthy' seasoning and marinades</i>			200	aprox. 1
<i>Idea 33: Ready-made fish fillets in olive oil</i>			220	aprox. 1
Meagre	2000	40		
<i>Idea 1: Frozen fish fillets with different recipes</i>			1200 (3 fillets) or 800 (2 fillets)	2/3 or 1
<i>Idea 4: Ready to eat meal: salad with fish</i>			45	17
<i>Idea 6: Fish burgers shaped as fish</i>		scenario 1 (from fish fillet)	85	10
		scenario 2 (from filleting discards 2%)		1/2
Pikeperch	2000	40		
<i>Idea 9: Fish spreads / pate</i>			100	8



<i>Idea 21: Fresh fish fillet with different 'healthy' seasoning and marinades</i>	150	5
<i>Idea 30: Ready-made fish tartar with additional soy sauce</i>	100	8

Essential characteristics and assessing criteria

The essential characteristics of the products are related to their nature and processing degree (Table 3). The shelf life assessment has taken place in deliverable D28.4: "Physical prototypes of new products from the selected species meagre, greater amberjack, wreckfish, pikeperch and grey mullet", including both microbiological and sensory criteria. High-quality shelf life can be termed as the duration of storage for which product retains mostly its freshness characteristics, is definitely shorter than the total shelf life and is the period within preferably commercialization should take place (note: the product can be commercialized until acceptability limit, but its value significantly decreases after having passed the high quality shelf life, i.e. towards the end of shelf-life). The high quality shelf life for each product is analytically presented in Table 3. The assessing criteria for determining the quality of the products are basically the sensory freshness assessment schemes. Additionally microbiological criteria including total plate count, mesophilic and psychrophilic bacteria, are essential freshness indicators, while total Enterobacteriaceae, *E. coli*, *Salmonella* sp., *Listeria* spp., *Shigella* spp., *Clostridium* spp. plate counts are safety indexes. These have been analytically assessed separately for each product in the deliverable D28.4: "Physical prototypes of new products from the selected species meagre, greater amberjack, wreckfish, pikeperch and grey mullet". The essential characteristics that are required for maximum safety and optimum maintenance and commercialization of products are those presented in the last two columns of **Table 3**.

Table 3. Products' nature, high-quality shelf life in days (d), months (mo) or years (y), safety issues and essential characteristics for retaining high quality during storage and commercialization (HPP: hydrostatic pressure processing, MAP: modified atmosphere packaging, VP: vacuum packed, VSP: vacuum skin packaging)

	product nature	high quality shelf life	safety measures*	essential characteristics
Greater amberjack				
<i>Idea 13: Frozen fish fillet that is seasoned or marinated</i>	marinated, frozen, VP	6 mo		deep freeze cold chain retaining at -20 °C ± 2 throughout storage



<i>Idea 30: Ready-made fish tartar with additional soy sauce</i>	fresh, VP (or preferably VSP)	approx. 3d	pH<5, allergen labeling (soya sauce, sesame seeds, mustard and sherry vinegar (may contain sulphites))	retaining cold chain throughout commercialization (<3 °C), retaining packaging
<i>Idea 34: Fresh fish steak for grilling in the pan</i>	fresh, VP	6d	hygiene during filleting	retaining cold chain throughout commercialization (<3 °C)
Grey mullet				
<i>Idea 2: Thin smoked fillets</i>	thermally processed, dried, VP or MAP, cold storage	21d		retaining cold chain throughout commercialization (<3 °C)
<i>Idea 21: Fresh fish fillet with different 'healthy' seasoning and marinades</i>	fresh, MAP	7d	allergen labeling (depending on sauce)	retaining cold chain throughout commercialization (<3 °C), retaining MAP
<i>Idea 33: Ready-made fish fillets in olive oil</i>	oil-preserved, sterilized, sealed in airtight glass container	<1y	sterilization after filling into vessel/glass container	avoid oxidation (retain packaging)
Meagre				
<i>Idea 1: Frozen fish fillets with different recipes</i>	frozen, VP	9mo	hygiene during filleting and freezing	deep freeze cold chain retaining at -20 °C ± 2 throughout storage, properly sealed vacuum package (avoid oxidation)



