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Studies on moisture levels in clipfish (cod & saithe) and methodologies applied by customs Authorities. *(CLIPTURE)* FHF: 901638

Clipfish industry meeting – 1st September, 2020.

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Objectives

- To get the decriptive statistics for moisture contents in the main size classes of clipfish (cod &saithe).
- To document non conformities and variation in test results due to size, species and between companies.
- To compare differences in moisture evaluation derived from the application of the Annex B of CODEX STAN 167/1989 vs. present Brazilian Methodology. Discussion of the consequences.
- To document the longitudinal variation in moisture content in a split clipfish piece.
- To define a new sampling procedure that could be easier, avoids misunderstandings and show similar results as the cross-sectional method from CODEX STAN 167/1989 –Annex B.

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Sampling

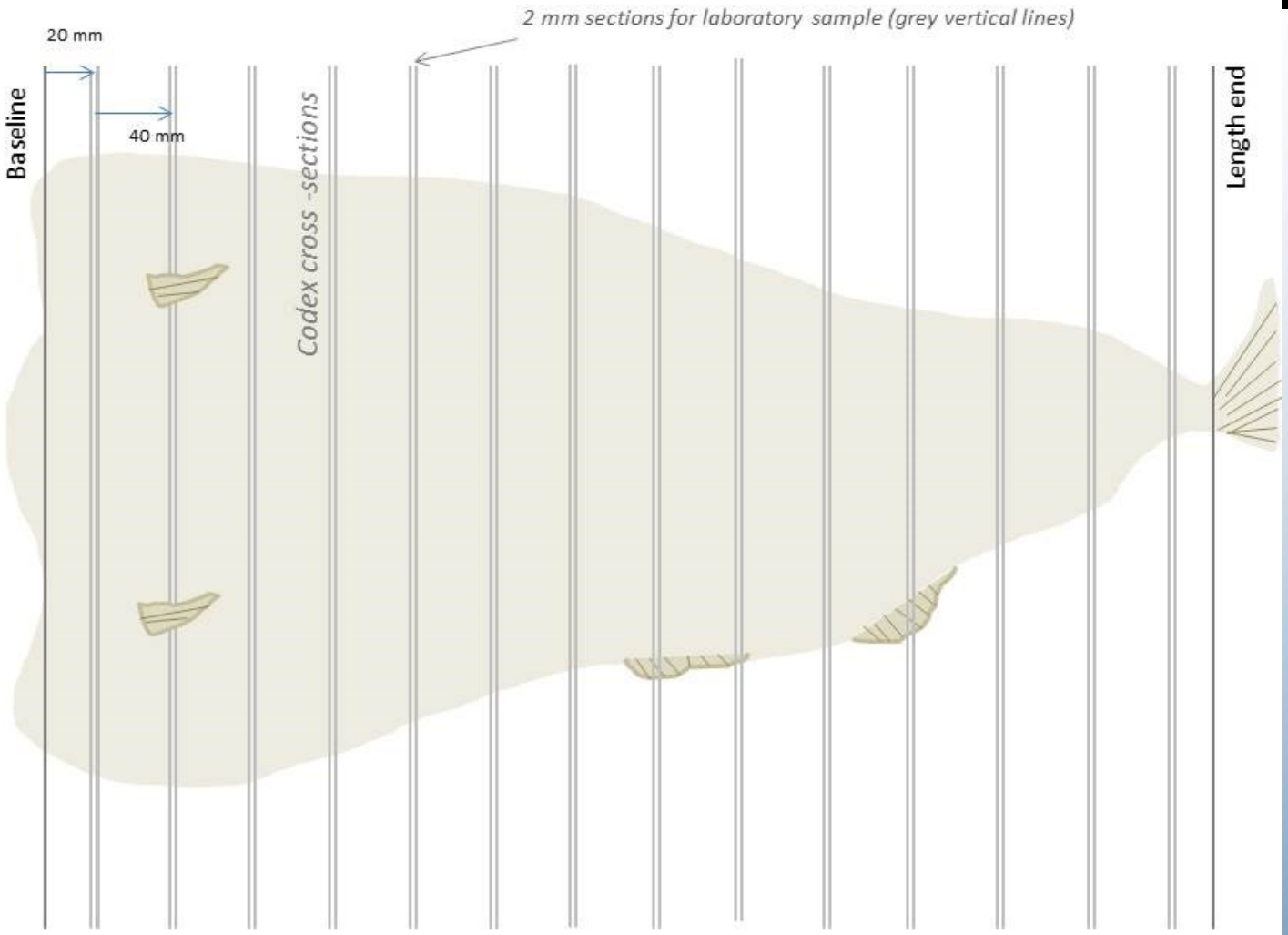
- 6 Norwegian companies as suppliers *(300 kg).*
- Dried salted cod and saithe.
- Three size classes for each of the species: Cod (8/10, 7/9,10/12) – Saithe (7/9, 10/12, 16/20).
- 4 samples x 5 companies = 20 samples / size class.
- Samples from companies were requested to be selected from different production lots.

Preservation: 2 - 3,5 C,
Mean RH (%)= 60,5%
Up to 3 months storage.

