4 October 2011

Chr. Hansen

First Capital Markets Day

Natural red

CHR HANSEN

Improving food & health

AGENDA

Time	Topic	Speaker
10:00 - 10:30	*Welcome* - Chr. Hansen Business Direction	Lars Frederiksen, CEO
10:30 – 11:30	*Cultures* - What are cultures and enzymes - Emerging markets	Knud Vindfeldt, EVP CED Sten Estrup, Com. Development
11:30 – 11:45	*Break*	
11:45 - 12.30	*Cultures continued* - Innovation - Clinical studies incl. EFSA update	Esben Laulund, Innovation Birgit Michelsen, Scientific Marketing
12:30 - 13.15	*Lunch*	
13:15 - 14:00	*Natural Colors* - What are natural colors - Market potential/consumer trends	Carsten Bennike, EVP NCD Peter Thorninger, Com. Development
14:00 – 14:15	*Break*	
14:15 - 15:10	*Natural Colors continued* - Application technology - Sustainable sourcing - Sales approach	Kim Binderup, Product Development Peter Thorninger
15:10 – 15:15	*Wrap up*	Lars Frederiksen
15:30 - 16:30	*Tour of facility*	

CHR. HANSEN

Our vision remains:
Improving food & health

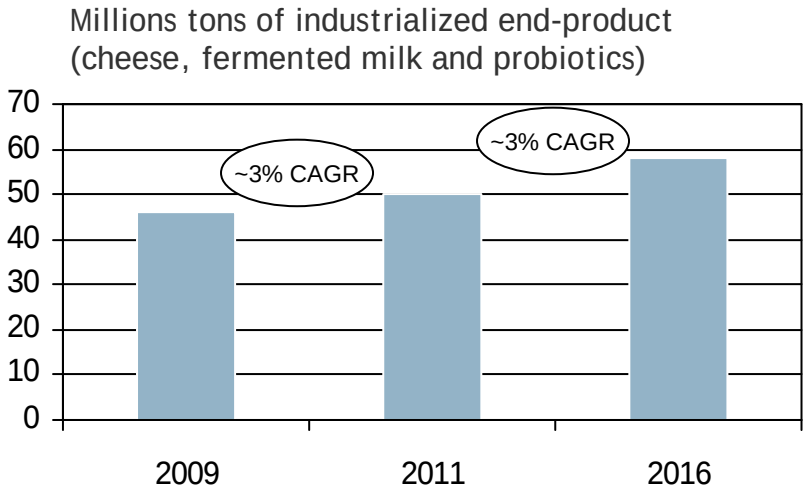
- We want to innovate, produce and supply solutions that increase the success of our customers in selected food and health industries
- We strive to understand and document the health benefits of probiotics
- We see the opportunity of, over time, transforming Chr. Hansen into a life science company
- We build on our core competences to develop novel applications which support our vision

innovation in progress

Three global mega trends supporting growth

- Growth in the industrial food production
- Increased focus on health and wellness
- Increasing consumer demand in emerging markets

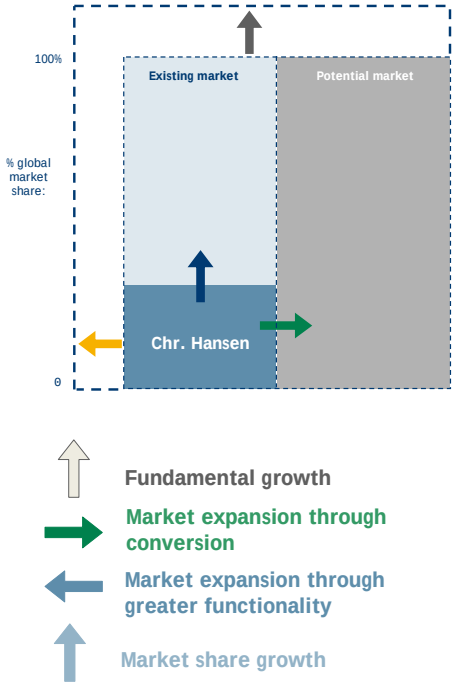
Size and expected growth in markets relevant for dairy cultures