<i>Idea 4: Ready to eat meal: salad with fish</i>	vinegar-marinated fish, fresh, MAP	5d (vegetable salad is the limiting factor)	24 h freeze fish before processing, proper acidification of fish, allergen labeling (gluten, mustard)	retaining cold chain throughout commercialization (<3 °C), retaining MAP
<i>Idea 6: Fish burgers shaped as fish</i>	thermally processed, frozen	6mo	allergen labeling (milk protein)	deep freeze cold chain retaining at -20 °C ± 2 throughout storage, properly sealed vacuum package (avoid oxidation)
Pikeperch				
<i>Idea 9: Fish spreads / pate</i>	thermally processed (pasteurized or sterilized) tube-sealed	30d in sealed tube (3d after opening)	proper heat treatment (pasteurizing and aseptic tube filling), allergen labeling (milk protein)	retaining cold chain throughout commercialization (<3 °C), retaining integrity of tube
<i>Idea 21: Fresh fish fillet with different 'healthy' seasoning and marinades</i>	fresh, MAP	6d	allergen labeling (depending on sauce)	retaining cold chain throughout commercialization (<3 °C), retaining MAP
<i>Idea 30: Ready-made fish tartar with additional soy sauce</i>	fresh, pressurized (HPP), VSP	approx 6d for the non-pressurized and ≤15 d for pressurized (HPP)	pH<5, allergen labeling (soya sauce, sesame seeds, mustard and sherry vinegar (may contain sulphites))	retaining cold chain throughout commercialization (<3 °C), retaining packaging

*safety measures for all products irrespectively include the application of HACCP principles.



Principles and conditions for production, control and packaging

The principles for proper production include three aspects: 1. raw materials of good quality. 2. good manufacturing (processing) practices. 3. proper traceability.

1. In respect to raw materials quality, all products have as main ingredient the produced fish. The main advantage of farmed fish species is that they allow the maximum degree of quality control due to fully controlled production and the maximum degree of freshness due to optimum slaughtering conditions, maximal ability of temperature control in cold chain and minimization of time during transportation from farm to processing plant. None of the studied species raises specific quality/safety issues.

Freshness evaluation of fish as raw material should be ensured prior processing (i.e. raw, whole, unprocessed fish). Standard sensory freshness can be assessed via Quality Index Method (QIM) (Hyldig & Green-Petersen, 2004). Among the herein studied species not individual QIM schemes have been developed. However, a QIM scheme has been developed for *Mugil platanus* (Adrande et al., 2015), a species of the same genus and for *Liza aurata* (Bahmani et al., 2011) a very similar species of the same family with *Mugil cephalus*, therefore this can be used and easily adjusted for the species. Alternatively, and until QIM schemes are first described for each of the studied species, general freshness schemes can be applied such as Tasmania Food Research Unit (TFRU) Sensory Assessment Score Sheet and/or generic EU scheme (Huss, 1995).

Besides fish, other ingredients included in the salad, in the fish burger, in the fish pate and in products containing sauces and marinades are various food raw materials which quality, freshness and safety should be ensured (**Table 1**). Of all used materials, the only ones that is more perishable than fish (and that actually determined shelf life of product) are the vegetables included in the salad. Other sensitive raw materials in aspects of stability is the emulsion included in the fish pate. There are no quality issues in dry materials and acidic raw materials (vinegars and lemon juice) that are incorporated. Where oils are included, and Extra virgin olive oil in particular, acidity and oxidation (free fatty acids, peroxide value) should be measured to ensure quality. Various quality control tests are recommended for olive oils (Finoti et al., 2007, <http://spartacos.be/Testing-olive-oil-quality.pdf>) Where honey is included the quality of honey should be ensured as described in European Directives ([Commission Recommendation C \(2015\) 1558](#), Council Directive 2001/110/EC of 20 December 2001 relating to honey) and in the Codex Alimentarius standards (Bogdanov et al., 1999; Thrasyvoulou et al., 2018).

2. The basic food processing principles involved in the generated products include a. heat transfer (i.e. heat exchange between food and its environment) in all thermally processed and in all frozen products, b. mass transfer (i.e. migration of a constituent of fluid or a component of a mixture in or out of a food product) in all marinated products and products that have several components, c. mixing (i.e. a common operation to achieve even distribution of ingredients) in all products that include sauces or marinades, and d. size adjustment (i.e. slicing, dicing, cutting, grinding, etc. to achieve desired size) in all products that include small or larger fish pieces. These are presented in **Table 4**.

The conditions required for production are described in detail in the sections referring to “manufacture information” in deliverable D28.4: “Physical prototypes of new products from the selected species meagre, greater amberjack, wreckfish, pikeperch and grey mullet”. Production conditions’ optimization is subject to specific research. Other post-slaughter handling should also be taken into account such as pre-processing gutting and/or heading or filleting time. Indicatively, it was found that meagre is better preserved in ice when whole, gutted and/or headed than when filleted (Bilgin et al., 2016). Technical issues while processing that can cause severe losses, should also be taken into consideration, such as gaping of fillets. At the moment there is no established knowledge on whether the species encountered herein, are prone to gaping. The fact that there are no respective scientific or production references mentioning fillet gaping, does not imply absence of the problem especially since there has not been any large-scale production of these products yet. The nature of the product is also a crucial parameter for consideration, since gaping would be an issue for products incorporating whole fillets, but not those involving chopped or homogenized fish tissues (pate, burger, and tartars).