COD	Size	Sampl.
Comp. A	7/9	4
	8/10	4
	10/12	4
Comp. B	7/9	4
	8/10	4
	10/12	4
Comp. C	7/9	4
	8/10	4
	10/12	4
Comp. D	7/9	4
	8/10	4
	10/12	4
Comp. E	7/9	4
	8/10	4
	10/12	4
		60

SAITHE	Size	Sampl.
Comp. A	7-9	4
	10-12	4
	16-20	4
Comp. B	7-9	4
	10-12	4
	16-20	4
Comp. C	7-9	4
	10-12	4
	16-20	4
Comp. F	7-9	4
	10-12	4
	16-20	4
Comp. D	7-9	4
	10-12	4
	16-20	4
		60

Codex Stan Cross-section method.



Include bone & Skin. *No mechanical grinding.*

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Sample preparation CODEX

Sample identification

Brush surface salt

Length measurement

Weighing

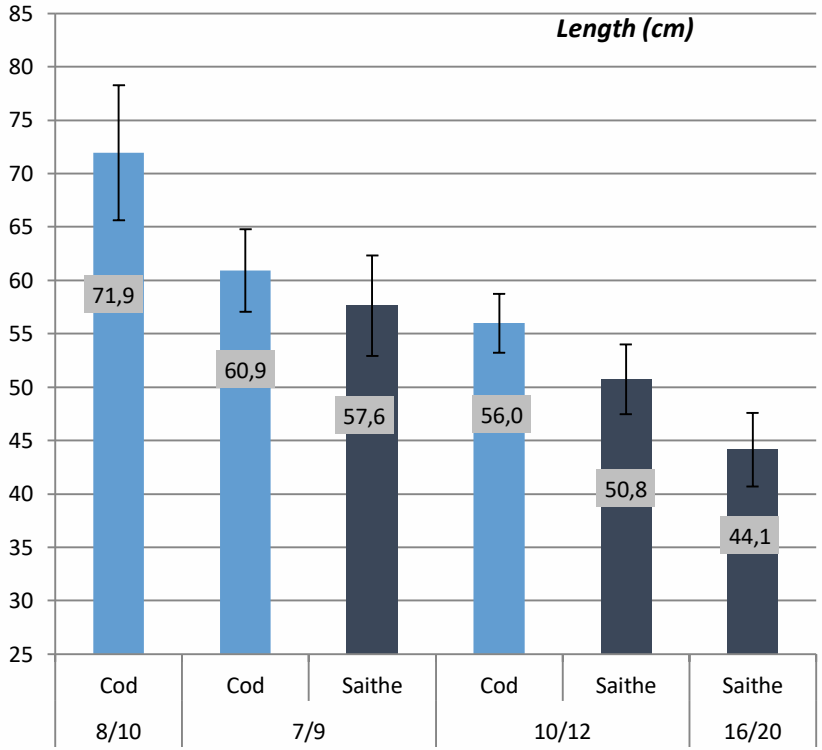
Cross sections (2 mm?)

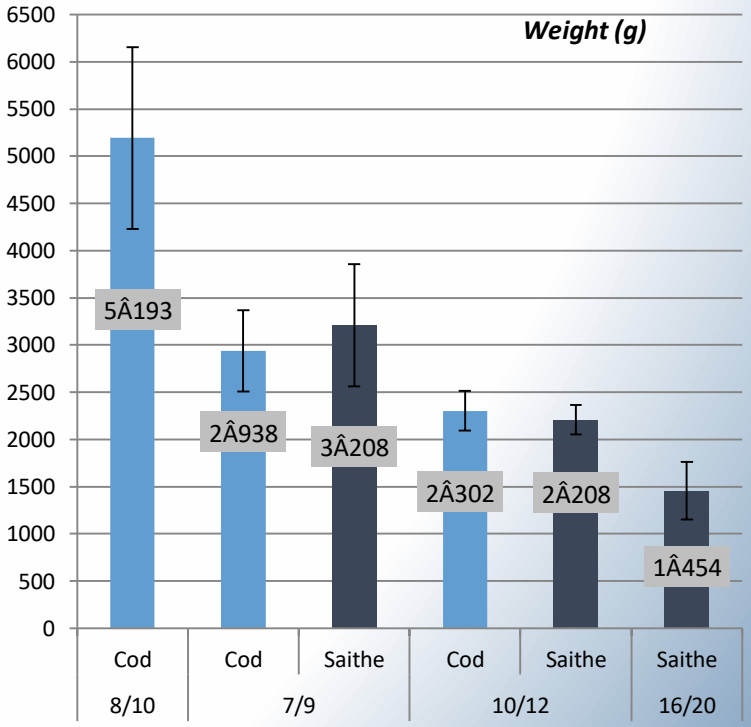
Sections cutting

Codex laboratory sample

- Difficult, high cost. **2 technicians spent 100 min to process 8 samples.**
- Mechanical band- saw required ¿Available at laboratories?
- Imprecise cuts (**2 mm is not realistic in practice**). Affects laboratory sample.
- 18-20 g of the laboratory sample go into the plate . 20 h – 103 C until constant weight.

Length and weight data.





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Moisture contents (Codex).

