

**Cost reduction
versus**

**Food Safety, Quality and
Environment**

Our Food
Food Safety and Control System

Cost reduction

- Overproduction leads to dumping prices destroying handcraft of regional enterprises.
- Ever growing concentration of food industry also triggers the possibility of widespread wrong hygienic practices.
- Cost reduction is achieved in many cases on detriment of food safety, quality and environment.

BSE	Bovine Spogyform Encephalopathy	Humans
CJDn	Creutzfeld-Jakob Disease	Humans
GSS	Gerstmann-Sträussler-Scheinker- -syndrom	Humans
FFI	Fatal Familial Insomnia	Humans
Scrapie	Scrapie	Sheep and goats
BSE	Bovine Spogyform Encephalopathy	Humans
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FSE	Feline Spongiforme Encephalopathy	Cats, other felines
TME	Transmissible Mink Encephalopathy	Mink
CWD	Chronic Wasting Disease	Mules, deer, elk
Kuru	New Guinea	Humans

Cost reduction

- As BSE got out of control in England, the carcasses of cows had to be discarded under reduced costs conditions, turning these corpses into 'valuable feed protein'.
- Feeding animal derivatives to ruminants turned them into carnivorous animals.
- Their milk, meat and hides became haram. Cheese, milk chocolate, ice cream baby food and a lot of other products of the European continent were consumed by Muslims acting in good faith of European food safety.

Cost reduction

- Normal sterilization procedures such as cooking, washing, and boiling do not destroy prions. The use of an autoclave to sterilize for at least **one hour at 132 – 134°C** is necessary to destroy them.

(Bacteria sterility = 120°C/20 Minutes)

- The BSE epidemic has waned, and slaughter techniques that allow cattle nervous tissue in beef for human consumption have been banned since 1989.

Crossing the gene barrier

Mad cat

- The first Swiss case of mad cat was found in 2001. Meanwhile there are 90 cases known in Great Britain. BSE meat containing feed is to be blamed to be the cause of the disease.
- The disease has crossed the species barrier. The animal feed is therefore one important part of food safety because all animals such as salmon, chicken, goats fed with BSE feed can harm humans.
- Specific risk material from ruminants for use of animal feed and pet feed was banned in Swiss 1996.

The ultimate cost reduction

- **Second cost reduction:** Sterilization time and temperature were reduced. The practice of feeding ground-up dead cattle to ruminants at reduced temperature made the mad cow disease spread all over the continent.
- Trouts, salmon, poultry, sheep, goats and pets on aquatic farms and animal breeding on land were fed with these infectious haram materials.

Dietary value of beef

Organ	Product	Use
Pancreas	Insulin	Diabetes
	Pancreatin	Help digestion
	Glucagon	Treat hypoglycemia
	Trypsin, chymotrypsin	Burns, wounds, promote healing
Soft cartilage	Cartilage	For plastic surgery
Bone meal	Calcium and phosphor	Supplements
Spinal cord	Cholesterol	For hormone products
Pituitary gland	Prolactin	Promote lactation
	Pressor hormone	Regulate blood pressure
	Vasopressin	Intestinal and renal functions
	ACTH	Arthritis and allergies
Liver	Heparin	Anticoagulant
	Liver extract	Treatment of anemia
	Vitamin B12	Vitamin B-complex deficiencies

Beef is an important food which must be better protected from adulterations.

Bearing the consequences

- Blood and human plasma in UK were imported from Germany and America. These countries had been considered to be free of nCJD.
- CJD is confined to the brain and central nervous tissue and elder persons.
- nCJD affects the whole body and very young persons.

Bearing the Consequences

- Various exotic ungulate species in zoos, as well as domestic house cats, all in the United Kingdom, have died of a transmissible spongiform encephalopathy caused by an agent that appears identical to the agent that causes bovine spongiform encephalopathy.
- Other animals like poultry, fish and pig were also fed with the same infectious material.

Bearing the consequences

- The consumer should on his term, be willing to pay fair prices.
- Supermarket chains should avoid price battles with staple foods in order not to force such disastrous price reductions.

Herring worm

The herring worm *Anisakis simplex* is found in guts and flesh from Herring, mackerel. If consumed alive, *Anisakis* can harm humans.

