

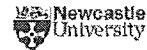
***Risk Perception and Communication
Associated with Food Safety***

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University, UK

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What factors determine consumer and/or societal
responses to food technologies or food risks?



Risk Perception

- The psychology of risk perception drives public risk attitudes
*e.g. an **involuntary risk** over which people have no control is more threatening than one people choose to take*
Exposure to milk contaminated by melamine
- Potentially **catastrophic** risks concern people most
BSE in cattle and new variant CJD
- **Unnatural** (technological) risks are more threatening than natural ones
Application of food technology to agrifood production
- **Ethical representations** and concerns are emerging as an important determinant of consumer decision making
Animal welfare,
Environmental impact of agriculture

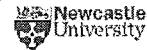
Consumer acceptance of new food technologies

- Research into the determinants of public acceptance of emerging technologies **has occurred subsequent to public rejection** of a particular application
- The European public's rejection of genetic modification of food and crops is frequently interpreted as representing **the normative societal response to new technology**
- Consumer research has identified predictors of **consumer rejection** not **acceptance**.
- Communication with the public about food issues associated with **health and environmental impact has focused almost exclusively on risks**, while health benefits have been communicated separately

Societal responses to technological innovation in the agrifood sector?

- Perceived **personal benefits**
- Perceived **societal benefits** (health, economic, social, environmental)
- Differential **accrument of risks and benefits** (fairness)
- **Ethical** concerns
- Perceived **personal risks** (health, economic, social, environmental)
- Perceived **societal risks** (health, economic, social, environmental)
- Perceived **efficacy of regulatory framework**

Frewer , Bergmann, Brennan, Lion, Meertens, Rowe, Siegrist, Vereijken, Ilsi expert group report, 2011, TIFS



Societal responses to technological innovation in the agrifood sector

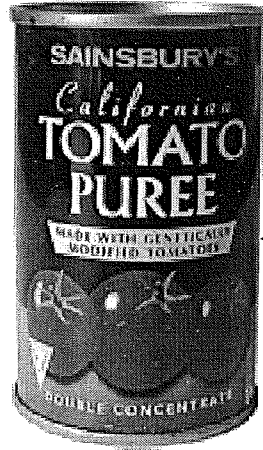
- Cognitive **associations** with other technologies
- Public **awareness (familiarity)**
- Perceived **scientific knowledge/ uncertainty**
- Perceived **naturalness**
- Controllability/ Choice (labelling/traceability)
- **Level of consumer /public involvement in technology/ product development**
- **Trust in science and regulation**

Frewer , Bergmann, Brennan, Lion, Meertens, Rowe, Siegrist, Vereijken, 2011



The genetically modified tomato paste – accepted by consumers (1996)

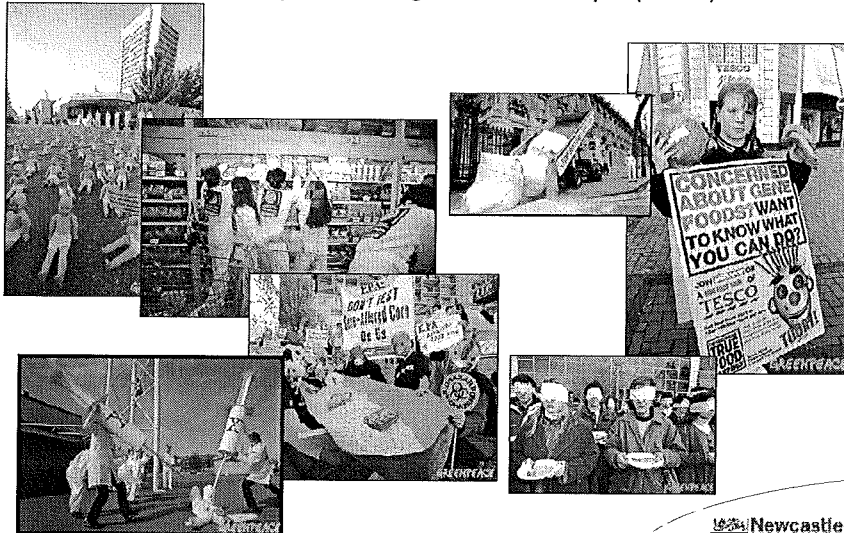
- Consumer choice
(voluntary consumption)
- Consumer benefit
- No interest to media



Clearly labelled therefore traceable



Consumer protests against GM crops (1998)



The Pegasus Project

- A systematic review of all research focused on consumer attitudes to GM applied in the agri-food sector
- Quantitative and qualitative publications
- Meta-analysis applied to quantitative data

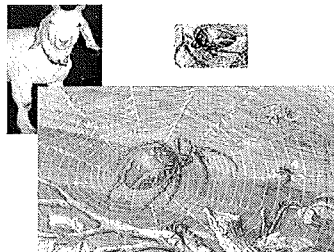


GM animals



The "Enviropig" – excretes less phosphate in faeces therefore better for the environment

The goat that produces spider silk in its milk (used for fabrics)