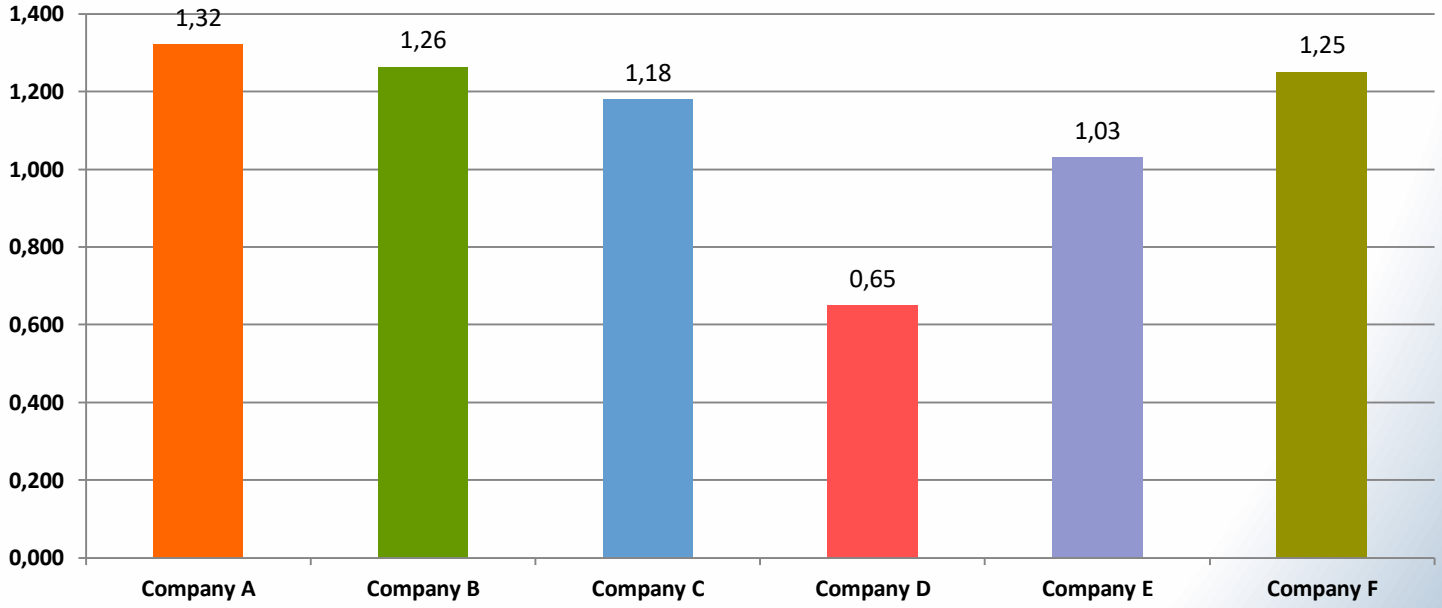
		N	Moisture Mean (g/100g)	Moisture SD (g/100g)	Number of samples not complaying with the Brazilian regulation	% of samples beyond the 53% limit (estimated statistically)	Statistical method.
8/10	Cod	20	**52,5**	1,3	7 (35%)	**35%**	*T-test*
7/9	Cod	20	**51,0***	1,1	0 (0%)	**4,2%**	*T-test*
10/12	Cod	20	**50,7***	1,3	2 (10 %)	**4,8%**	*T-test*
7/9	Saithe	20	**50,5***	1,6	1 (5%)	**7,2%**	*T-test*
10/12	Saithe	20	**49,5****	1,6	0 (0%)	**2,0%**	*T-test*
16/20	Saithe	20	**49,8****	1,8	1 (5%)	**4,0%**	*T-test*

** No statistical differences found between groups in the mean results.*

** * No statistical differences found between groups in the mean results.*

Are these non-compliance rates acceptable by exporting companies?

