CODEX ALIMENTARIUS COMMISSION E

Food and Agriculture Organization of the United Nations

World Health Organization

Viale delle Terme di Caracalla, 00153 Rome, Italy - Tel: (+39) 06 57051 - Fax: (+39) 06 5705 4593 - E-mail: codex@fao.org - www.codexalimentarius.org

Agenda Item 9 **CX/FFP 12/32/9**

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON FISH AND FISHERY PRODUCTS

Thirty-second Session

Bali, Indonesia

1 – 5 October 2012

PROPOSED DRAFT AMENDMENT TO THE STANDARD FOR QUICK FROZEN FISH STICKS (NITROGEN FACTOR FOR SOUTH ATLANTIC HAKE) (At Step 3 of the Procedure)

Prepared by South Africa

Governments and interested international organizations are invited to submit comments on the attached Proposed Draft Amendment at Step 3 (***see* paragraph 10**) and should do so in writing in conformity with the Uniform Procedure for the Elaboration of Codex Standards and Related Texts (see *Procedural Manual of the Codex Alimentarius Commission*) to: the Secretariat, Codex Alimentarius Commission, Joint WHO/FAO Food Standards Programme, FAO, Viale delle Terme di Caracalla, 00153 Rome, Italy, by email codex@fao.org or fax: +39-06-5705-4593 with a copy to Codex Contact Point, Norwegian Food Control Authority, P.O. Box 8187 Dep. 0034 Oslo, Norway, Email: ccffp@mattilsynet.no, fax: +47.74.11.32.01 **by 15 August 2012**. .

BACKGROUND

1. At the last Codex Committee on Fish and Fishery Products in April 2011, South Africa was requested to provide information for discussion on a new nitrogen factor for South Atlantic hake.

2. To handle this issue, South Africa formed a drafting group consisting of the South African National Regulator For Compulsory Specifications (NRCS) and the body representing the trawling industry on technical matters, the White Fish Technical Committee.

3. This group set up a Standard Operating Procedure(SOP) to cover a series of trials to determine a factor for South Atlantic hake, covering a range of variables including fishing grounds, time of season, spent and non-spent fish, fishing companies, fish size and days at sea etc.

4. A range of controls was put in place to ensure adherence to GMP and a representative from the NRCS was present at every trial to ensure conformity to the SOP's.

5. For each trial, 5 sampling points were agreed per trial, which meant a total of 360 samples were to be taken. These samples were to be composited down to a final total of 90 and to be sent for nitrogen analysis. Two laboratories that are officially accredited by an ILAC associated certification body for the Kjeldahl method were used. Where, due to supply or logistic problems the SOP could not be met, any variation had to be noted and approved by the NRCS representative.

6. A problem with excess water in the trimmings on the first trial required a change in methodology and a discounting of the first hake mince results. A compositing error in the second trial reduced the final total down from 90 samples to 84 but this did not affect the average result. Throughout the trials there were tight controls on all GMP's.

7. The trials took place between October 2011 and May 2012.

8. Although we found a nitrogen factor of 2.6 for the control sample (pre-processing) after processing into blocks, we had a figure of 2.46 for fillets and 2.38 for mince. A reduction in nitrogen factor between the whole fish and the frozen block is in line with international findings and although the reduction of 7.5 %may be higher than found with cod (3-4%) this is probably due to the softer texture of hake.

9. The full report is attached as Appendix I.

RECOMMENDATION

10. We therefore propose that the Committee consider a **nitrogen factor of 2.45** for South Atlantic hake.

Appendix I

TRIALS TO DETERMINE THE NITROGEN FACTOR FOR SOUTH ATLANTIC HAKE

INTRODUCTION

At the 31st Session of the Codex Committee on Fish and Fishery Products held in Tromsø in April 2011, it was noted in the report that[1]

154. On the proposal of the Delegation of South Africa to include a nitrogen factor of 2.65 for South Atlantic Hake, the Committee recalled its earlier decision that it was necessary to provide information on the data collected and methodology used in order to propose new nitrogen factors for discussion.

The Delegation of South Africa was requested to provide this information for consideration by the next session of the Committee.