GM animals



Goats that produce pharmaceuticals in their milk



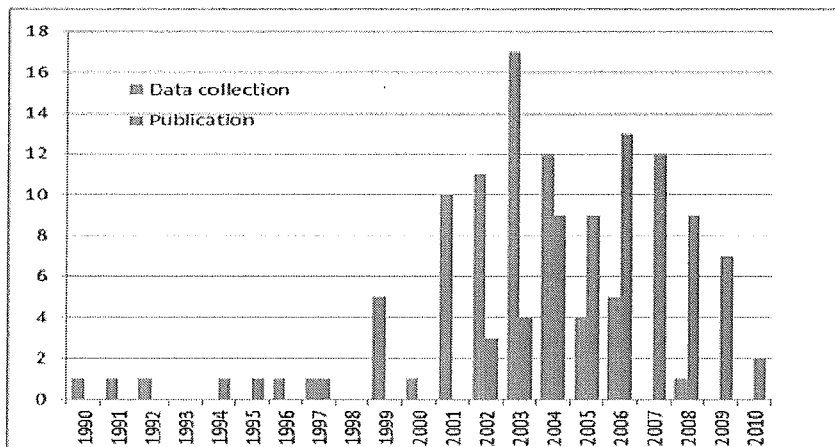
Increased meat production



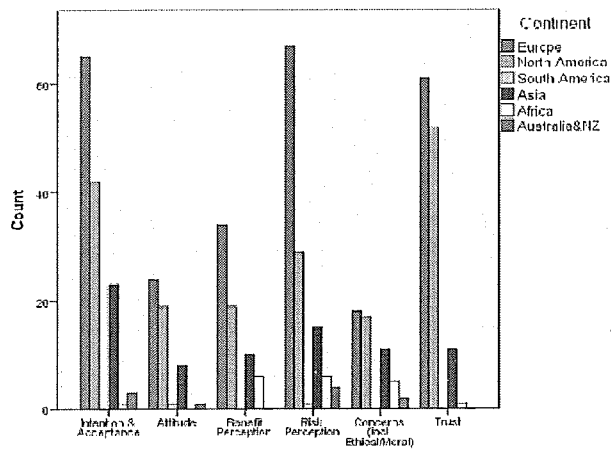
Pet fish that "glow in the dark"



Data collection and paper publication by year



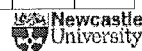
Data available for meta-analysis constructs by region



Key results

	Intention		Attitude		Benefit Perception		Risk Perception		Concern on ethical issues		Trust	
R ²	34%		33%		30%		46%		58%		12%	
Heterogeneity	ns		ns		ns		ns		ns		ns	
Baseline: GM animal, Europe, 2006	-0.71		-0.31		-0.08		0.45		-0.51		-0.30	
	Offset from baseline	P value	Offset from baseline	P value	Offset from baseline	P value	Offset from baseline	P value	Offset from baseline	P value	Offset from baseline	P value
Plant	0.40	p=.02	0.23	p=.06	0.11	ns	-0.14	ns	0.01	ns	n.a.	
Non specific	0.36	p=.03	0.22	p=.05	0.26	ns	-0.10	ns	-0.15	ns	n.a.	
Year of data collection	-0.02	ns	0.03	ns	0.04	p=.03	0.03	p<.01	-0.02	p=.06	-0.02	ns
North America	0.33	p<.01	0.28	p<.01	0.29	p<.01	-0.14	p=.01	0.52	p<.01	0.05	ns
South America							-0.83	p<.01				
Asia	0.57	p<.01	0.45	p<.01	-0.06	ns	-0.52	p<.01	0.42	p<.01	0.21	p=.06
Africa	-0.30	ns			0.40	p<.01	-0.14	ns	0.26	ns	0.73	p=.03
Australasia	0.01	ns	0.22	ns			-0.08	ns	0.03	ns		

NB, Additive model
No interactions estimated



Key results

- Research focused on GM applied to crops or general agrifood applications of GM, rather than public acceptance of GM animals.
- **Consumers intention to use the products of GM**
 - animals were lower than for plants or for GM applications in general.
- **Europeans** expressed *lower intentions* to purchase the products GM organisms compared to **SE Asia and North America**.
- No differences were observed with **time** in any region.
- Similar results were observed for **overall attitude** towards GM



Perceptions of risk, benefit and ethical concerns

- **Benefit perception**
 - **North Americans perceived more benefits** associated with GM overall when compared to Europeans and Asians.
 - **Benefit perception increased with time** in all regions
 - independent of whether the target of the application was focused on GM animals, plants or generic applications
- **Risk perception**
 - North American, South American and Asian participants perceived **fewer risks** than Europeans.
 - **Risk perception increased with time** independent of region, and target organism.
- **Ethical and moral** concerns were
 - **Greater in North America and Asia** compared to Europe.