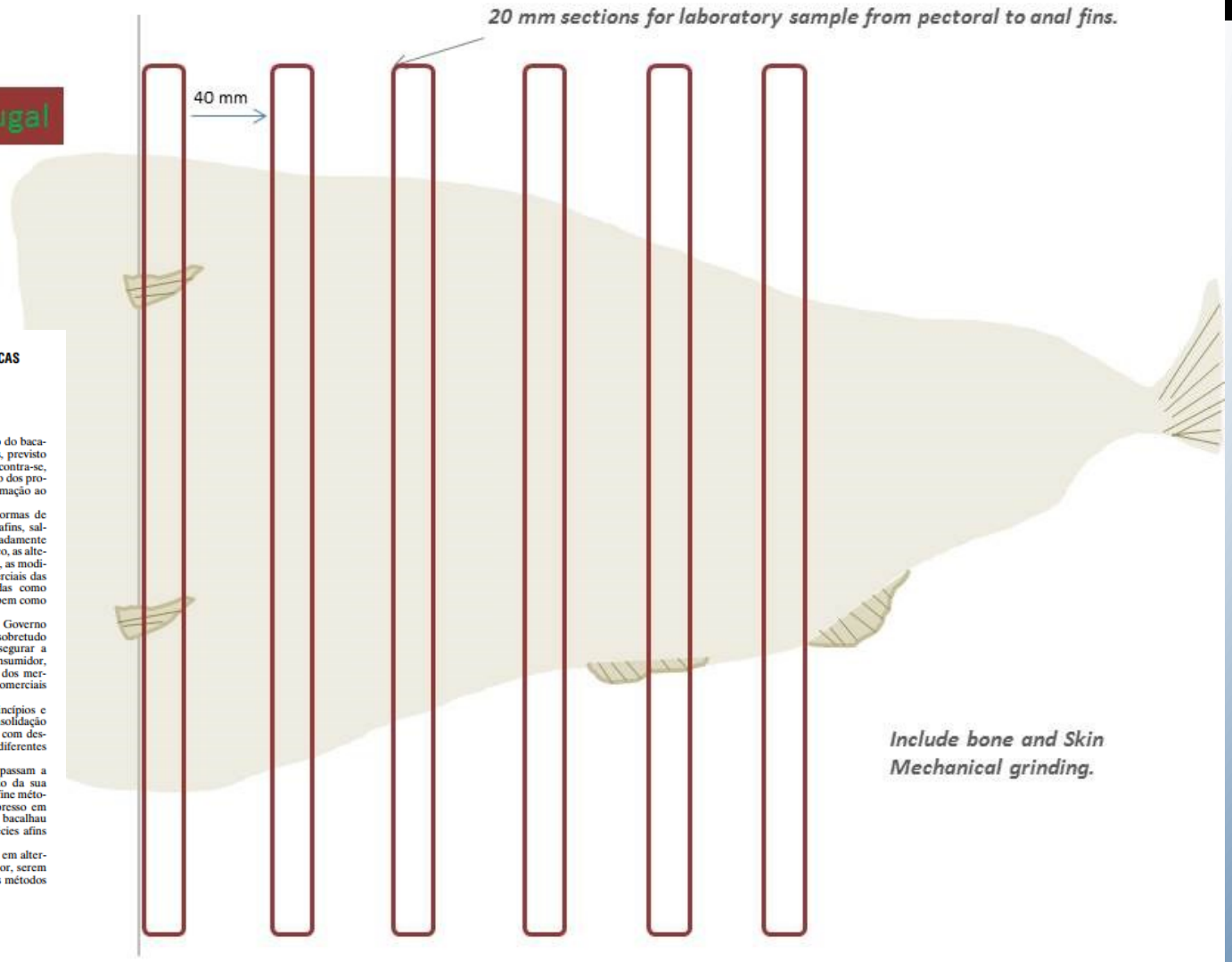
Moisture contents internal variability at the companies.



Low variance between production lots.

Portuguese Decreto-Lei 25-2005.

Portugal



MINISTÉRIO DA AGRICULTURA, PESCAS E FLORESTAS

Decreto-Lei n.º 25/2005

de 28 de Janeiro

O actual regime aplicável à comercialização do bacalhau e espécies afins, salgados, verdes e secos, previsto pela Portaria n.º 355/87, de 29 de Abril, encontra-se, hoje, desadequado face à evolução do mercado dos produtos alimentares, onde a qualidade e a informação ao consumidor são cada vez mais importantes.

Deste modo, é necessário definir novas normas de comercialização para o bacalhau e espécies afins, salgados, verdes e secos, tendo em conta designadamente a evolução dos processos tecnológicos de fabrico, as alterações verificadas no mercado destes produtos, as modificações introduzidas nas denominações comerciais das espécies autorizadas a serem comercializadas como bacalhau, ou apenas como afins do bacalhau, bem como a informação a fornecer ao consumidor.

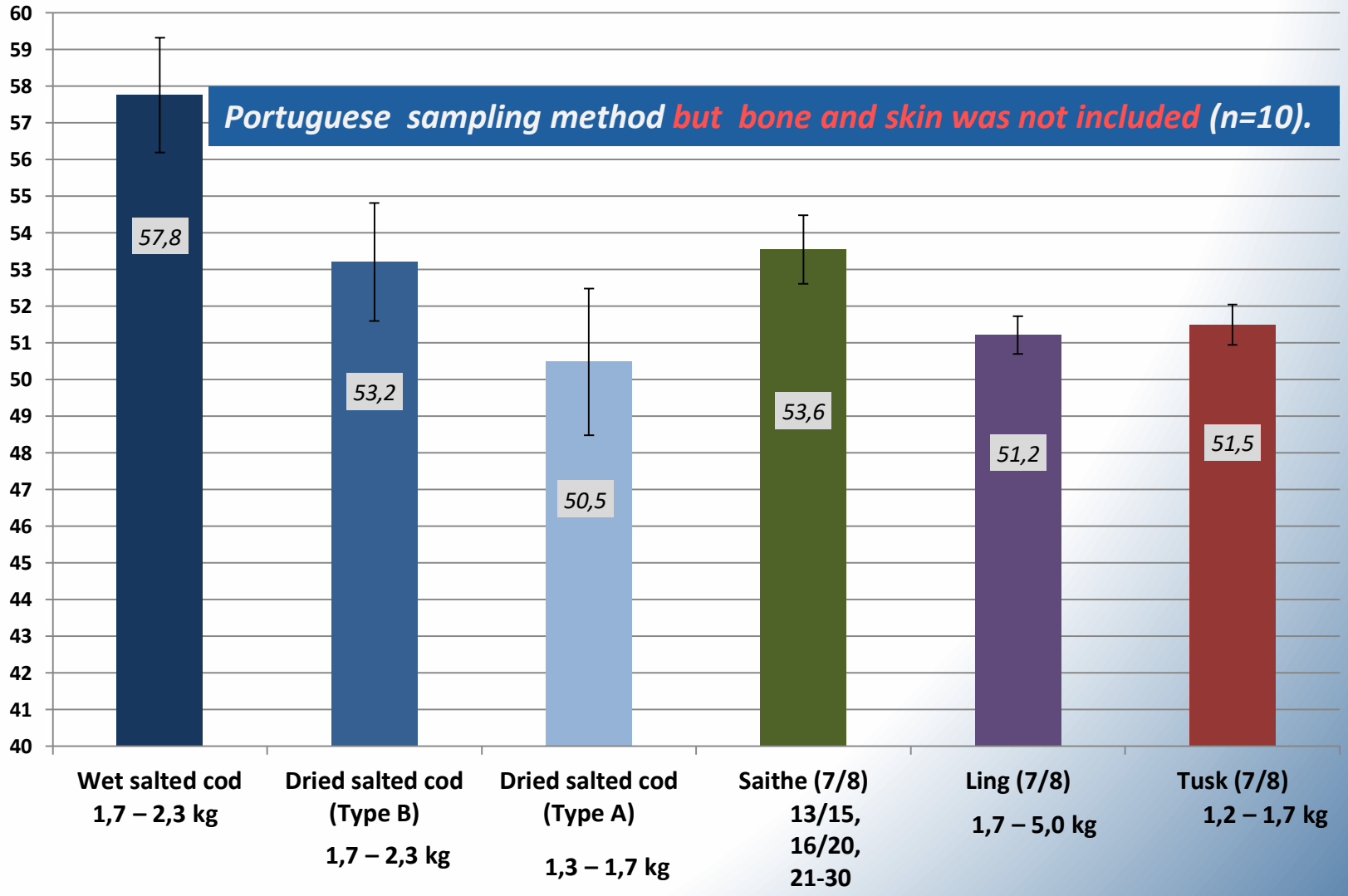
Este diploma insere-se nos objectivos do Governo em termos de política alimentar, visando sobretudo alcançar elevados padrões de qualidade, assegurar a defesa dos legítimos interesses e direitos do consumidor, garantir a livre concorrência e transparência dos mercados e prevenir, ao mesmo tempo, práticas comerciais condenáveis, como a fraude e a especulação.