Raw or undercooked fish, sushi, Dutch green herring, marinated and cold smoked fish can cause an infection. It causes abdominal pain and acute allergic symptoms such as urticaria.

Nematodes in Fish

Fishing grounds	Nematode in flesh	Nematode in guts
West of Scotland	13	340
West of Scotland	22	463
North sea	49	1762
North sea	32	2666
North sea	43	3086

Mackerels of the central market in Tokyo were found 94 – 100% infested with *Anisakis*. (Murata)

Measures to reduce Anisakis

- Immediate gutting on board. Discard the belly flaps.
- Salting:
 - Immersion in 80° brine, 21% salt for 10 days.
 - Lower salt concentration takes 30 Days to kill all larvae.
- FDA: recommends that all Fish and shellfish intended for raw or semiraw (marinated or partly cooked) consumption be blast frozen to -35°C or below for 15 hours or frozen to -20°C or below for 7 days.

Measures to reduce Anisakis

- Gutting, brine salinity, freezing temperature and holding times often are reduced for the sake of lower production costs.
- Codex Alimentarius allows a maximum of 5 worms in 1 Kg of fish (This, however, should be reduced as some people are allergic to Anisakis.)

Seafood allergies

- Scombroid fish poisoning and Anisakis allergy may mimic allergic reactions to seafood.
- Adverse reactions may also occur after eating seafood contaminated by algae-derived neurotoxins, including ciguetera and paralytic shellfish poisoning.
- Seafood allergy is most common in communities where seafood is an important part of the diet, such as Asia and Scandinavia. Population with high diet in fish should reduce as much as possible allergens such as Anisakis.

Materials in contact with foods

High Density Polyethylene-HDPE Cutting Boards

HDPE is more rigid and harder than low density materials and is three times better in compressive strength. HDPE complies with FDA requirements for direct food contact applications.



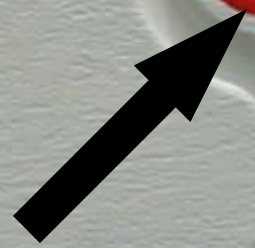
Good quality of plastic cutting boards and food preparation surfaces

Plastics or wood

- New plastic boards are generally easier to clean than wooden boards but plastic boards that have extensive knife scars are difficult to clean manually.
- Some wooden boards have been reported to exhibit antibacterial properties.
- The use of colour coded boards to distinguish those to be used for different types of food are recommended.



Colour coded cutting boards



Cost cut on preservatives

Mould inhibitor for use in Bread

- Microencapsulated sorbic acid as replacement for calcium propionate being thus a cost-saving method to keep bread fresh and mould-free for a couple of weeks.
- Controversy has arisen around the use of calcium propionate following recent findings published in the Journal of Paediatrics & Child Health.

Cost cut on preservatives

- Preservatives in bread can be avoided as special care during production can achieve a reasonable shelf life.
- Cost cutting on cleaning and maintenance of the production line and reheating after packaging makes the use of preservatives and microencapsulated ingredients attractive.
- Bread should be produced as natural as possible

Production of aminoacids

Cost cut

- Tryptophan has been produced many years. The company Showa Denko used genetic engineering and reduced the filter charcoal to accelerate and increase the efficiency of production and to reduce costs.
- The product was released without primary tests and sold in 1988.

Production of aminoacids

Cost cut

- 37 persons died and 1,500 were permanent disabled.
- EBT (dimeric tryptophan 1,1'-ethylidene-bis-L-tryptophan), a dimerization product of tryptophan had been formed in the new production line.
- The desire to increase productivity and failing to comply with safety tests resulted in this catastrophe.

Protozoan parasites in water and food

- **Cryptosporidium parvum and Giardia lamblia** are significant waterborne pathogens around the world, causing watery diarrhoea and abdominal cramps.
- **Cryptosporidium parvum:** Tap water, unpasteurized milk, fresh pressed apple juice, salad, raw meat.
- **Giardia lamblia:** Fruit salad, sandwiches, fresh vegetables, noodle salad.

Contamination of food by infected person.

Remove diseased person from food handling.