Source: Chr. Hansen market intelligence survey

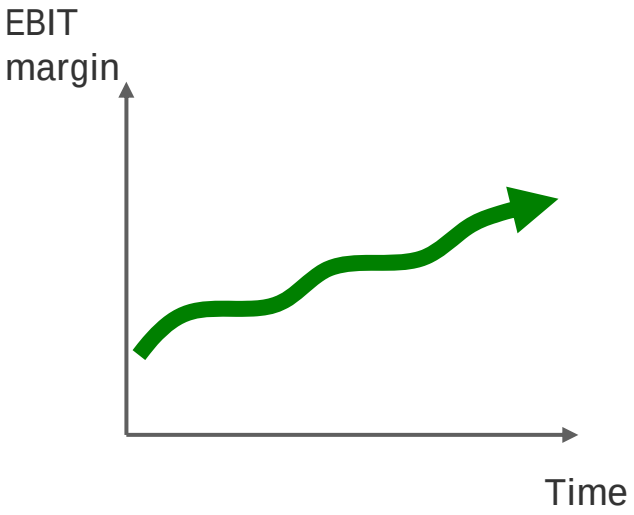
Our business model is intact

Growth

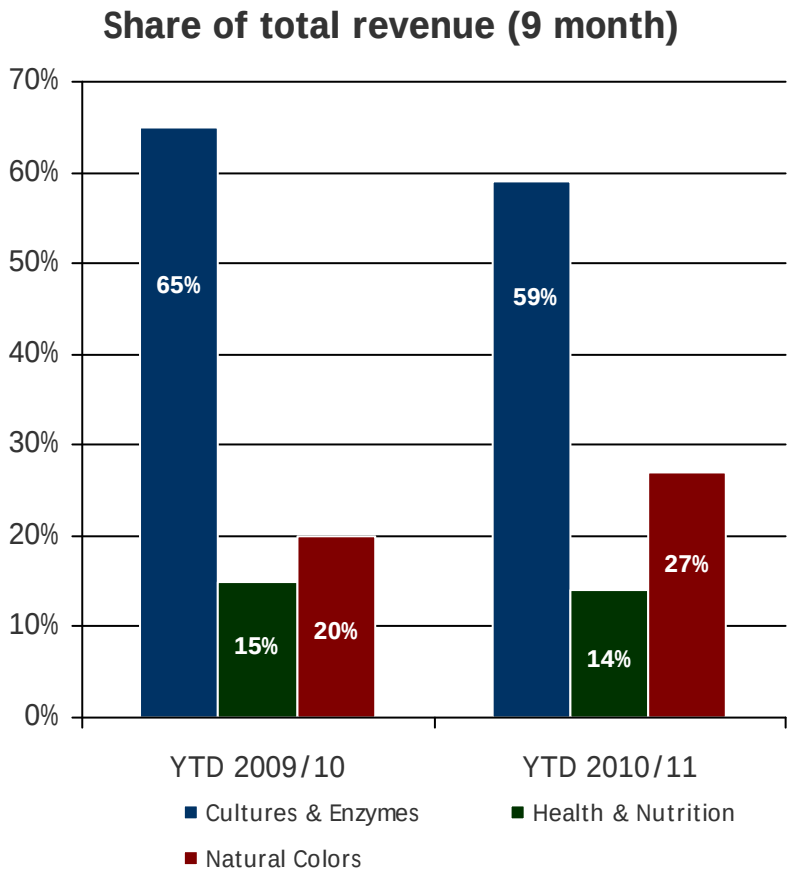


Entry barriers

Scalability



Despite change to business mix



Cultures & Enzymes

- Good growth in regular cultures for cheese and yoghurt while probiotic cultures negatively effected by EFSA uncertainty

Health & Nutrition

- Continued double digit growth

Natural Colors

- Exceptional growth in natural colors driven by accelerated conversion and inflated sales prices due to increased raw material prices

Cultures & Enzymes Division

- Cement market leadership

Goals...

- Strengthen our market leader position in dairy cultures and enzymes
- Develop sustainable and leading position in businesses beyond dairy

... embedded in four strategic objectives

1. **Improve our ability to document value creation at customers**
2. **Continuous innovation through fast and close customer understanding and interaction**
3. **Efficient planning and production with yield improvements**
4. **New business based on our technology and knowledge platform**

CHR. HANSEN

Health & Nutrition Division

Human health

Goals…

- Strengthen market leadership in probiotics for Dietary Supplements
- Penetrate the Infant Formula segment
- Expand probiotics business in the OTC segment

…embedded in four strategic objectives

1. **Grow the existing dietary supplements business**
   - Obtain documentation and 13.5 EFSA claims on key products
2. **Make probiotics a "must have" for Infant Formula**
   - Build stronger relationships with global and strong local producers of instant formula
3. **Leverage probiotics knowledge into the over-the-counter segment**
4. **Expand our presence globally**
   - Asia and South America

Health & Nutrition Division

Animal health

Goals...

- Gain market share leadership in key segments
- Expand the business with new innovations and new markets

... embedded in four strategic objectives

1. **Grow the business within key segments:**
   - Cattle, poultry and swine
2. **Focus on documentation of product performance**
   - Document product claims, economic benefit and positioning with solid data
3. **Expand the business into new markets**
   - E.g. penetrate Asia through partnerships
4. **Develop biotech innovations for the agricultural industry**
   - E.g. commercialize bacillus-based product for plant health in collaboration with FMC Corporation

CHR. HANSEN

Natural Colors Division

- Seize the moment

Goals...

- Expand the use of natural colors through conversion
- Broaden the portfolio through innovation
- Superior application knowledge matching the needs of multinationals

... embedded in four strategic objectives

1. **Capture the conversion potential in our focus industries: Beverages, Confectionery, Ice-cream and Prepared foods**
2. **Maintain market leadership within mature industries: Dairy and Fruit Prep**
3. **Understand our customer's innovation needs and ensure that paradigm shifts originate from Chr. Hansen**
4. **Strengthen set-up and structure of sourcing and product supply**

CHR. HANSEN

Our long term ambitions maintained

Long term ambitions (3-5 years) based on unchanged business mix (November 2010)

Avg. Org. Growth	EBIT margin b.s.i.	NWC (% of revenue)	Cap. Exp.* (% of revenue)	R/D Exp.* (% of revenue)	Tax rate (On operating profit)	Net debt/ EBITDA
8-10%	Gradual increase	14-17%	6.5-7.5%	~6%		2-2.5

2010/11 (July 2011)

Org. Growth	EBIT margin b.s.i.	NWC (% of revenue)	Cap. Exp.* (% of revenue)	R/D Exp.* (% of revenue)	Tax rate	Net debt/ EBITDA
14-15%	At or above 25%	In line with long term target (14-17%)	(6.5-7.5%)	(~6%)	~26%	~2.0

* Includes capitalized development costs

CHR. HANSEN

Klaus Pedersen
CFO Chr. Hansen

DSB

- Acting CEO (March 2011 – Sept 2011)
- CFO (Nov 2010 – March 2011)

TDC

- CEO/Senior Executive Vice President, Business Nordic (2005-2009)
- CEO TDC Shared Services (2004-2005)
- CFO, Sunrise (TDC Switzerland) (2001-2004)

Other

- Chairman of Faroese Telecom (May 2010 -) (Member since May 2009)
- Education: M.Sc. in Business Economics from Aarhus School of Business (1992)

Cultures

Natural red

CHR HANSEN

Improving food & health

Speakers

Knud Vindfeldt

- EVP head of CED and member of executive management
- Joined Chr. Hansen in 1991
- Previously at Tholstrup Cheese and Arla Foods

Esben Laulund

- SVP Innovation, CED
- Joined Chr Hansen in 1986
- Previously at Danish Dairy Board

Sten Estrup

- SVP Commercial Development, CED
- Joined Chr. Hansen in 2002
- Previously at Arla Foods

Birgit Michelsen

- Director, Scientific Marketing
- Joined Chr. Hansen in 2006
- Previously at Ferrosan, BASF and Danisco

Agenda

Cultures

- What are cultures and enzymes
- Emerging markets
- Innovation
- Clinical studies

CHR. HANSEN


Site Avedoere

What are cultures and enzymes?