Neste sentido são estabelecidos vários princípios e regras de actuação, umas constituindo a consolidação das matérias já em vigor e outras inovadoras, com destaque para a definição e caracterização dos diferentes tipos de produtos.

Neste âmbito, as entidades fiscalizadores passam a dispor das condições necessárias ao exercício da sua actividade, uma vez que o presente diploma define métodos para a determinação do teor de sal, expresso em cloreto de sódio, e do teor de humidade do bacalhau salgado, verde, semi-seco ou seco, e das espécies afins salgadas, verdes, semi-secas e secas.

Além disso, considera-se a possibilidade de, em alternativa àqueles métodos e a pedido do operador, serem utilizados, em qualquer das determinações, os métodos

Moisture contents from project FHF - 901307 .



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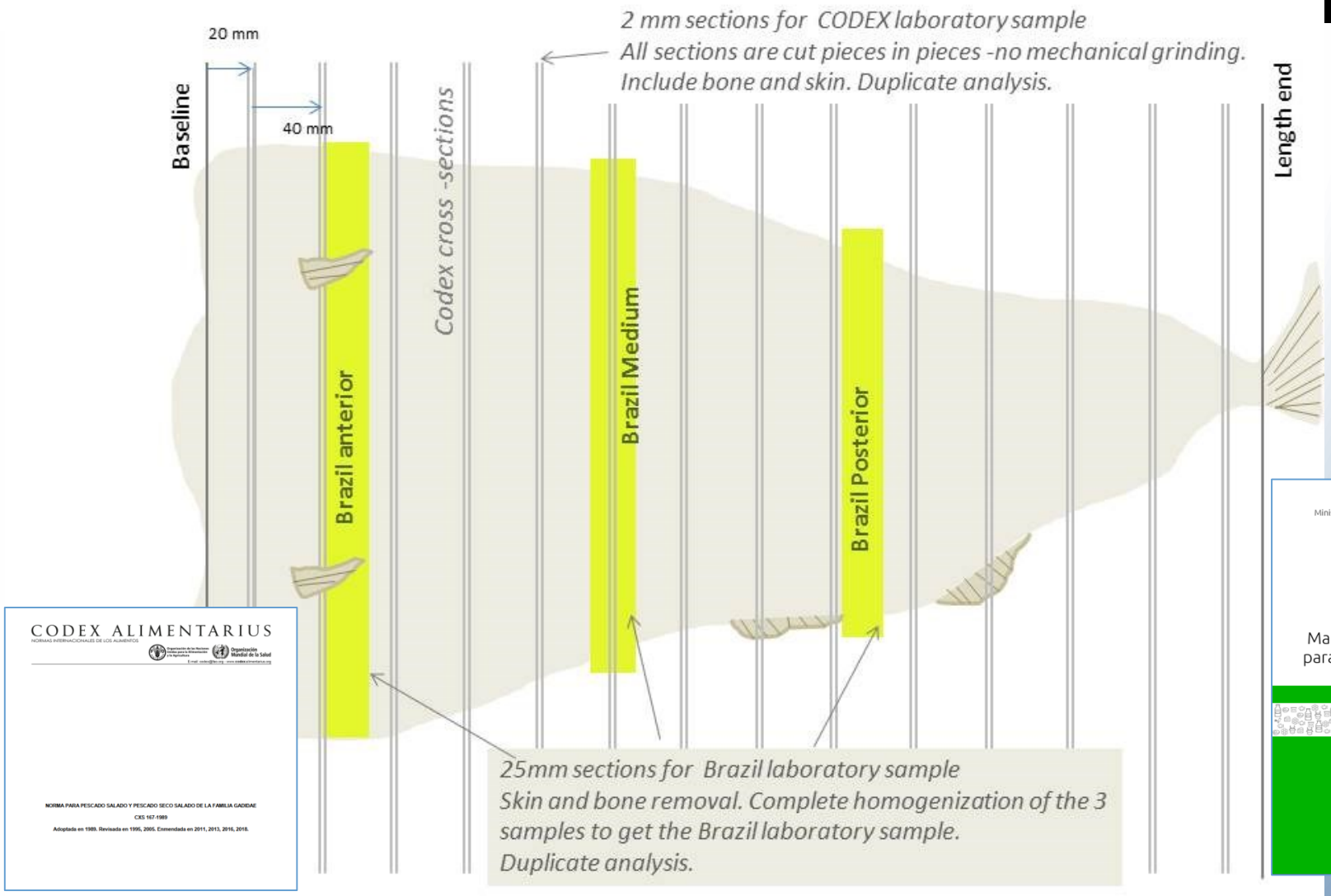
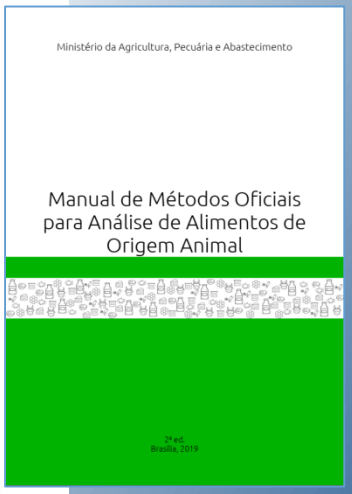
Sample selection for Brazil vs. Codex method comparison.