Interim conclusions

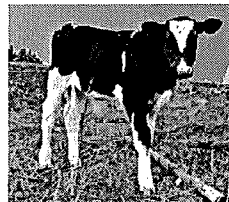
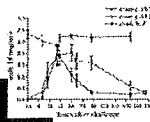
- Consumer acceptance of products will depend on which factor (or combination of factors) predicts consumer behaviour.
- The importance of different factors as a determinant of consumer behaviour may also vary between different regions, and according to different socio-cultural and historic contexts.
- We have little data regarding consumer attitudes for some major EU trading partners
 - BRIC countries
 - Partners in capacity building



Science and Society Case Study - recombinant human lactoferrin (rhLf) in the milk of transgenic cows



Human lactoferrin



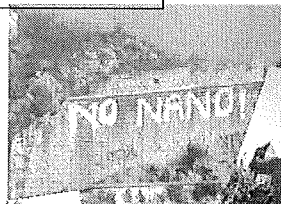
Science and Society Case study - recombinant human lactoferrin (rhLf)
in the milk of transgenic cows

Area of concern	Societal Acceptance	Societal rejection	Communication of uncertainty
Human health and food safety	Medical application (infant immune system development)	<ul style="list-style-type: none"> Vulnerable target groups (infants) Certainty demanded regarding safety? Food or medicine? 	Incomplete data <ul style="list-style-type: none"> Human health risk not yet identified Meat accidentally or fraudulently enters human food chain
Animal health and welfare	Embryo transplantation equivalent to other practices in welfare terms	Animal welfare (large offspring syndrome)	<ul style="list-style-type: none"> No data on unhealthy transgenic cows These will be the focus of societal concern
Environmental safety			Uncertainty of "no impact" following environmental release of animals?



"Soil Association bans nanomaterials from organic products (Guardian January 2008)"

Protest against Minatec, Grenoble, France



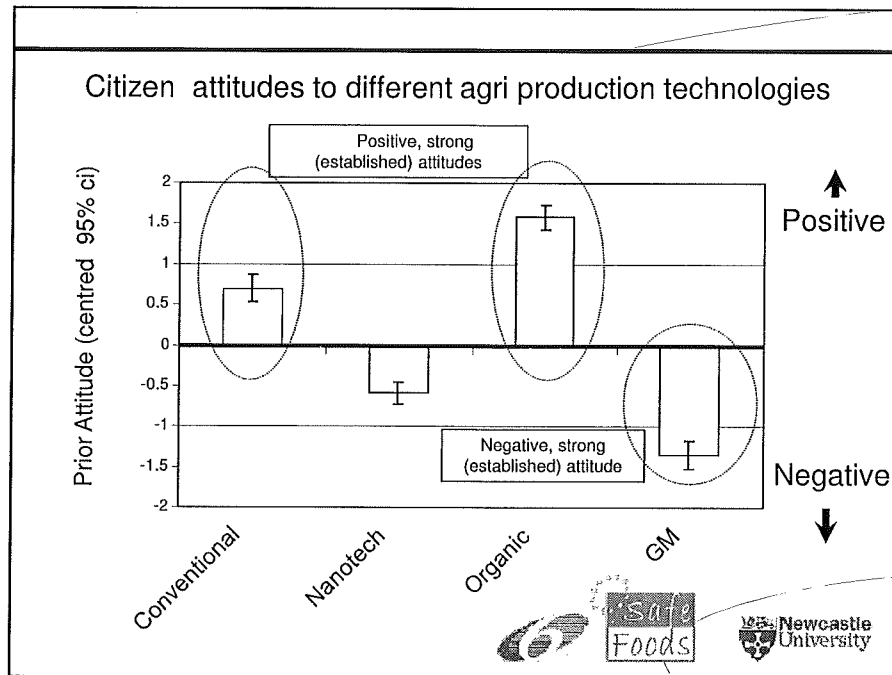
Anti-nanotechnology protesters, Chicago



Nanotechnology applications associated with risk, benefit and cost

Application	Benefit	Risk	Cost	Uncertainty
Foods which have the potential for cognitive enhancement	Improved cognitive performance	Overuse /misuse of substances Nanoparticles in human body	Financial (who can afford to be enhanced?) Creation of socially excluded individuals	Unintended effects? Population level variability?
Nano-enabled microsensors in animals	Real-time monitoring of health status through ICT application	Animal welfare issues(?)	Disadvantaged groups of farmers (e.g. in developing countries)	Effects on human health through ingestion (?)
Nanoscale genetics	Improved food production /Personal care products /Pharmaceutical production	Negative consumer attitudes (from the GM debate)	Research and development if consumer acceptance does not occur	Environmental and health risk benefit assessment adequate?

What impact does risk and /or benefit information have on established attitudes?