What they are:

- Natural live bacteria - mainly lactic acid bacteria

What they do:

- Vital to the manufacturing of cheese and yogurt
- Provide features such as texture and flavor

How they are made:

- Produced by fermentation and supplied in concentrated ready-to-use forms (frozen or freeze dried)

CHR. HANSEN

Cultures are used in the dairy, meat and wine industries

Product area	Technology	Description / featured benefits
Cheese 	Cultures	Acidification of milk assisting coagulation Development of cheese flavor and texture Improved yield, process speed and consistency
Fermented milk (e.g. yogurt) 	Cultures Probiotics	Acidification of milk needed for milk clotting Development of flavor and texture Gut health maintenance (Probiotics)
Meat 	Cultures	Acidification of fermented meat Accelerated meat ripening speed Increased product consistency Improved product preservation, texture and flavor
Wine 	Cultures	Improved process speed and consistency Improved taste

CHR. HANSEN

How do we produce cultures

Raw materials

Media

UHT process

Culture bank Hoersholm

PIM*

DIM**

”Sterile”CIP/SIP***

Fermentation

By-product

Concentration

Clean rooms

Pelletizing

Packaging

Freeze-drying

Packaging

Freeze Dried

Frozen

* PIM: Pre Inoculation Material

**DIM: Direct Inoculation Material

***CIP: Clean In Place
***SIP: Sterilization In Place

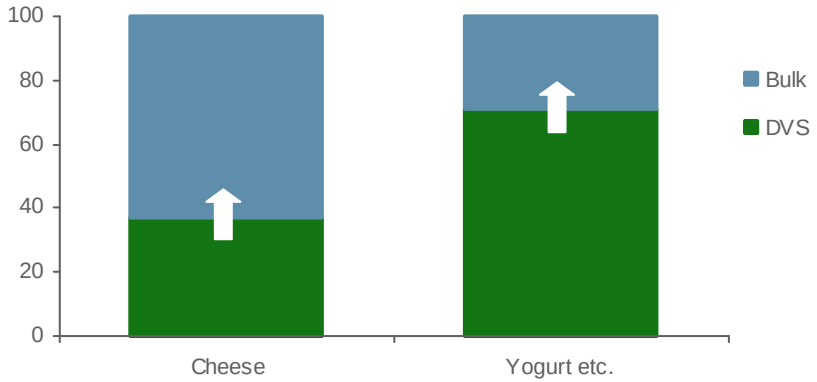
CHR. HANSEN

Different growth drivers

Fundamental growth

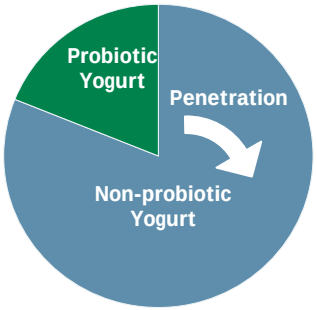
- GDP growth
- Increased demand for healthy food
- Increase in middle income groups in emerging markets

Conversion



Greater functionality

Probiotics penetration (volume)



Agenda

Cultures

- What are cultures and enzymes
- Emerging markets
- Innovation
- Clinical studies

CHR. HANSEN

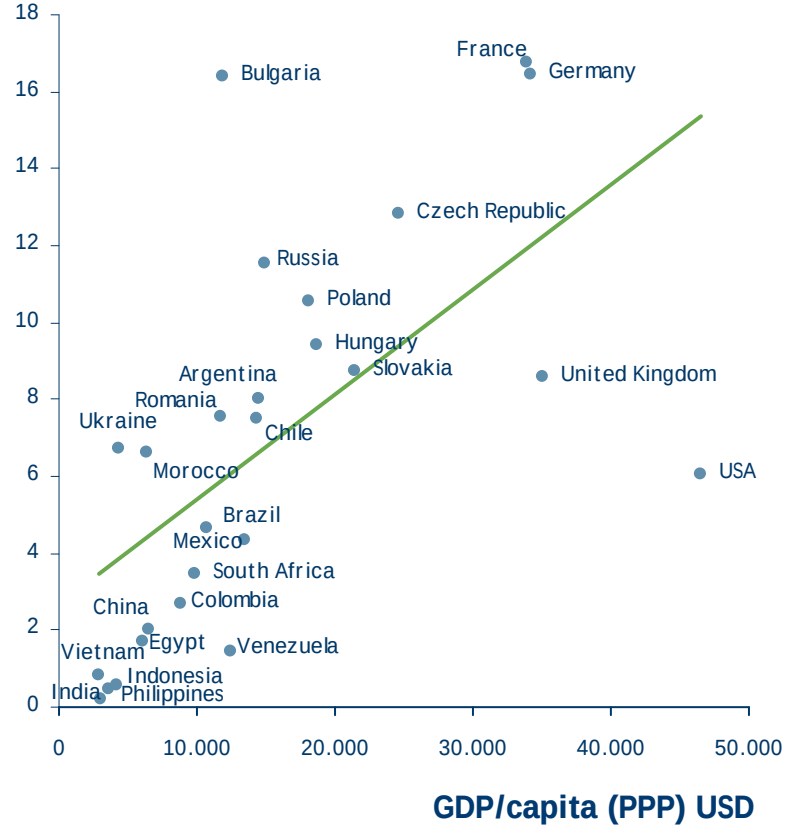
Emerging dairy markets
– Impact for Chr. Hansen