CODEX ALIMENTARIUS
NORMAS INTERNACIONALES DE LOS ALIMENTOS

NORMA PARA PESCADO SALADO Y PESCADO SECO SALADO DE LA FAMILIA GADIDAE
CXS 167-1989
Adoptada en 1989. Revisada en 1995, 2005. Enmendada en 2011, 2013, 2016, 2018.


Ministério da Agricultura, Pecuária e Abastecimento

Manual de Métodos Oficiais para Análise de Alimentos de Origem Animal

2ª ed.
Brasília, 2019

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Sample selection for longitudinal variance.

Include bone & Skin
No mechanical grinding. Hand-cut in small pieces.

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Sample preparation for method & anatomical comparison

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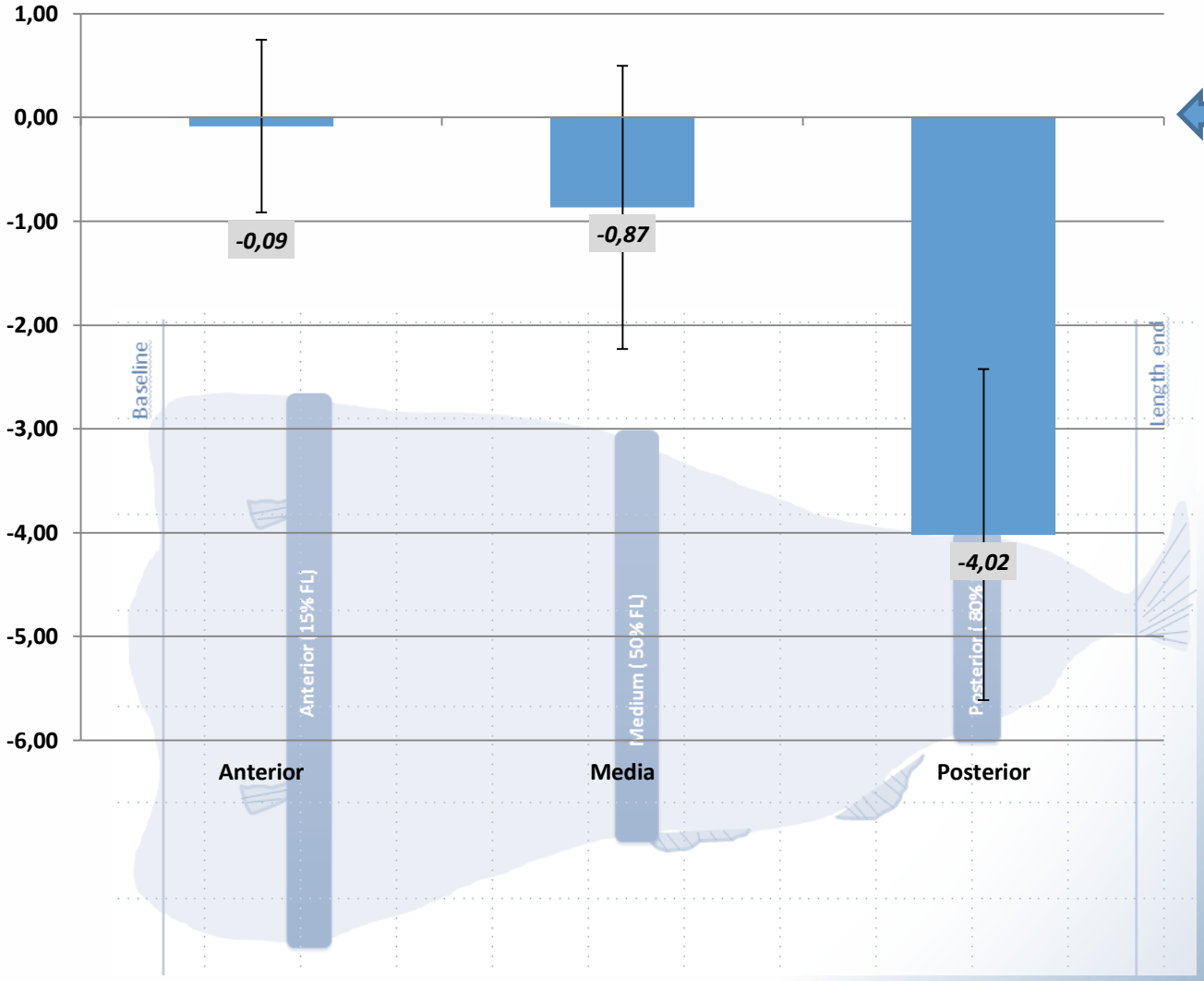
Sample preparation for method & anatomical comparison

