



# Added water in meat and meat products

An industry perspective

Clemens Gerris

**4th International Workshop on Water in Food  
27 and 28 March 2006, Brussels, Belgium**

# Agenda



- Introduction CCL Nutricontrol
- Consumer meat products
  - Product groups
- Functionality of ingredients
- Chemical analysis of meat products
- Destroying a reputation
- Cost of chemical analyses
- Building a brand
- Conclusions

# CCL Nutricontrol



**Laboratories with consulting and research services, with almost 40 years experience in the feed and food market**

Since 2000, a commercially independent company within the Cehave-Landbouwbelang holding, with DMV International owning a minority share. The shareholders and CCL Nutricontrol are located in Veghel, the Netherlands.

Key numbers 2005:

Turnover	7 mil/year
Employees	60 fte
Analyses	500.000 /year



# Research areas

- Raw materials and finished products for food and feed
- Hygiene projects throughout the food chain with a special interest in slaughter plants
- Ingredients for the pharmaceutical industry
- Waste water

## Key markets

- Feed
- Animal farming, meat production
- Dried dairy products
- Meat
- Convenience food
- Food additives

# Service areas



- Food and feed safety advice throughout the chain
- Chemical - Instrumental - Microbiological Analyses
- Customer specific analytical services
- Meat research: benchmarking - quality and quick measuring techniques
- Meat technology facilities

*Solutions for feed and food processors*

# Consumer meat products



For consumers there are easy to distinguish meat product groups:

- **Not processed, whole muscle, no ingredients**
- **whole muscle, marinated**
- (Fully) cooked (whole or commuted): deli meats, cooked sausages
- Commuted meats, not cooked: sausages



## Not processed, whole muscle, no ingredients

*Unprocessed products can be classified as “raw products”, i.e. they have not undergone processing (i.e. any action that substantially alters the initial product, including heating, smoking, curing, maturing, drying, marinating, extraction, extrusion, or a combination of these processes)*

### Process

No processing

### Consumer evaluations:

Tasty

Healthy

Sometimes tough or dry after cooking



# Marinated meat

*Processed products are obtained by submitting raw products to a process such as heating, smoking, curing, maturing, drying, marinating, etc. The process must lead to a substantial alteration of the initial product*

## Example

Marinated (American) ham

Marinated Pork loin

## Process

Injection of water + additives

Tumbling

## Consumer evaluations:

Tasty, (but not just meaty)

Tender

Juicy



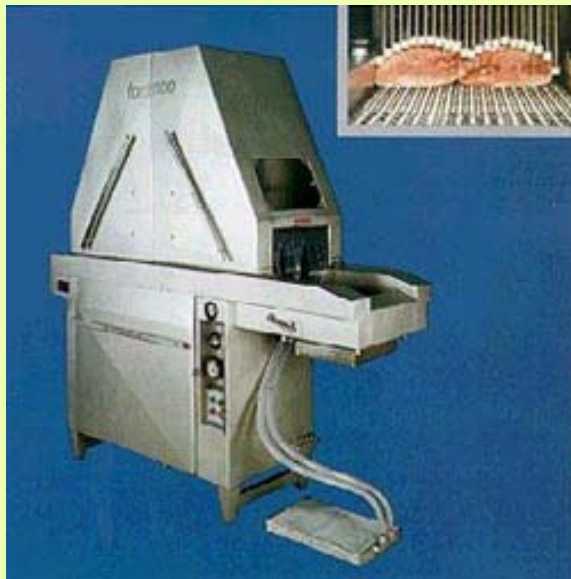
# Processing equipment:

## Multi needle injector

### General method:

Under pressure a water solution (brine) is pressed into the meat via multiple needles

Needles are in a configuration to guarantee a constant quality



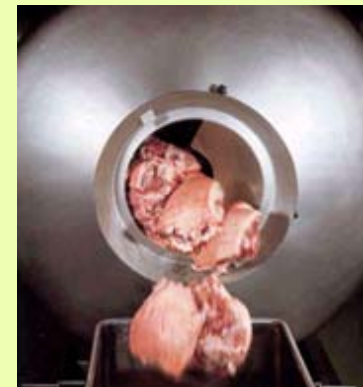
# Processing equipment:

## Tumbler

**General method:**

**By tumbling motion meat absorbs brine**

**This can also be used after an injection process to increase ingredient effectiveness**



# Consumer confused



Marinated meat can look like un-processed meats



The meat and poultry industry gives itself on a regular basis negative press



# Functionality of ingredients

One function of ingredients (additives) is increasing shelf life and safety. Water can act as a means of transport for those ingredients into the meat.

## Nitrites

- For cooked ham nitrites/nitrates are used
- In a whole muscle meat like ham, this can only be added by a moisture injection system
- Historically the brine would be injected via the main vein (artery system gives distribution), limited water addition

## Salt

Salt increases

- shelf life
- functionality of meat proteins, Water Holding Capacity
- Salt levels have decreased in 1960 due to phosphate use

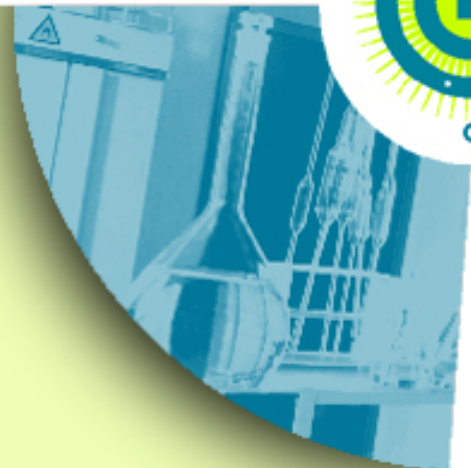
# Functionality of ingredients WHC



Ingredients are very cost effective

Ingredient	Water binding capacity	average price	price per kg water binding
		US\$/kg	
Lean meat	0,10	4,00	40,00
Lean meat, 2% salt	0,45	3,92	8,71
Lean meat, salt, phosphate	0,90	3,90	4,33
MDM meat	0,10	0,80	8,00
soy protein	5,00	2,50	0,50
milk protein	8,00	7,00	0,88
carageenan	45,00	8,50	0,19

# Chemical analysis of meat products



Chemical analysis is usually limited to label requirements

- protein
- fat
- carbohydrates
- ash
- dry solids
- fibers
- salt, vitamins and minerals

These are insufficient to determine meat content when ingredients contain proteins

# Chemical analysis of meat products



Due to a choice in N-containing additives, knowledge of the formulation is needed to determine meat content

Companies do not have the obligation to give insight in specific recipes

This gives room for “scams”

# destroying a reputation



Technical possibilities can be abused

December 2005

**Out of 10 companies  
10 have non-  
compliance's**

**6 out of 10 have  
misleading labels**

**VWA**

June 2003

"It may be legal but it doesn't make it acceptable. The only reason to add proteins is to pump up the water to high levels and that's a recipe for ripping customers off.

"That is why we think that the amount of water that can be added to chicken should be limited and the use of non-chicken proteins banned."

The FSA's surveys found chicken pieces with added water accounting for up to 55% of the total weight.

December 01

The scam is that chicken is being sold to caterers that may only be half chicken and the rest is water and a cocktail of chemicals that is added to make the water stick in the chicken

John Krebs,  
chairman of the  
Food Standards  
Agency





# Building a brand

- In the US, technical possibilities are used to satisfy customer demands
- More than 50% of BRANDED pork is enhanced

Commercial success due to

- Convenience
- Flavours
- Better tenderness, moisture and flavour
- Increased shelf life
- Increased profitability



**Hormel** Always Tender™  
Products



# Conclusions

Customers have the right to know what they are buying

Several companies do not fulfil their duties (EU)

Marinating can be very well appreciated by consumers (USA)

To marinate using the most cost effective methods, manufacturers need a choice in ingredients

To accurately determine if labelling is correct, local auditing can be an effective tool