3. Certain traceability schemes can be implemented through the quality control systems. The FAO Food Traceability guidance can provide useful information on this aspects (FAO, 2017). Food traceability systems should be implemented in all products but also in raw materials that are incorporated during processing (https://ec.europa.eu/food/sites/food/files/safety/docs/gfl_req_factsheet_traceability_2007_en.pdf). The advantage of farmed fish (the main constituent of all products) is the fully controlled production system that allows easy tracing of the produced fish.

Control conditions include safety and total quality control. For the control of production in industrial units where processing takes place, universally accepted quality and safety schemes (such as ISO22000 and HACCP) should be implemented. The requirements and application of these schemes are largely related to the nature and setup individualities of the processing units. A good guide in respect to the fish quality and safety management throughout the processing can be found in FAO Fisheries Technical Paper 444 (Huss et al., 2003)

The packaging type is presented along with the description of the product nature in the second column of **Table 3**. The conditions required for packaging are analytically described in the sections of “Product packaging and retail market prototype” in deliverable D28.4: “Physical prototypes of new products from the selected species meagre, greater amberjack, wreckfish, pikeperch and grey mullet”. It is worth mentioning that packaging applied within the present processing solutions is based on standard conditions and packaging types applied for similar products/species. The optimization of packaging conditions is further subject to experimentation at a research level and trial and error in large-scale industrial conditions. For instance there have been some data indicating various different optimum modified atmosphere (MAP) or vacuum packaging (VP) conditions for meagre fillets. Thus some scientists suggest that VP will be equally efficient and more economic than MAP in preserving the meagre fillets and therefore should be preferred (Sáez et al., 2015), while opposingly others imply that MAP fillets are likely to have a longer shelf-life than VP samples when a sufficient/certain CO₂ equilibrium concentration is achieved (Genç et al., 2013).

Table 4. Products’ raw materials and basic processing principles.

	basic processing principle
Greater amberjack	
<i>Idea 13: Frozen fish filet that is seasoned or marinated</i>	heat transfer, mass transfer, mixing materials
<i>Idea 30: Ready-made fish tartar with additional soy sauce</i>	mixing materials, size adjustment
<i>Idea 34: Fresh fish steak for grilling in the pan</i>	size adjustment
Grey mullet	
<i>Idea 2: Thin smoked fillets</i>	heat transfer, size adjustment
<i>Idea 21: Fresh fish fillet with different ‘healthy’ seasoning and marinades</i>	size adjustment
<i>Idea 33: Ready-made fish fillets in olive oil</i>	mass transfer, size adjustment



Meagre

Idea 1: Frozen fish fillets with different recipes

heat transfer, size adjustment

*Idea 4: Ready to eat meal: salad with fish*mass transfer, size adjustment,
dressings involve mixing

*Idea 6: Fish burgers shaped as fish*heat transfer, mass transfer, mixing,
size adjustment

Pikeperch

*Idea 9: Fish spreads / pate*heat transfer, mass transfer, mixing,
size adjustment

Idea 21: Fresh fish fillet with different 'healthy' seasoning and marinades

mixing, size adjustment

Idea 30: Ready-made fish tartar with additional soy sauce

mixing, size adjustment

Conclusions

The production in industrial scales of the developed products from the DIVERSIFY fish species can be a feasible task, subject to the application of certain principles and conditions.

The technical yields that can be achieved are very satisfying for all products, thus providing high profit margins. The duration of high quality life ranges widely depending on the product nature but also on the optimization of processing and preservation procedures. Frozen products and sterilized (oil-preserved fish fillet and fish pate) have long high quality shelf life, expanded in months, while fresh products have a high quality shelf life of few days, varying with the ingredients included (most sensitive ingredient is the limiting factor), the manufacturing process and the packaging type.

The principles for proper production include three aspects: 1. raw materials of good quality. 2. good manufacturing (processing) practices. 3. proper traceability. Freshness of the raw materials should always be ensured. The ISO and HACCP principles should apply throughout the whole processing chain and commercialization for ensuring safety and maximum quality. Food traceability systems should be implemented in all products but also in raw materials that are incorporated during processing.

These rules are necessary and sufficient condition for high quality and economic sufficient products.

Deviations: No deviations

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