- Driving growth in global milk production, Asia at 4.4%, higher in India and China
- Major part of 766 millions world population growth by 2020
- Middle class grow by 70 millions per year to become 800 millions people by 2020
- Diet change from grain to “high value” meat and dairy
- Massive urbanization drive GDP growth, shift from home cooking to convenience and packaged foods – and enabler for distribution of dairy products
- Customer consolidation and geographic expansion enable use of modern culture and enzyme technologies
- Customers addressing bottom of pyramid with basic and affordable dairy nutrition

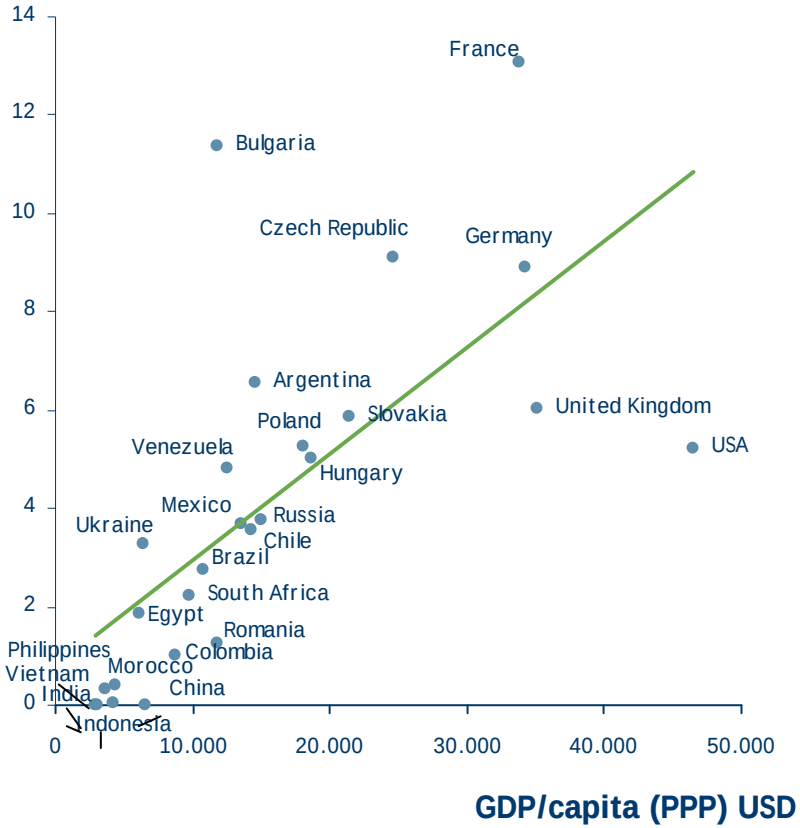
Economic development is driving yogurt and cheese consumption

Room for growth in emerging economies

Packaged yogurt market (kg/capita)[1]



Packaged cheese market (kg/capita)[1]



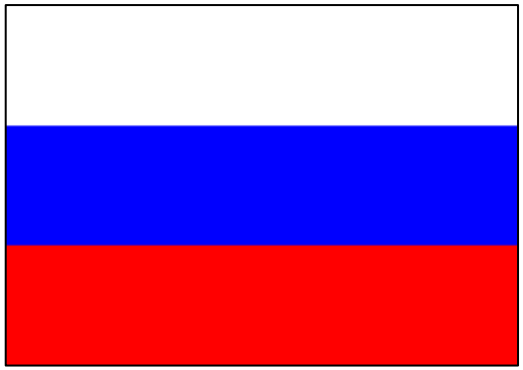
Note 1: Consumption figures include sour milk (e.g. butter milk)
Sources: Euromonitor 2009 (yogurt and cheese consumption, respectively and population)

CHR HANSEN

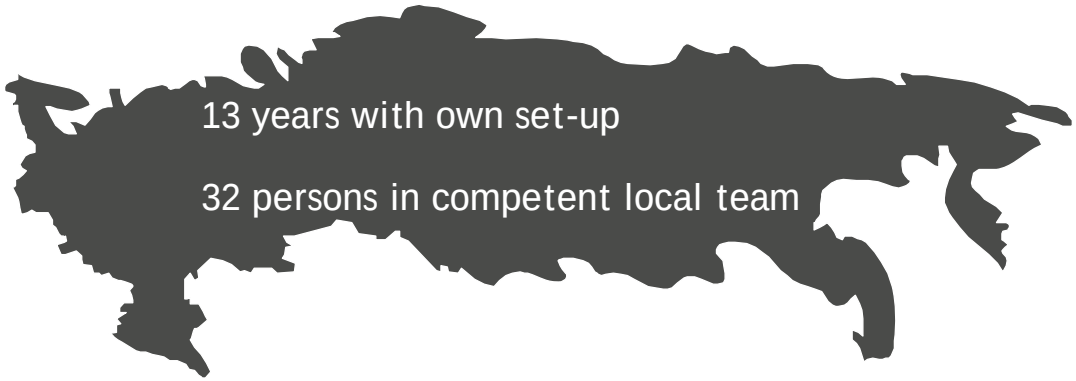
Brazil
From early entry to next level

- Robust quality solution to meet higher demand for Mozzarella
- Offsetting high cost of capital making good Grana cheese faster
- Using bioscience to tap into large non-industrial cheese market