Do not use untreated sewage and sludge on vegetable fields

Protozoans in water and food

- **Cyclospora disinfection**

Oocysts of *Cryptosporidium parvum* are the most resistant of the two and only ozone can destroy them. Other disinfectants do not destroy *cryptosporidium* in drinking water.

Temperature

72,4°C for oocysts of *Cryptosporidium parvum* in water.

For milk it should be higher than that. (Normal pasteurisation of milk = 72°C/15 sec.)

64,2°C for 2 minutes for *Giardia lamblia*.

Protozoans in food

Resistance to acidity

Oocysts can survive pH of 3,8 – 4,0 of apple juice for several days at ambient temperature and weeks during frozen storage. 30 days at -22°C when slow freezing is used. There is no survival with snap freezing using liquid nitrogen.

Protozoans in food

Waterborne parasites especially *Cryptosporidium* and *Giardia* in food systems must be controlled in epidemic areas.

It is essential that food processors who use mains water either for washing foods or as an ingredient in foods for which there is no terminal heat process, develop a control system of their mains water system.

Environment and food diseases

Cholera is present in the mainly sugar-cane-growing areas of South America, Gulf coast of the USA, Australia, Africa, south east Asia, northern India and Japan.

Near absence of indigenous cholera outbreaks in other countries.

Sugar-cane leftovers in fields, and by-products and effluent of the sugar-cane industry contain nutrients, essential aminoacids, and salts which make it possible to *Vibrio cholerae* to survive during interepidemic periods.

Environment and food diseases

Heavy agricultural and related industry activities produce significant changes of the environment which can alter the local population of microorganism and lead to reservoir of pathogens.

Health authorities should take this in consideration controlling widespread industrial activities. Sugar-cane waste should not get into surface water and main stream of water.

Cost cuts on industrial waste influences important environment hygiene.

Low infectious dose

The infectious dose of Salmonella can be as low as 1 germ per serving.

Ice cream and related products causing infections in South Australia with Salmonella oranienberg and Salmonella enteritidis in Minnesota U.S.A. in 1994 had a very low infection dose.

The source of the Minnesota epidemics was the contaminated raw eggs residue left in a truck trailer which was used then used to transport pasteurised ice cream mix.

Low infectious dose

Failure in cleaning and disinfection in ice cream production and other frozen products is very dangerous as carelessness easily spreads out because their products do not deteriorate due to the deep storage temperatures. The bacteria survive at least for 12 month at -20°C.

Visual and bacteriological controls of cleaning and disinfection procedures by trained personals.

Cost cutting activities affecting safety can lead to disasters.

Spices and herbs

In Germany in 1993 paprika potato chips caused an outbreak of salmonellosis which affected around 1,000 people.

The paprika had been sun-dried in northern Africa.

Environment, quality of irrigation, improper use of manure and handling by diseased persons are possible contamination cause.

Spices and herbs

Good microbiological quality

Steam sterilisation, batch selection and good manufacturing practice produce good microbiological quality of herbs and spices.

Irradiation

Irradiation has been proved to be effective in eliminating pathogens from herbs and spices, but is not frequently used.

Industrial use

Modern food technology tries to submit all spices and herbs to a heat treatment or use extracted essential oils, oleoresins and seasonings such as oregano and thyme.

Campylobacter jejuni

Transmission to humans is usually by contamination of food or water although in some countries unpasteurised milk is also implicated. Chicken, poultry and other foods are thought to be the most likely sources of infection in developed countries.

Consumers have an important role to play in reducing the incidence of foodborne disease. Minimisation of cross-contamination in the domestic kitchen specially handling with raw poultry, can do a lot to avoid *Campylobacter* infection.

Toxoplasma gondii

Undercooked or raw meat and contact with infected cat stool can be the source of toxoplasmosis

Temperatures of 66°C and higher will inactivate *Toxoplasma*. This temperature, however is not sufficient to inactivate other pathogens. Wash all vegetables and fruits before eating them raw.

Toxoplasma gondii

HIV positive persons and pregnant women should be kept distant from cats.

The cat's litter box should be changed daily wearing disposable gloves, hand washing with soap and disinfectants. Cats should be kept indoor to prevent them from hunting. All pet feed should be cooked. No raw meat should be given to cats.

Fresh fruit and vegetable juices

Fresh fruit and vegetable juices are produced without thermal treatment.