- 7 samples from each fish (2 Codex replicates, 2 Brazil method replicates, 3 sections (anterior, medium, posterior).

- 20 samples from 5 suppliers. Duplicate analysis for method comparison.

	Codex Stan 169 - 1989					Analysis Brasil
COD	Size class	Analysis	Anterior	Media	Posterior	Mix
Company 1	8/10	4 x 2	4	4	4	4 x 2
Company 2	8/10	4 x 2	4	4	4	4 x 2
Company 3	8/10	4 x 2	4	4	4	4 x 2
Company 4	8/10	4 x 2	4	4	4	4 x 2
Company 5	8/10	4 x 2	4	4	4	4 x 2
		40	20	20	20	40

Moisture content variation in the fish length *(Cod 8-10).*



Codex cross-section result

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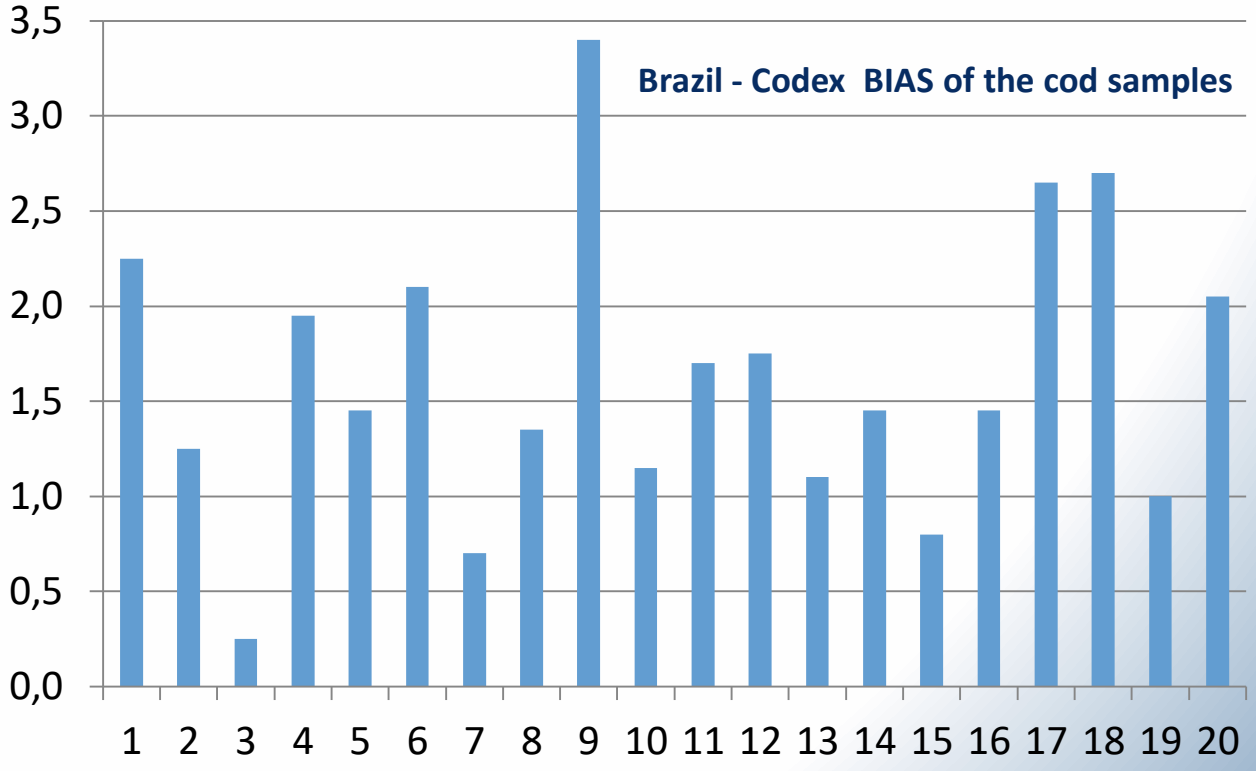
Brazil vs. Codex method comparison *(Cod 8/10).*

The Brazilian methodology leads to more precise results (± 0,58) than Codex method (±1,10).