Russia
From early entry to next level



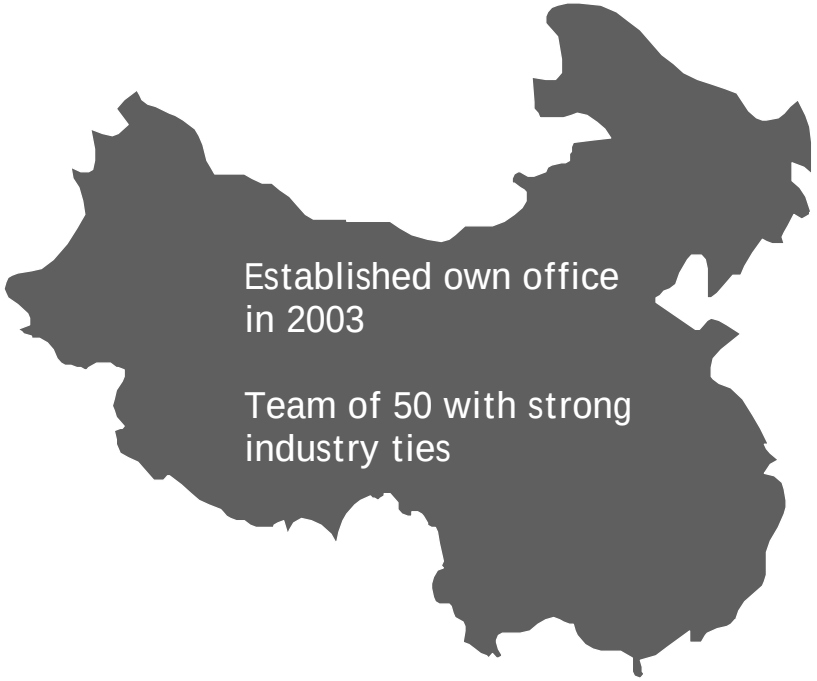
- 50 small-mid sized dairies being acquired by 2 major dairies last 5-10 years
- Danone-Unimilk merger in 2011
- PepsiCo acquire Wimm-Bill-Dann in 2011
- Extending shelf life from 1 to 3 weeks enable consolidation of production and distribution
- Customer loyalty from intensive process and quality training of local customer staff

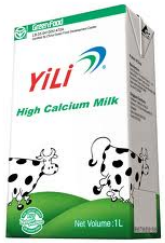


China

Early investments paying off

- Mengiu & Yili, from local Mongolian based players to global top 20 dairy in 10 years
- Consolidation by key players expanded from milk land to big cities
- Yogurt consumption still around 2kg/capita, but 5 kg/”middle class” capita
- Estimating a “middle class” of 250 millions in China



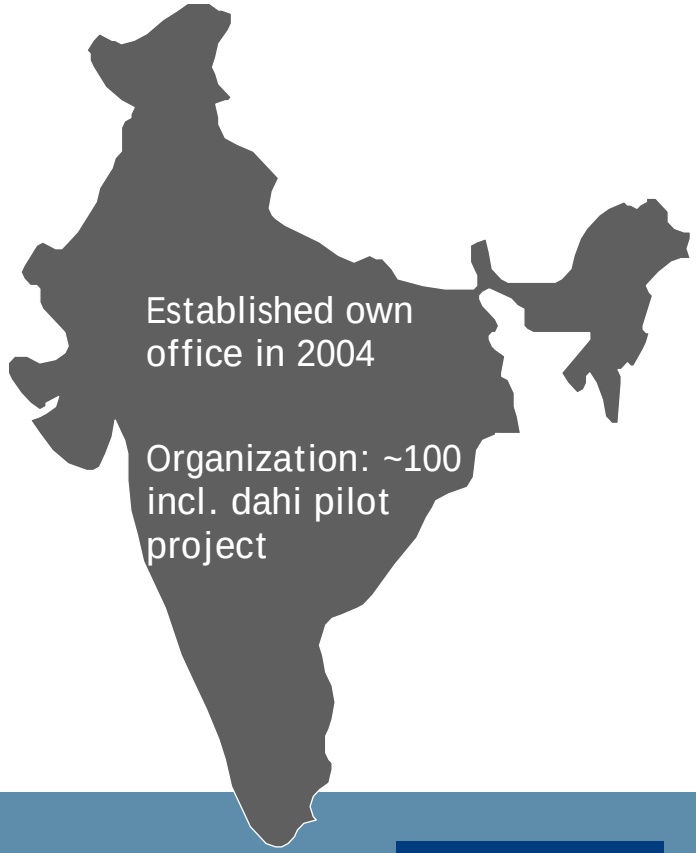


CHR HANSEN

India

Readiness is key for market in transition

- India is only 1-2 kg/capita of packaged yoghurt
- Largest milk producer in the world(+10 million tons/year), only 7% into fermented milk
- Assisting customers driving industrialization and converting milk into value-added yogurt products
- 1 billion people in bottom of the pyramid, demand for basic and affordable dairy nutrition, enable packed food for aspiring middle class



CHR. HANSEN

India

Fermented milk market is 7 million tons/year ~25% global volume[1]

Organized Sector (6%)	Informal Sector (22%)	Household Sector (72%)
Make at least 500 kg per day	Make 20–50 kg per day	Make 0.5-1 kg per day
Sold branded in pouches or cups	Sweetmeat shops, caterers, restaurants over the counter	Prepared and consumed at home
Infrastructure in place for distribution to retailers	Culture: Previous day's dahi or dahi from organized sector	Culture: Previous day's dahi or dahi from organized sector
Culture: DVS solution		