Status of the Proposed Draft Amendment to the Standard for Quick Frozen Fish Sticks

155. The Committee agreed to forward the amendment above to the Commission for adoption at Step 5/8 with the recommendation to omit Steps 6 & 7 (Appendix XI). **The nitrogen factor for South Atlantic Hake was returned to Step 2/3 for redrafting, comments and consideration by the next session.**

Historically we have figures for nitrogen factors for hake from the 1980's to the present day. These figures were simply analysis figures from checks on final products taken without records of the origin of the fish (e.g. grounds, time of year etc). These comprised 481 samples of which most were from H&G fish or whole fillets skin-on or skinless. Only 3 of these samples were from blocks. These results showed an average factor of 2.7 and as the interim standard for white fish had been given as a factor of 2.65 we agreed to accept this standard for hake at the last Codex meeting. However as the Committee decided we must collect data and the methodology used in order to propose a new nitrogen factor for hake (which information was not available from our historical figures) we decided to carry out a full scale investigation over a prolonged period.

As the origin of this work is to determine a nitrogen factor for South Atlantic hake to be used for determining the fish content of frozen fish fingers, it is necessary to determine the factor using frozen fish blocks. Hake blocks that can be used for the production of fish fingers are hake fillet blocks, hake mince blocks, or a mixture of both fillets and mince in a block. It was therefore necessary to determine the nitrogen factor for hake fillet blocks and hake mince blocks, with the assumption that a block comprising a mixture of fillet and mince would fall within this range. The work to determine the nitrogen factor of cod fillet and cod mince blocks has already been carried out in the UK and the methodology used there was taken as a template for the work on hake blocks[2].

METHODOLOGY

A Drafting Group was formed between the trawling industry and the National Regulator for Compulsory Specifications (NRCS). The South African Deep Sea Trawling Industry Association (SADSTIA) is a body representing the majority of the trawling industry in South Africa and has a subcommittee which handles all technical issues, called the White Fish Technical Committee. This Committee represented the industry on the group. The NRCS is the government body responsible for ensuring industry complies with all relevant local and international standards.

To manage the project the group employed a consultant-Terry Bennett. Terry Bennett is an independent Food consultant who has had over 40 years experience with the food industry on an international basis and 30 years experience as an advisor on the CCFFP and other Codex Committees.

[1] Report of the 31st Session of the Codex Committee on Fish and Fishery Products, Tromsø, Norway, 11- 16 April 2011 (REP11/FFP)

[2] Trials to determine the nitrogen factor of both UK and imported fillet and mince blocks. V4-Watson Homer, Grant & Hughes, September 2004

Analyses were carried out using the Kjeldahl method as prescribed by Codex by 2 officially approved laboratories[3].

South Africa has only one source of fish to produce hake blocks which is fresh landed hake, processed fresh and then made into blocks and frozen.

The group then considered what Standard Operating Procedure we needed to adopt to ensure that GMP controls were in place for all the processing to ensure minimal delays, proper temperature control, minimum water uptake etc. As part of the SOP it was agreed that a representative from the NRCS would be present at all trials to ensure the agreed SOP's were being followed.

DETERMINATION OF SOP'S

The first issue was to cover variations due to the time of the year. The nitrogen factor for hake should not vary particularly due to seasonality, other than variations caused by the spawning period. Hake has two spawning periods during the year, so it was essential to take samples during the time when the fish were in the spent and non-spent phases. It was agreed to do tests at three times of the year-

- October/November 2011
- February /March 2012
- April/May 2012

In theory, the October/November period should be mainly spent fish and the other 2 periods non-spent fish. It was agreed that an expert would be available at each trial to determine the state of the gonads and report on this.

There are a number of companies involved in processing hake in South Africa and it was agreed that for variation, we need 2 companies. It was also agreed that the two companies chosen should be ones that have plants that have EU approved HACCP systems, to ensure GMP is in place. The 2 companies chosen were two of the larger major processors of frozen fish products.

The next issue was fishing grounds. There are essentially 2 fishing areas for hake in South Africa-the West Coast and the South East Coast, as determined by a longitudinal line running through Cape Point. It was agreed that one company would cover the South East Coast and the other company the West Coast.

Although fish size should not have a great effect on nitrogen content, it was agreed that as far as possible, we should be consistent in the size taken for trial purposes. Whilst we knew this may be restrictive in terms of having sufficient quantity of that size available for trial on a specific day, we would attempt to stick to this parameter. It was agreed we would take fish of grade size 500g -1200g.

The standard method for hake processing is to head and gut at sea (H&G) and then hold this fish on ice until landing .The fresh fish trawlers have a voyage time of between 6 to 8 days. The amount of moisture loss from the fish could in theory increase with time and therefore it was agreed to take fish that would be 3 days old on landing, to represent the average time on ice after catch.