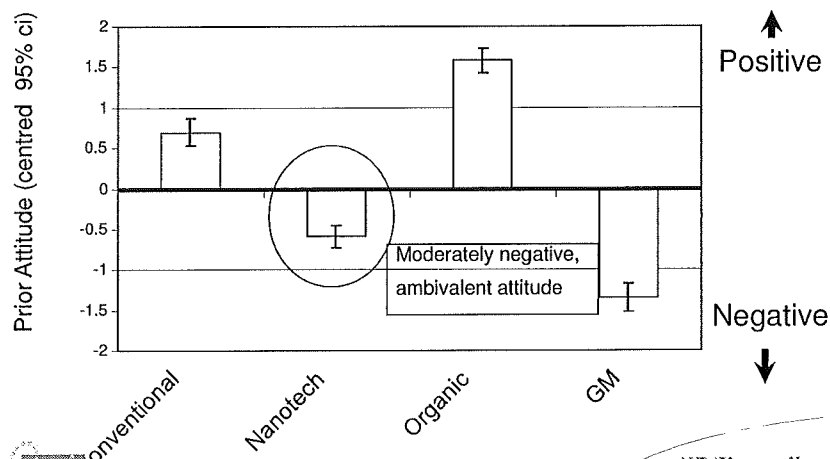


Impact of risk-benefit information on established attitudes (Conventional agriculture, Organic agriculture, GM production)

- Negative attitudes become **slightly less** negative
- Positive attitudes become **slightly less** positive

Attitudes once established are difficult to change

Citizen attitudes to different agri production technologies



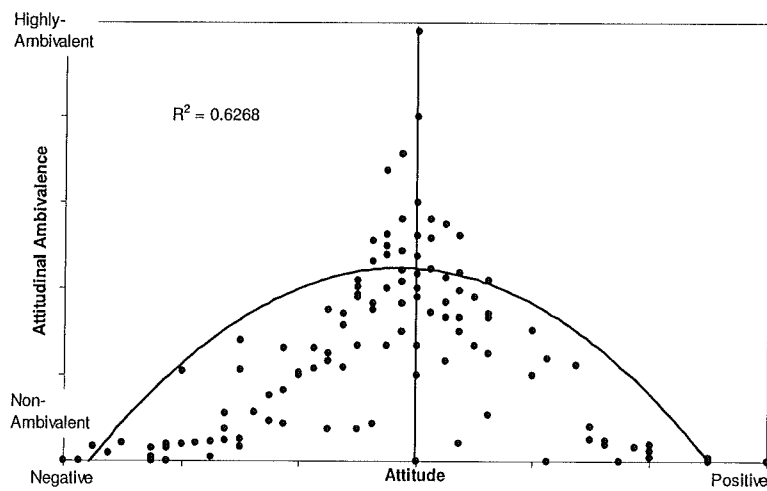
Risk-benefit communication

- Ambivalent negative attitudes (*nanotechnology*).
 - People more amenable to be influenced by whatever information becomes available

How are attitudes towards nanotechnology distributed *post risk-benefit information provision*?



Inverse U-shape relation between attitude and attitudinal ambivalence



Fischer et al, in press, Public Understanding of Science



Individual differences in attitude

Three “segments” of consumers

- *Group 1 (42%) became more negative*
 - *Less / average education*
- *Group 2 (46 %) didn't change*
 - *Less / average education*
- *Group 3 (12%) became more positive*
 - *Younger or older*
 - *Male*
 - *Highly educated*



Does this imply that food technology innovators should only communicate about benefits?

Almost certainly not.....



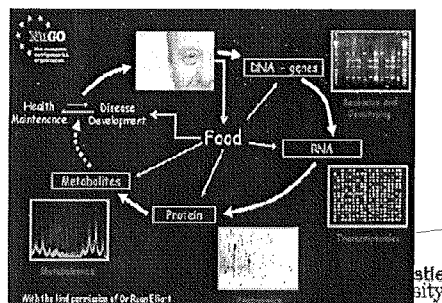
Setting the agenda

- Who will set the agenda for public debate...
 -those people and societal groups who are either extremely positive or negative towards the technology ...
- Industry must provide "honest" risk-benefit communication if consumer trust is to be maintained
- Undecided individuals will absorb the attitudes of those with whom they perceive to share values
- Future technology is dependent on developing products which people want and need
- Consumer choice is essential



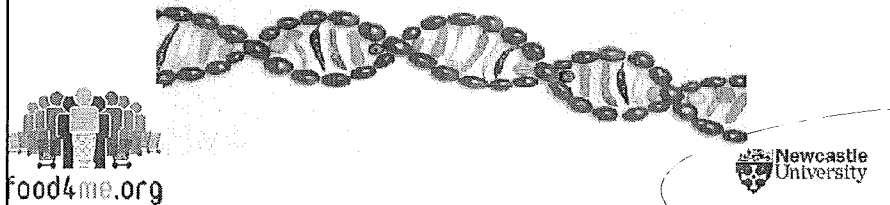
Nutrigenomics and personalised nutrition Will consumers accept personalised nutrition?

.....the study of how different foods affect someone's health by the way they react with that person's genes, for example by making them more or less likely to get heart disease or other illnesses.