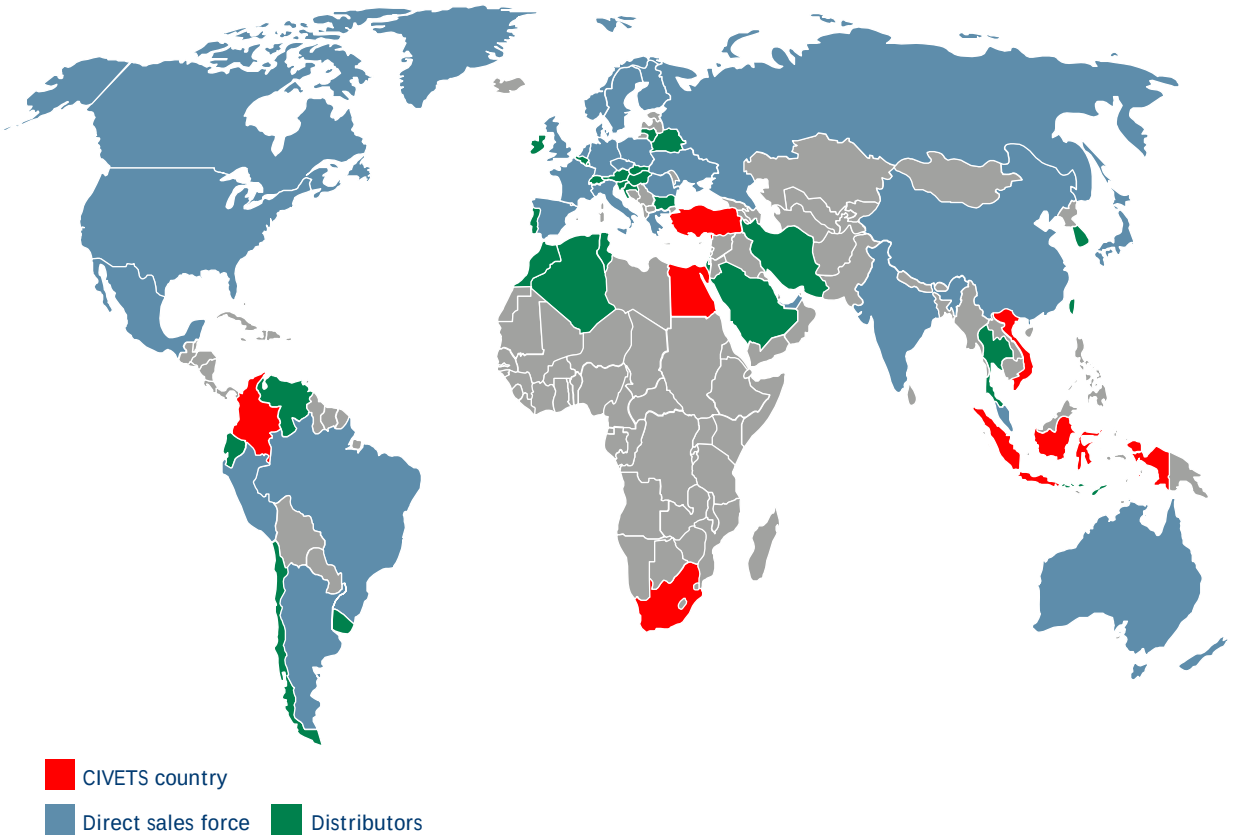
Note 1: Euromonitor 2009, organized, informal and household sector relative to global retail market
Source: Market characteristics based on Chr. Hansen estimates

CHR HANSEN

“CIVETS” opportunities for the future

We have invested in people and infrastructure, building customer intimacy

Local experts in more than 30 countries



CIVETS (population)

Colombia(47m)

Indonesia(243m)

Vietnam(88m)

Egypt(85m)

Turkey(73m)

South Africa(49m)

CHR. HANSEN

B R E A K

Agenda

Cultures

- What are cultures and enzymes
- Emerging markets

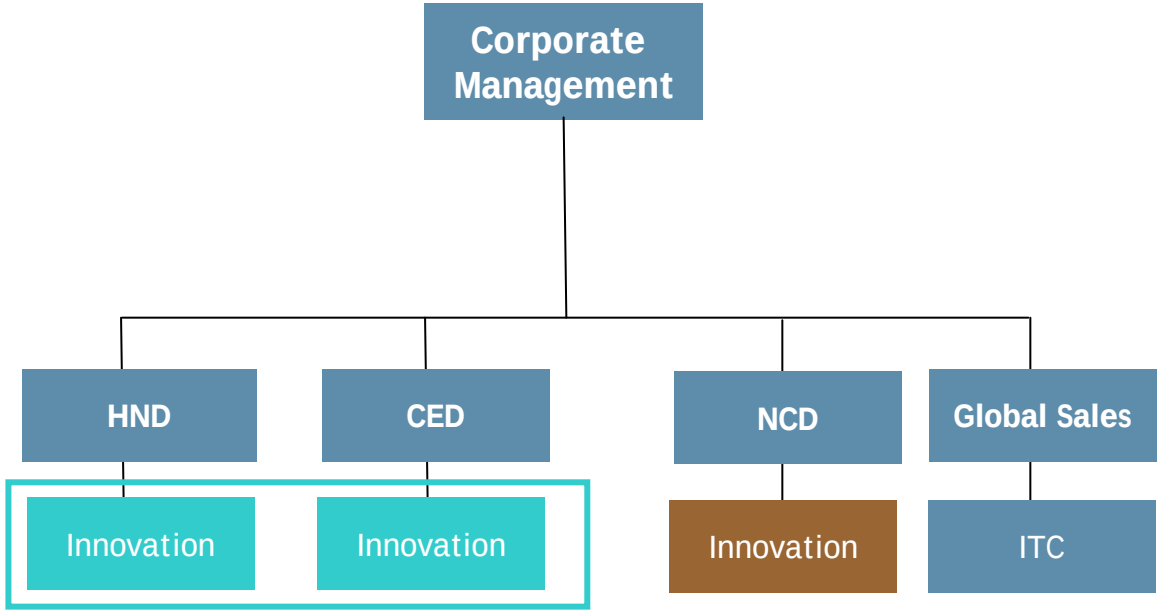
Innovation

- Clinical studies

R&D organization in Chr. Hansen

Objective

- Ensure new product and process development
- Business support
- Develop right competences
- Prepare future pipeline



40 employees

185 employees

~ 25% Ph.D,
~ 25% Scientists,
~ 50 % Technicians etc.