It was agreed there would be 5 sampling points:-

1. Raw material Input-the fish comes into the processing plant in the H&G form and this is the first point of sampling (the control). As our purpose is to determine the nitrogen factor of the edible portion of the fish, it was necessary to hand fillet the H&G fish (with the skin retained) to ensure the analysis results were not skewed by the presence of fish skeleton and gut material.
2. Fillet post trimming and skinning-this determines the nitrogen factor of the fish after processing, but before block freezing
3. Mince after deboning-this determines the nitrogen factor of the mince after processing, but before block freezing
4. Fillet block
5. Mince block

[3] SABS Laboratories, Pretoria and J. Muller Laboratories, Cape Town

In order to ensure we covered a full variation of samples but reduced analysis costs, it was agreed we would take 12 samples of 500g at each point and then composite these 12 to 3 samples for analysis. This would give us 360 samples and after compositing, 90 analysis results.

It was agreed that the trial size would aim for 500kg per trial. This would ensure a big enough throughput to equate to normal production and also supply enough trimmings to produce mine blocks.

Although we noted from the UK report that they analysed each sample for fat, moisture, ash and nitrogen, we could see no significant effect that the figures for fat, moisture and ash had on the final nitrogen figure to the 2 decimal places required. For this reason, we only analysed for nitrogen.

PROCESS CONTROLS

AT SEA-3 days prior to landing collect sufficient medium hake to ensure approx 500kg of size 500g-1200g will be available post grading. Fish to be binned and iced and tagged with catch date/fishing area and company. Expert to note condition of gonads. Maintain on ice and record temperatures whilst at sea.

ON LAND-binned ice to be transferred to factory chill room. The time in chill will vary according to fishing/factory constraints. An average of 36 hours is the norm. However the actual time in chill is determined by line availability, therefore anything between 24 hours and 48 hours is allowed for this SOP. During storage, regular temperature checks to be made and recorded. When necessary, fish must be re-iced. Fish to be maintained between 0°C and 4°C.

The first processing step is de-icing. During this process the fish may be held up for a short time in a mixture of ice and water. If this occurs, it will normally be only for a few minutes but should not exceed 30 minutes. Period in ice/water to be noted.

After grading, the quantity of fish of correct size for the trial will be assessed. The target is 500kg but anything over 300kg will be acceptable. If it is significantly less than this, the trial is to be aborted and repeated at a later date.

The graded fish is to be placed in bins and properly iced and then returned to the chiller.

The fish is to be held in chill for between 4-24 hours before sending for processing.

During this holding period, there will be regular checks on the fish temperature (0-4 deg C) and regular checks to ensure the fish is sufficiently iced, with extra ice being added as required.

The fish is then sent to the filleting line. The fish again have to be de-iced. During this process the fish may be held up for a short time in a mixture of ice and water. If this occurs, it will normally be only for a few minutes, but should not exceed 30 minutes. Period in ice/water to be noted.

Twelve random samples of single H&G fish will be taken from the line prior to filleting. Each fish will be hand filleted to produce fillets with skin, pin bone etc intact and then frozen to a core temperature of minimum -18 deg C. (The laboratory is to composite these 12 samples into 3 samples prior to nitrogen analysis-this procedure to be followed for all samples))

The trial fish are sent through the Baader filleting machine, through the Trio skinner and then pass to the trimmers. The fillets are to be V-cut and trimmed as per normal procedure for fish going to blocks. All the fillets from this process are to be isolated and sent for block production.

At this stage 12, random 500 g samples of fillet material must be bagged up and sent for freezing to a core temperature of minimum -18 deg C

All trimmings, v-cut pieces etc must be isolated and sent for mincing. There needs to be enough mince to produce at least 1x 7.484kg block and 12x 500g samples. The material is processed to mince though the Baader 695 and isolated and sent for block production.

At this stage, 12 random 500g samples of fresh mince are taken, bagged up and sent for freezing to a core temperature of minimum -18 deg C.

The fillets are made into 7.484 kg blocks and plate frozen to a core temperature of minimum -18 deg C.

Twelve random blocks are chosen and from each block a 500g sample is band sawed out and sent for analysis.

The mince is made into 7.484 kg blocks. 12 random 500g samples will be band sawn from the mince block stock. If this is only 1 block, then all 12 samples must come from different parts of this block.

The maximum time delays between producing the mince and fillets from the processing line and putting product into the plate freezers will be 1 hour and the maximum temperature of product during this time will be below 12 deg C. Regular line temperatures to be taken and recorded.