Innovations (and commercialisation possibilities)

- DNA testing and food profiling
- Personalised ICT based “coaching” to get people to eat specific foods...
- Specific food products for people with specific gene types



Objectives of consumer research activities

Overall objective

- To develop a theoretical model of the factors influencing consumer decision-making regarding personalized nutrition, in particular ***perceived risks and benefit***, to identify consumers' needs, values and preferences regarding provision of personalised nutrition information, including those related to product delivery

Subobjectives

- to identify differences in these preferences in terms of
 - ***socio-economic factors***
 - ***cross-cultural preferences***
 - ***demographic differences and other salient individual differences (gender, other genetic factors, health status, age, income, etc.)***



Consumer research activities

- Phase 1
 - Focus groups (Ireland, Germany, Netherlands, Norway, Spain, Portugal, Sweden, UK, (2 in each Eu member state)
- Phase 2
 - Surveys (n=1000) in each EU member state included
- Phase 3
 - Comparison with people recruited into personalised nutrition cohorts in each EU member states included



Preliminary results Initial results consumer focus groups

- People like
 - The concept of personalised nutrition providing it fits in with their lifestyles
 - The idea of specific products or nutritional supplements
 - Obtaining personalised nutrition through health services but not from private companies
- People are concerned about
 - Taking blood samples
 - Sending these to anonymous companies by post
 - Whether they can trust private companies with their genetic information
 - Being "coached" by a computer (i.e. they get dietary feedback over the internet) as opposed to a dietician or health professional



Next phase

- Identifying groups or segments of consumers who reject nutrigenomics
- Comparing quota sampled population with people recruited into the nutrigenomics cohorts...
- More formal analysis of risk/benefit perceptions etc



Thank you

Any questions or comments?





Overview of Food Safety Control System in Japan

Dr. Kazushi Yamauchi
Ministry of Health, Labour and Welfare
Japan

A brief presentation is made on the role of the Japanese Ministry of Health, Labour and Welfare in keeping food safe.

The Food Sanitation Law states its purpose as ensuring the safety of food to protect the health of the people. The public and private sectors and the consumers all have their own roles in food safety. The manufacturers bear the responsibility of keeping their products safe, while the governments oversee, manage and take actions when necessary.

The Central Government establishes nationwide regulations and co-ordinates key players. There are specific rules and standards on pesticides, microbiological organisms, and other substances that can contaminate food, and on the use of additives to food. Imported food is controlled by the Central Government. Local governments administer and provide services more closely related to local residents and food businesses. Local governments take the major role in keeping the safety of distributed food.

After the detection of the food poisoning, local health centers conduct an investigation and establish countermeasures against the cause. Reports about incidents are made to the prefectural government. The MHLW can request a more thorough investigation in cases of emergency, and when there are considerably large number of patients that are widely distributed across trans-prefectural boundaries.

There are roughly 1 to 2 thousand cases food poisonings reported each year. In the winter seasons, we have seen many cases of viral food poisonings that are frequently due to contamination by norovirus. Recent examples of widespread food safety emergencies are the outbreak of enterohemorrhagic *E. coli* in restaurant chains, and the contamination of radioactive materials due to the nuclear power plant disaster after the Great East Japan Earthquake. Countermeasures by the government have been placed and are currently in effect.



Empowering Human, Pursuit of Harmony Living

Mr. Antonius Nababan

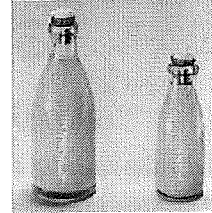
*P.T. Yakult Indonesia Persada
Indonesia*

1. Yakult International:
 - Philosophy of Yakult, based on Shirota-ism (Pursuit of Human Health)
 - *L casei* Shirota strain
 - FOSHU
2. Yakult Indonesia:
 - Propagation, Plant Visit
 - Distribution (Empowering human and create Job)
 - Waste Water Treatment (Environmentally Friendly)
3. Japan Indonesia Yakult ways:
 - Cooperation between Local and Japanese (Ho Ren So)
 - Down to Earth (Genba)
 - Bottom Up information (Kaizen)
4. Success Story:
 - Fair and Humble (Create Carrier by potential staff)
 - Suitable Product and High Discipline (Quality of Service)
 - Own Delivery to all chain store and end user (Prevention complain, Quality Control)
 - Secure Company and adapt local culture (Continuous operation)
 - Utilize local applicant for good candidate of Leader (Appraisal and application standards)





**Yakult
1935**

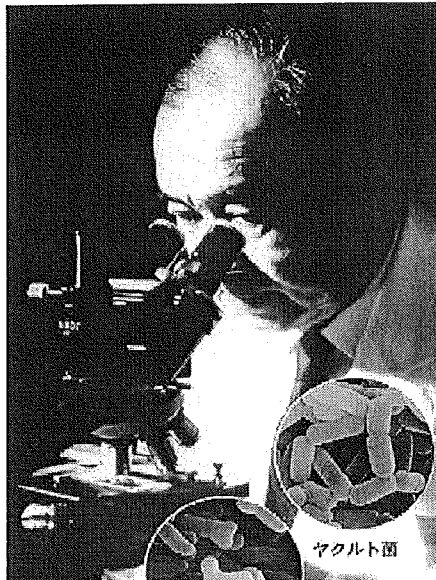


Yakult Honsha Co., Ltd

**1-19 Higashi Shimbashi 1-chome,
Minato-ku, Tokyo, Japan**



International Conference for Sharing
Information on Food Standards in Asia



**DR Minoru Shirota
1899 - 1982
Founder of Yakult**

Utilize Bacteria

***L. casei* strain Shirota**



ビフィズス菌 International Conference for Sharing
Information on Food Standards in Asia

SHIROTA-ISM

The root of Yakult Business

1. Preventive medicine

Emphasis should be placed on medicine that prevents illness, rather than on treating illness once it develops.