Fruits and vegetables are frequently in contact with soil, insects and animals during growing and harvesting in the field. Consequently, their surfaces are not free from natural contaminants.

“Untreated fruit juice or vegetable juice must contain no detectable *E. coli* / ml and *Salmonella spp.* should be absent in 25 g when the sample is analysed by the prescribed method.” (Australian Food Standards Code 1.6.1 Volume 2)

Fresh fruit and vegetable juices

Prevention: Equipment should be properly sanitized, packing materials should be kept in sanitary condition, and storage temperature should be controlled to inhibit the growth of undesirable microorganisms.

Elimination: Microbial contaminants can be reduced by fruit sorting, washing, and rinsing. In addition, chemical sanitizers with thiabendazole (TBZ) before degreening, washing with sodium orthophenylphenate (SOPP) and thermal treatments may be applied.

Fresh fruit and vegetable juices

Alkaline washing: In general, high pH washing solutions (pH 11.8) applied with an adequate spray volume effectively reduced the surface contamination of fruit which lowered the microbial load of fresh juice as well.

Heat treatment: A 5-log reduction of *E. coli* was attained by immersing inoculated fruit in hot water at 80°C for > 1 minute or 70°C for > 2 minutes.

Fruit Waxes: Waxes are currently applied on citrus, apples, pears, tomatoes, cucumbers, eggplants, and peppers to reduce water vapor loss, enhance surface shine, and, in some cases, provide a vehicle for antimicrobial agents and/or dyes.

Fresh fruit and vegetable juices

Microorganisms can be effectively destroyed by thermal treatment. Pasteurization and sanitizing treatments eliminate human pathogens and minimize spoilage organisms.

To be on the safe side all food should be heat treated when long transport, prolonged shelf life and storage conditions are too difficult to comply.

Fresh, not heated juice should be produced only immediately before consumption.

Fresh cut melon

Fresh cut melon products have been associated with food-borne illness like the epidemics in U.S. States caused by *Salmonella poona*.

Melons grow at ground level and most have very rough surfaces. The cantaloupe melons grown in Mexico have an uneven, scaly rind

Fresh cut melon

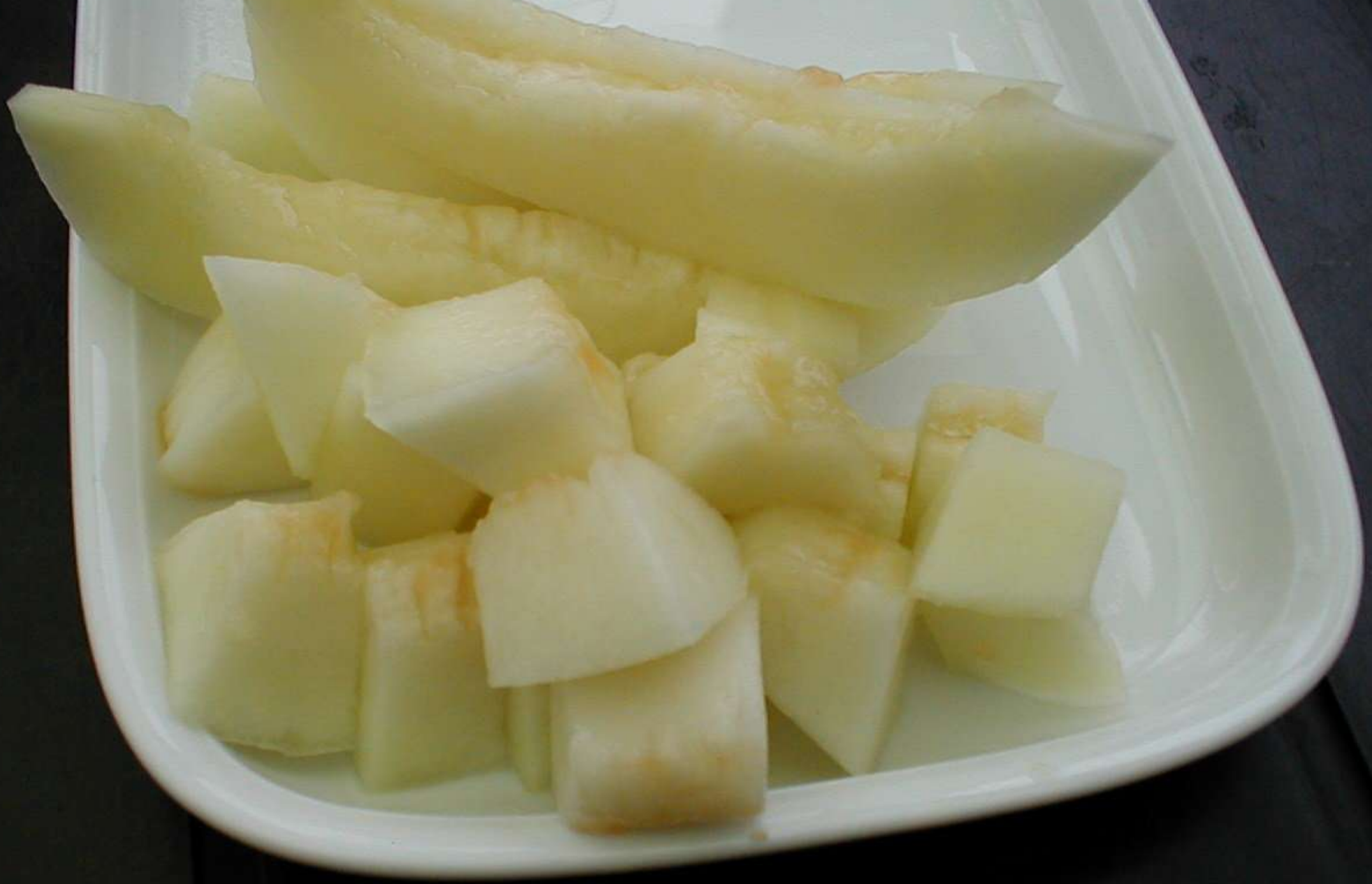
A hydrogen peroxide wash applied to melons prior to cutting shows promise of improving the microbiological quality and shelf life of fresh cut cantaloupe.