There will be an NRCS representative present at every factory trial to ensure the SOP's are followed and to sign off on these.

All sample bags must be clearly marked with:-

Company name

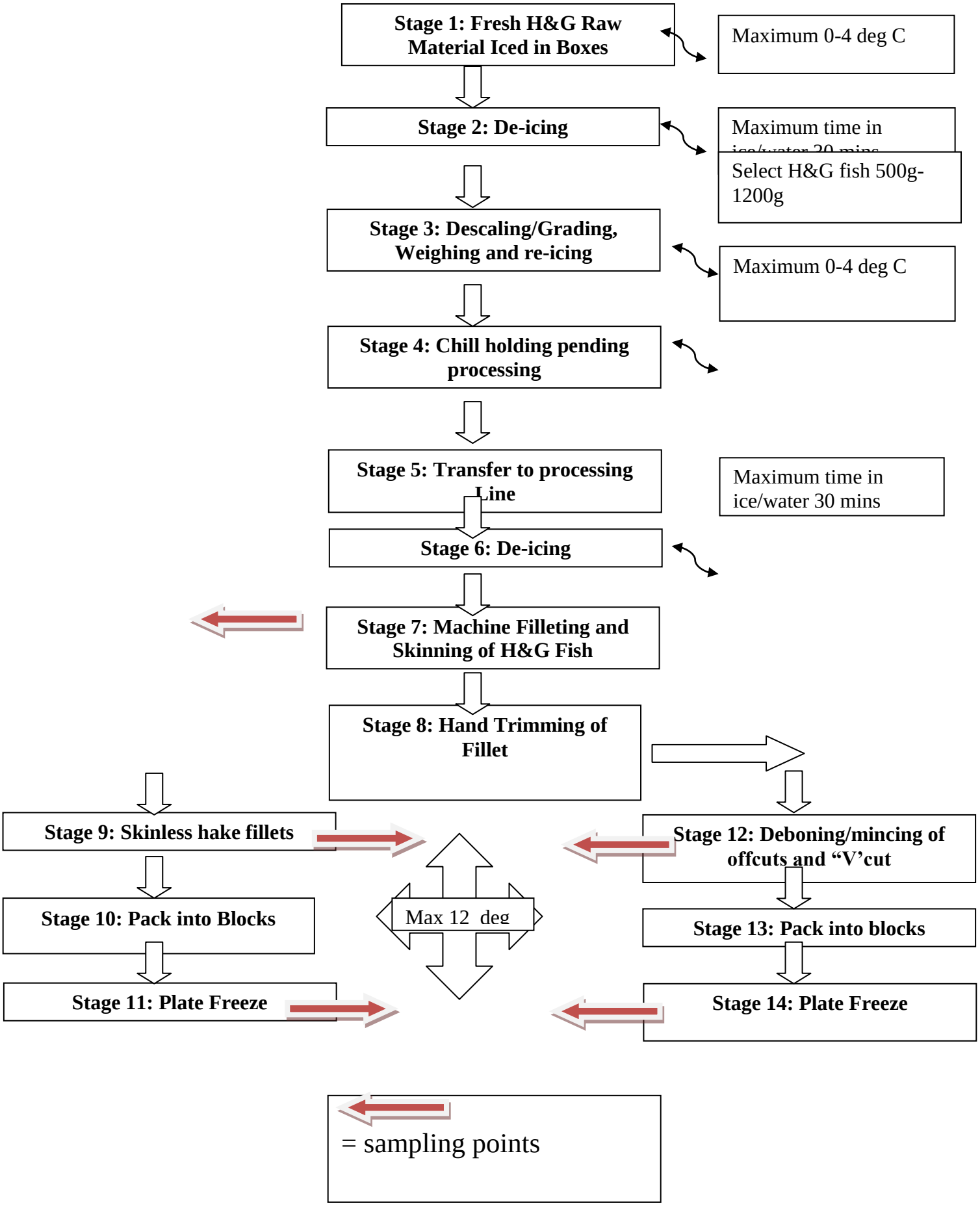
Catch area-West Coast or South East Coast

Catch date

Sample type:-

- H&G
- Fresh fillet
- Fresh mince
- Fillet block

A Schematic diagram showing the production of hake fillet and mince blocks



DEVIATIONS FROM SOP THAT MAY HAVE AN EFFECT ON TRIAL RESULTS:

DURING THE FIRST TRIAL:

The problem operators had during this trial was, that they had to separate out the fillet trimmings that were destined for the fresh mince and mince blocks, into separate plastic trays to avoid them getting mixed up with standard production on the in-line transfer belts. The problem this gave was that the trays had no drainage facility and we noted the trimmings seemed quite wet compared to the normal process (providing for appropriate drainage via the slatted belt, thus producing drier trimmings)**.** The analysis of the mince from this trial gave quite a low nitrogen factor, probably due to the excess water. We therefore agreed that for further trials, we would use trays with holes in and consider possibly ignoring the mince results from this trial (the first three results on mince in Table 1).