2. A healthy intestinal tract leads to a long life

Human beings take in nutrition through their intestines.
Making the intestines strong leads to healthy and long lives.

3. A price anyone can afford

The goal of providing as many people as possible with easy access to *Lactobacillus casei* strain Shirota, which protects the intestines.

Shirota-ism also includes the concepts of

“broadening acceptance,” “home delivery,”
“harmony among people,” and “sincerity”

as timeless and fundamental aspects of our business activities.

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Food for Specified Health Uses (FOSHU)

FOSHU refers to foods containing ingredient with functions for health and officially approved to claim its physiological effects on the human body. FOSHU is intended to be consumed for the maintenance / promotion of health or special health uses by people who wish to control health conditions, including blood pressure or blood cholesterol.

In order to sell a food as FOSHU, the assessment for the safety of the food and effectiveness of the functions for health is required, and the claim must be approved by the MHLW (Ministry of Health Law and Welfare Japan).

Requirements for FOSHU Approval

- Effectiveness on the human body is clearly proven
- Absence of any safety issues (animal toxicity tests, confirmation of effects in the cases of excess intake, etc.)
- Use of nutritionally appropriate ingredients (e.g. no excessive use of salt, etc.)
- Guarantee of compatibility with product specifications by the time of consumption
- Established quality control methods, such as specifications of products and ingredients, processes, and methods of analysis

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Food with Health Claims (Food for Specified Health Uses = FOSHU)

There are two types of food with health claims

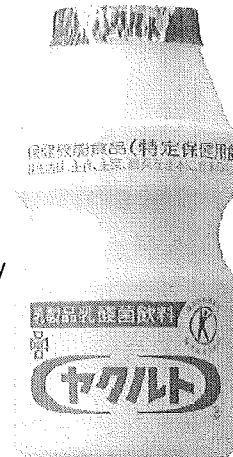
- **“Food for Specified Health Uses”**

is intended to provide certain health benefits and includes substances (active ingredients) that have beneficial effects on the body's physiology.

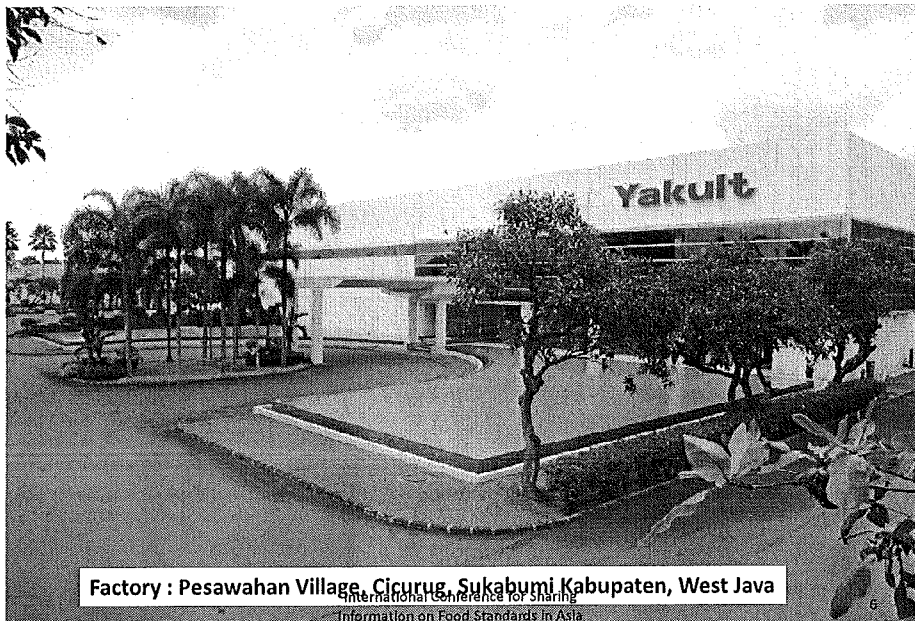
A food can display the “Food for Specified Health Uses” label only after its effectiveness, safety, and quality have been scientifically tested by the Japanese government and authorization is received

- **“Food with Nutrient Function Claims.”**

is intended for use as a nutritional supplement. As long as it includes specified substances (vitamins, minerals, etc.) and meets designated standards, a food may be labeled as a “Food with Nutrient Function Claims” without applying for permission from, or notifying, the government



PT YAKULT INDONESIA PERSADA



Factory : Pesawahan Village, Cicurug, Sukabumi Kabupaten, West Java

PT YAKULT INDONESIA PERSADA

- **1990 joint venture company PT Yakult Indonesia Persada established as a license of Yakult Honsha Co., Ltd., Japan**
- **January 1st 1991 Grand Launching**