40 employees

70 employees

*Global Sales ITC & Technical application

Chr. Hansen culture competences

Platform based on deep technological knowledge and market understanding…

- Strains, Metrics, Process, Product and application,
- Probiotic screening
- Library of over 10,000 microorganisms
- Documentation

…Strong basis for innovation…

- New applications, concepts **(products)**
- Stable processes, Better yields, Lower unit costs **(processes)**

…in close cooperation with customers

- 19 application centers around the world
- Focused customer service
- Local adaptation,
- Trouble shooting

Collaboration with universities, research institutes and customers

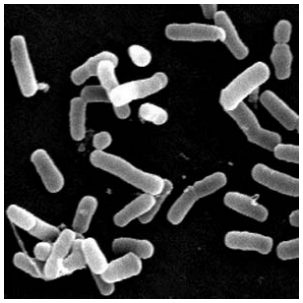
CHR. HANSEN

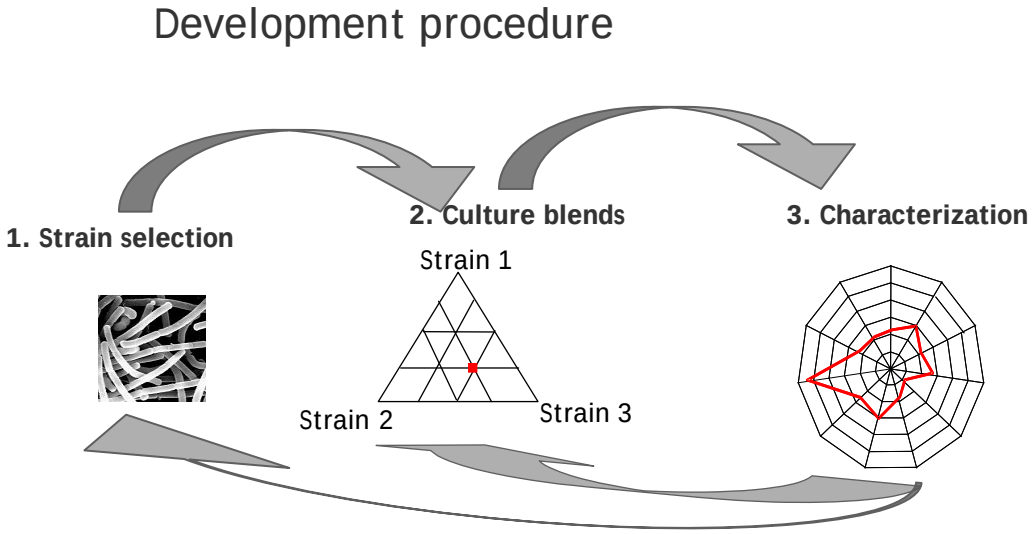
Four platforms enable innovation value creation

Platform	New product development	Productivity improvement	Business support	Research competences
1 **Product and technology**	Develop cultures and enzymes	Set product specifications	Technical sales service	Flavor, Texture Compounding, Coagulants
2 **Process**	Develop processes for new cultures & enzymes	Increase yield and stability	Production trouble shooting	Bio-processing, Fermentation
3 **Strain knowledge**	Screen, select and improve culture performance	Medium design	Scientific information	Microbial Physiology, Strain development Bacteriophages
4 **Metrics**	Identify and set specification for new cultures and enzymes	Identify and set specification for production parameters	Product analysis and performance evaluation	Product performance Microbial taxonomy