Fresh cut melon cubes should be kept at 4°C and the shelf-life kept as short as possible. Pathogens on the surface of melons like Salmonella can be significantly reduced by avoiding manure and contaminated surface water to irrigation.

Melon should be cut at the site of consumption and used at the same day.







Soy sauces

Chloropropanols were found in surveys of acid hydrolysed vegetable protein (acid HVP) and some soy sauces and related products.

The chloropropanols are 3-monochloropropane-1, 2-diol (3-MCPD) and 1, 3-dichloro-2-propanol (1, 3-DCP). Both are suspected carcinogens.

Soy sauces

All sauces with high chloropropanols had been produced using an acid hydrolysis process.

Soy sauces manufactured using only a traditional fermentation process did not give rise to the chloropropanols.

Conclusion: It seems that acid hydrolysis was introduced to cut costs in the production of soy sauce, whereas the traditional process of fermentation was much expensive but the safe way.

Antibiotic use in food production animals

Antibiotic resistance in foodborne pathogens is a growing problem in both developed and developing countries

In August 2000, the World Health Organization released a set of global principles aimed at reducing the risks of using antimicrobial drugs in food animals :

Obligatory prescriptions for all antimicrobials used for disease control in food animals.

Termination or rapid phasing-out of the use of antimicrobials for growth promotion.

Hand drying and hygiene

Single use paper is the best method to obtain good hand hygiene because of its low initial microbial population, its low contamination level on site, its low risk of re-contamination and its mechanical action in removing moist dirt.

Hot-air hand dryers are less effective than paper towels in removing bacteria because:

Lack of abrasion and removal of bacteria, and the emission and recirculation of bacteria in air streams from contaminated dryers as well as contamination from the starter knob.

Conclusion

Cost reduction activities in large food enterprises have resulted in many epidemics. Price struggle between global retailers in the staple food sector, has triggered a downward spiral of cost cuts.

Enterprises and consumer should both accept the higher price of food safety. Food health authorities should put an eye on the food chain which is under price strain in order to avoid excessive risks.

Conclusion

Some specific foods, like fresh juices or fresh cut melons should remain a domain of restaurants or other services at consumer site in order to minimize the time between preparation and final consume.