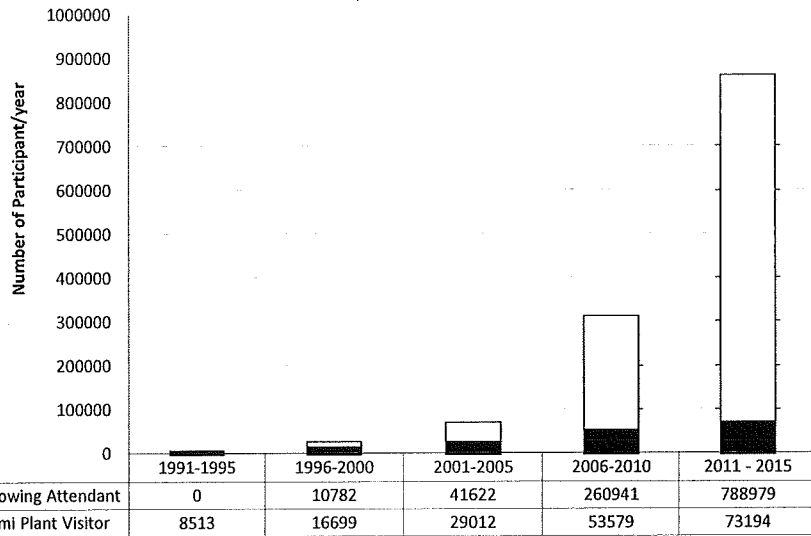


PT YAKULT INDONESIA PERSADA

- **July 1997 up to end of 2000, Indonesia economy crisis**
- **2001 The Company status change to fully Foreign Investment company**
- **Top Brand Fermented Milk Product**
- **Golden Brand Probiotic Drink**

PT YAKULT INDONESIA PERSADA

PROPAGATION



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9

WASTE WATER TREATMENT

Advanced water treatment system that uses *Yakult* containers

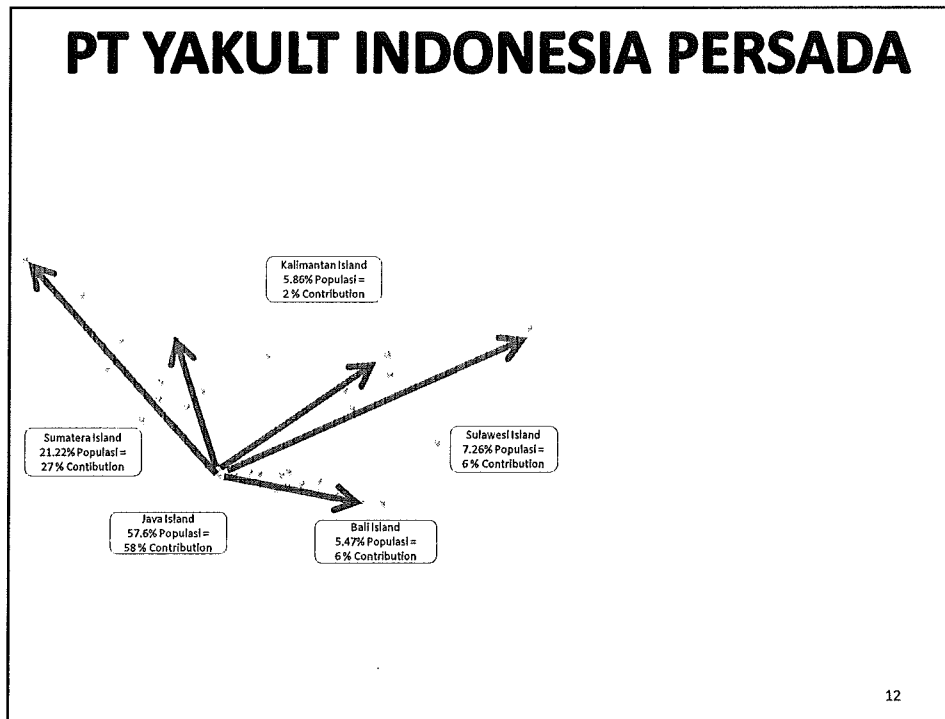
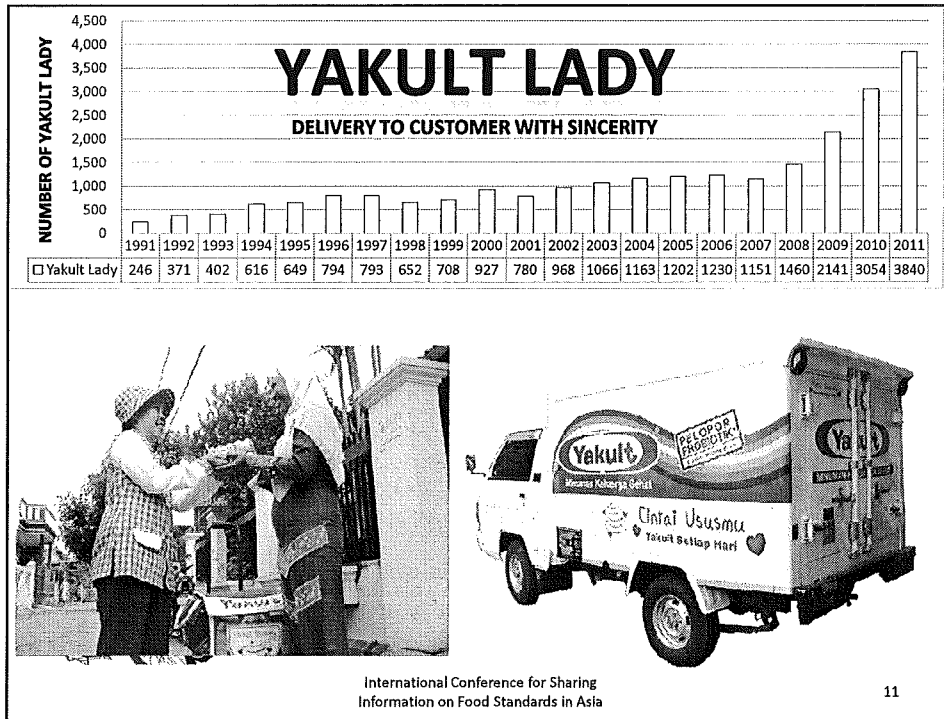
Yakult is working to promote a water treatment system that uses 65 ml *Yakult* containers with the bottoms removed as tools for culturing microorganisms that break down contaminants.