DURING THE SECOND TRIAL

An error was *made by the test* laboratory and instead of compositing 12 samples to 3 on the fresh mince, skinless fillet and H&G samples, the 12 samples were composited to 1. This error meant that instead of having nine results for these three products, we only had three. This reduced the total analysis results down from 90 to 84, but would not affect the overall averages.

SUMMARY OF NOTED VARIATIONS FROM SOPs

Other than the problem with wet trimmings at the first trial, there were no variations that were considered to be likely to affect the analysis results. The wet trimming problem was resolved for subsequent trials and the analysis results were ignored.

OVERALL ADHERENCE TO SOP'S

For each trial, we managed the control of the process to GMP throughout.

ANALYSIS RESULTS

TABLE 1 RESULTS OF ANALYSES OF NITROGEN CONTENT OF HAKE SAMPLES

HEADED & GUTTED FISH	FRESH SKINLESS FILLETS	FRESH MINCE	FILLET BLOCK	MINCE BLOCK	
2.69	2.62	2.26	2.58	2.12	
2.63	2.54	2.16	2.61	2.04	
2.58	2.61	2.2	2.59	2.06	
2.47	2.37	2.42	2.25	2.13	
2.45	2.33	2.43	2.29	2.08	
2.53	2.37	2.42	2.37	2.08	
2.87	2.93	2.71	2.52	2.53	
2.59	2.62	2.26	2.5	2.48	
2.81	2.91	2.36	2.38	2.51	
2.37	2.82	2.56	2.52	2.47	
2.86	2.79	2.49	2.83	2.48	
3.02	3.01	2.75	2.64	2.68	
2.99	2.77	2.66	2.57	2.95	
2.11	2.39	2.26	2.73	2.16	
2.48	2.36	2.18	2.36	2.62	
2.22	2.19	2.02	2.25	2.09	
2.604375	**2.601875**	**2.38375**	2.02	2.05	
			2.31	2.39	
			2.462222222	**2.328888889**	
2.61	**2.6**	**2.38**	**2.46**	**2.33**	
		(average exc 1-3) 2.42		**(average exc 1-3) 2.38**	

ANALYSIS RESULTS

(SEE TABLE 1)

On H&G fish, we found an average factor of 2.61, which is in line with our historical findings of 2.7 for H&G fish and whole fillets (see introduction) upon which we based our agreement to an interim factor of 2.65 for hake. For the skinless fillets, we found a factor of 2.60 and for the fillet block, we found this dropped to 2.46.

On fresh mince, we had a factor of 2.38 and for frozen mince a factor of 2.33. However, as pointed out within the TRIAL RESULTS section, we had a specific problem with excess water in the trimmings for the first trial. If we ignore these 3 results for both fresh and frozen mince, we get a factor of 2.4.2 and 2.38 respectively.

The difference of 2.46 for fillets and 2.38 for mince shows a drop of 3.3%, which is in line with the cod results on UK processed blocks of 2.88 for cod fillet dropping to 2.74for mince (4.8%).

Therefore, it appears that although a factor of 2.65 is acceptable for H&G hake or whole fillets, it is not the norm for hake blocks and a figure of 2.45 is a more accurate factor for hake blocks. This would indicate a 75% drop in nitrogen factor from whole fish to fillet/mince block.

We note that from the UK report that they concluded "the conversion of fillet ingredient to final block resulted in a decrease in nitrogen, as a result of protein being lost during pressing and freezing.[4]"

This effect we also found in hake, although the degree of loss in hake appears higher than that for cod (3 – 5%), probably due to the softer texture of the hake species.

Therefore, in conclusion, we propose a new nitrogen factor of **2.45** for South Atlantic Hake.

[4] Trials to determine the nitrogen factor for both UK and imported fillets and mince blocks. V4-Watson, Homer, Grant & Hughes, September 2004