In average, the Brazilian method gives a 1,63 ± 0,76 g/100g higher moisture content than CODEX method.



The implementation of Brazilian method would greatly increase the previous non-compliance rates.

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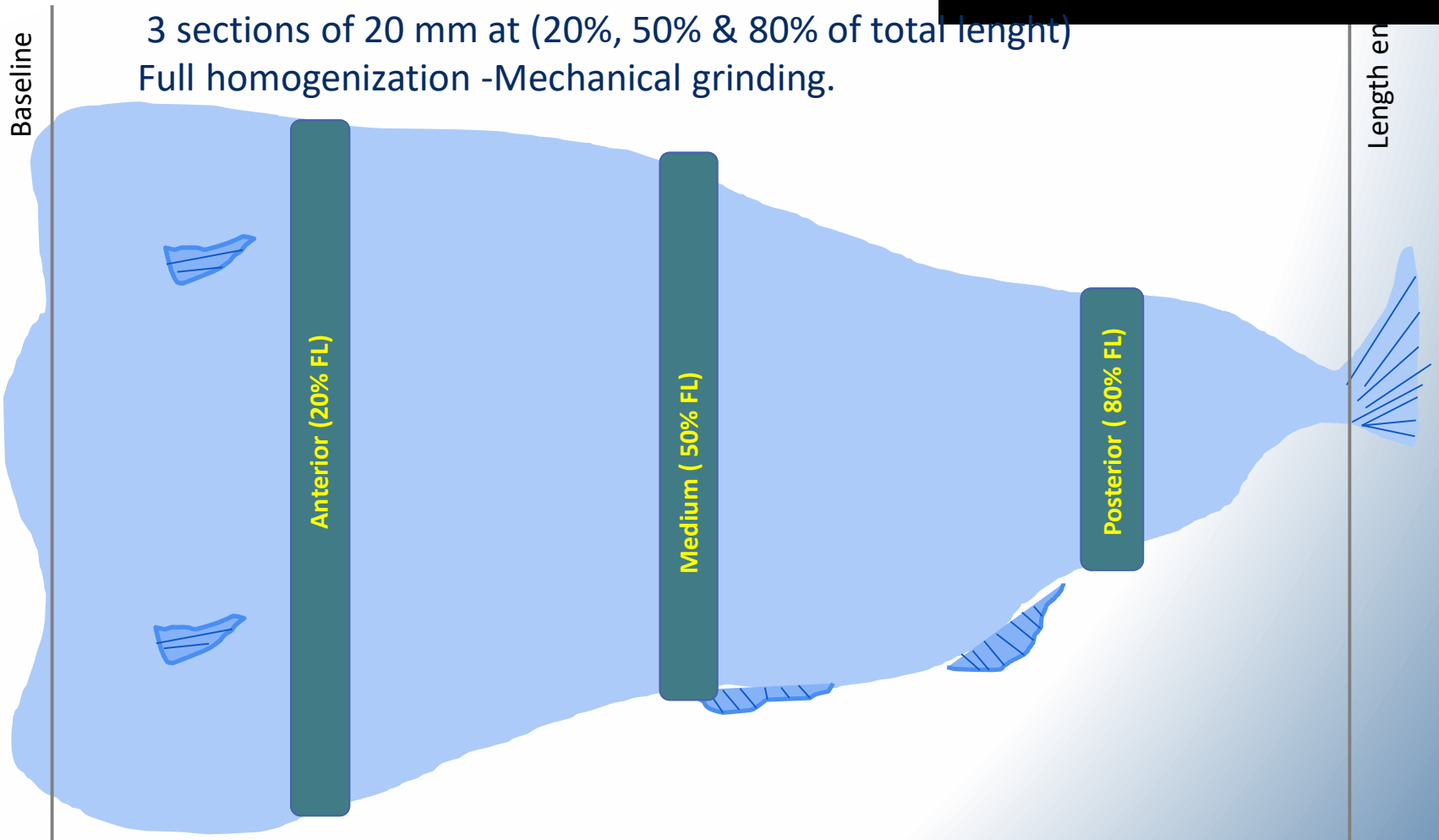
Suggested methodology change.

3 sections of 20 mm at (20%, 50% & 80% of total lenght)
Full homogenization -Mechanical grinding.



Inclusion of bone & skin would best reflect the moisture content of the product, but may cause higher variability in the result.

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Take-home remarks.

- Codex method is costly and imprecise. The use of sections at defined positions can get the same result as the cross-section methodology and make the analysis easier and more accessible.
- Codex results reflect that **mean** moisture contents are below 53% for all groups, but non-compliance rates (*Brazil*) of production may not be assumable by exporters especially for the 8/10 size class.
- Low internal variability between lots. Moderate variance in between companies´ production.
- Longitudinal variance in moisture contents was found, specially for the posterior section (related to product thickness).
- The brazilian method is easier to implement and more precise since only the edible fraction is used. Sections are certainly skewed to the front part of the fish (excludes tail).
- The Brazilian method gives significantly higher moisture contents than Codex method (**Mean Bias: +1,6 g/100g). This should be taken into account by authorities.**
- A modification of the reference method is suggested.

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Thank you for your attention.

Any questions?