In this system, bottomless *Yakult* containers are randomly added to wastewater treatment tanks where various types of microorganisms take up residence on both the insides and outsides of the *Yakult* containers.

These microorganisms thoroughly break down and digest the organic substances that contribute to water pollution, achieving very high levels of treatment with industrial and residential wastewater. Compared to traditional activated sludge treatment methods, this system produces significantly better treatment results, and, with both the national and local governments adopting it, *Yakult* is helping to improve water quality.

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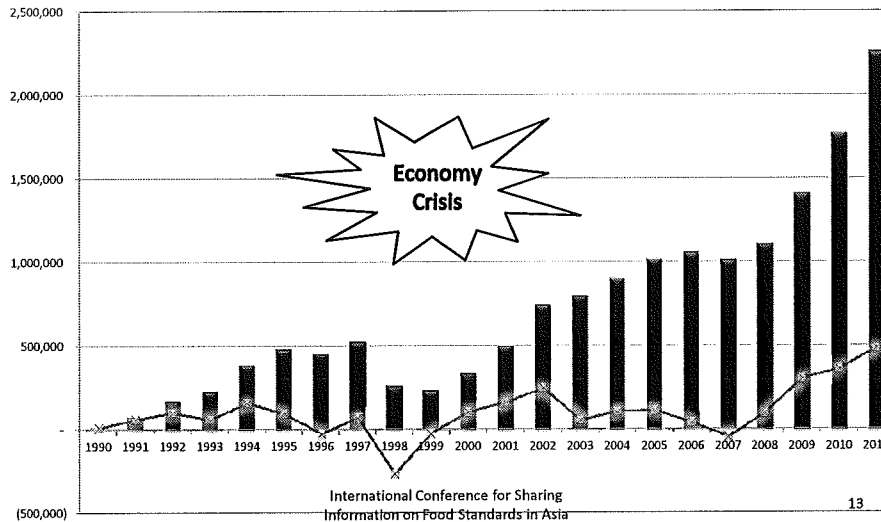
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PT YAKULT INDONESIA PERSADA

1997 July up to end of 2000 economy crisis

Yearly Yakult Indonesia Daily Average



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13

PT YAKULT INDONESIA PERSADA

1997 July up to end of 2000

Economy Crisis

MAINTAIN ORGANIZATION

NO FIRING EMPLOYEE

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14

PT YAKULT INDONESIA PERSADA

**2001 The Company status change to fully
Japan investment company**

COMMUNICATION, DISCUSSION, MEETING

Using Bahasa

Hokoku = Information

Renraku = Reporting

Soudan = Discussion

SUCCESS STORY

CONSUMER ACCEPTANCE

Product Quality

Company Services

Employee's Attitude

Total Quality of Services

SUCCESS STORY

LOYALITIES

Longterm Company Operation

Good Governance

Follow the Regulation

Continuous Operation

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17

ANTONIUS NABABAN

- AUGUST 1992 JUNIOR SUPERVISOR YAKULT LADY SYSTEM**
- DECEMBER 1993 SENIOR SUPERVISOR YAKULT LADY SYSTEM**
- MAY 1995 SENIOR SUPERVISOR DIRECT SALES SYSTEM**
- JANUARY 1996 ASSISTANT MANAGER DIRECT SALES SYSTEM**
- APRIL 1998 SALES MANAGER**
- OCTOBER 2001 MARKETING GENERAL MANAGER**
- MAY 2009 DEPUTY DIRECTOR MARKETING COMMUNICATION AND COMMERCIAL**
- JUNE 2011 DIRECTOR MARKETING COMMUNICATION AND COMMERCIAL**

International Conference for Sharing
Information on Food Standards in Asia

18

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