CHR. HANSEN

Bringing ideas to life

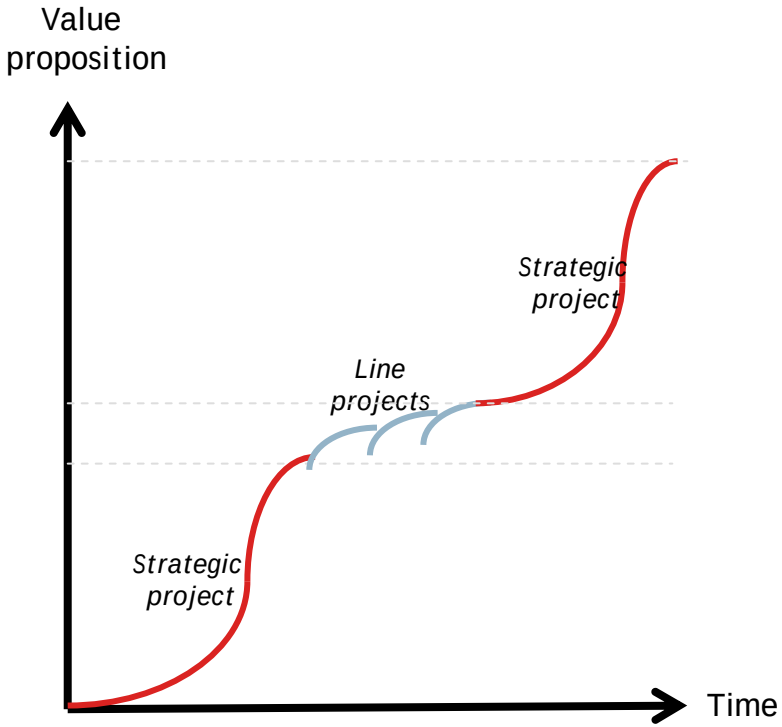




CHR. HANSEN

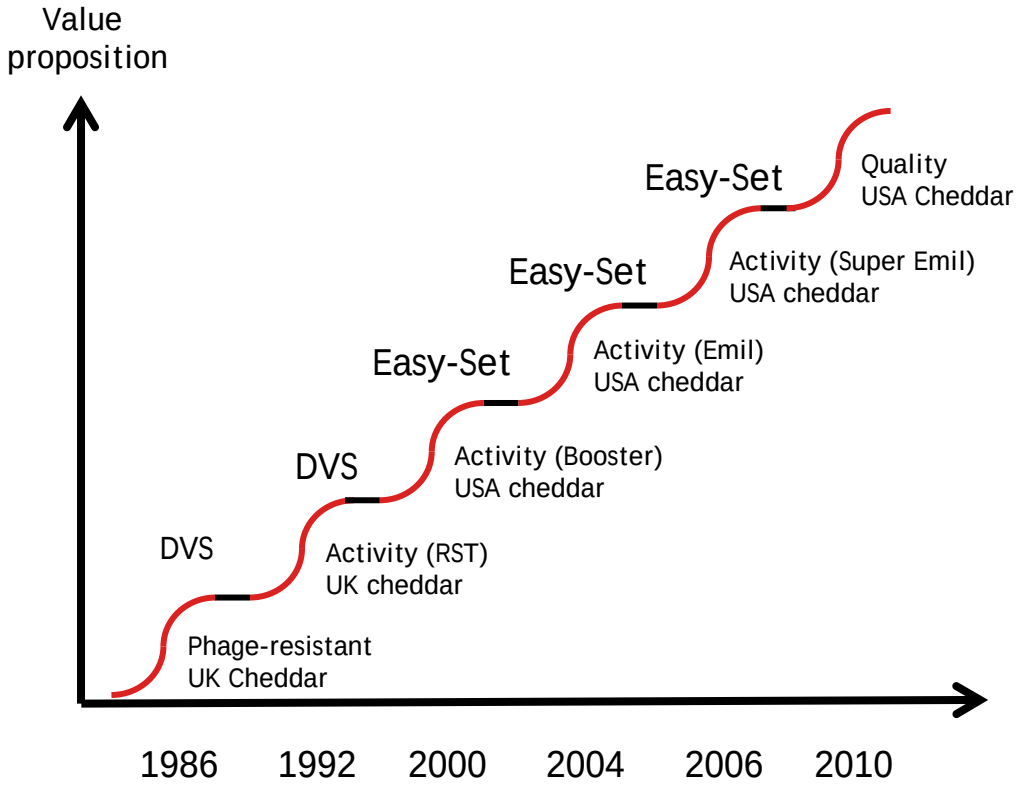
Strategic projects create potential

Major leap in product performance realized in strategic projects



Customer projects build on it

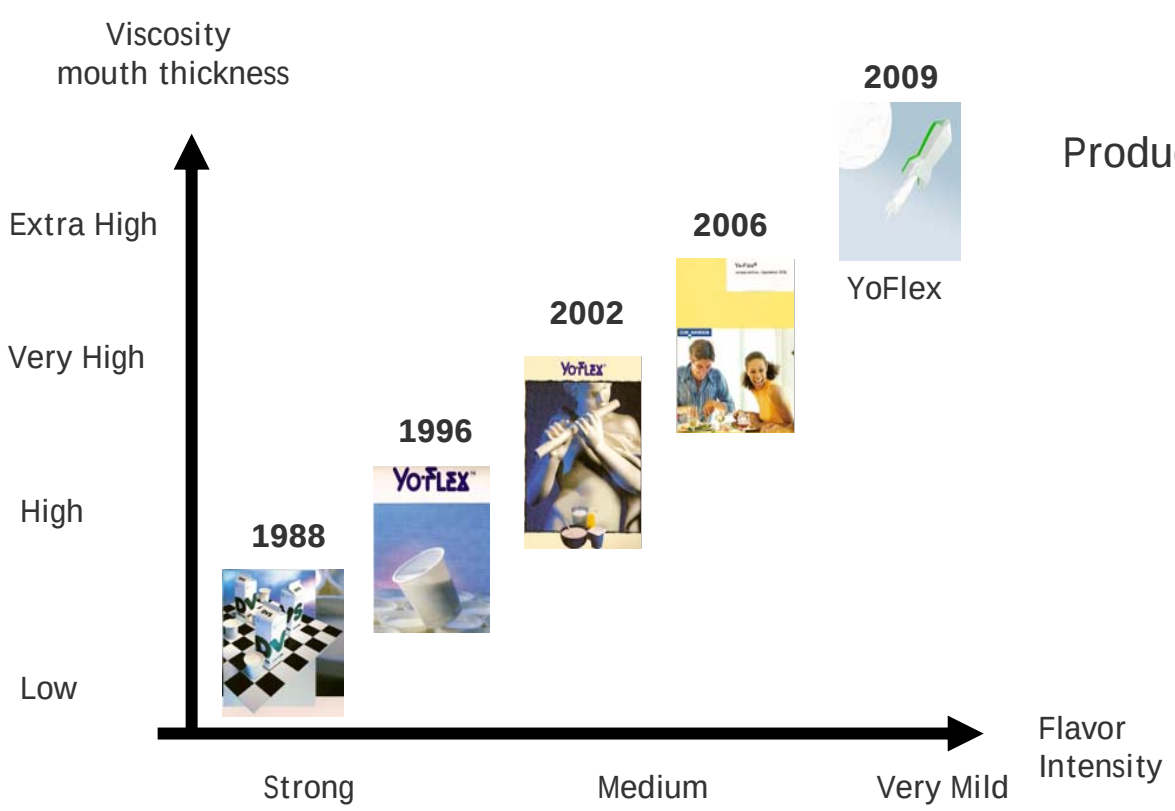
How Chr.Hansen captured the US cheddar culture market (process)



Yo-Flex – a strategic project
(product)

2010/11

YoFLY
Drinkable yogurts



Product Differentiation

Low fat

Global platform with local reach

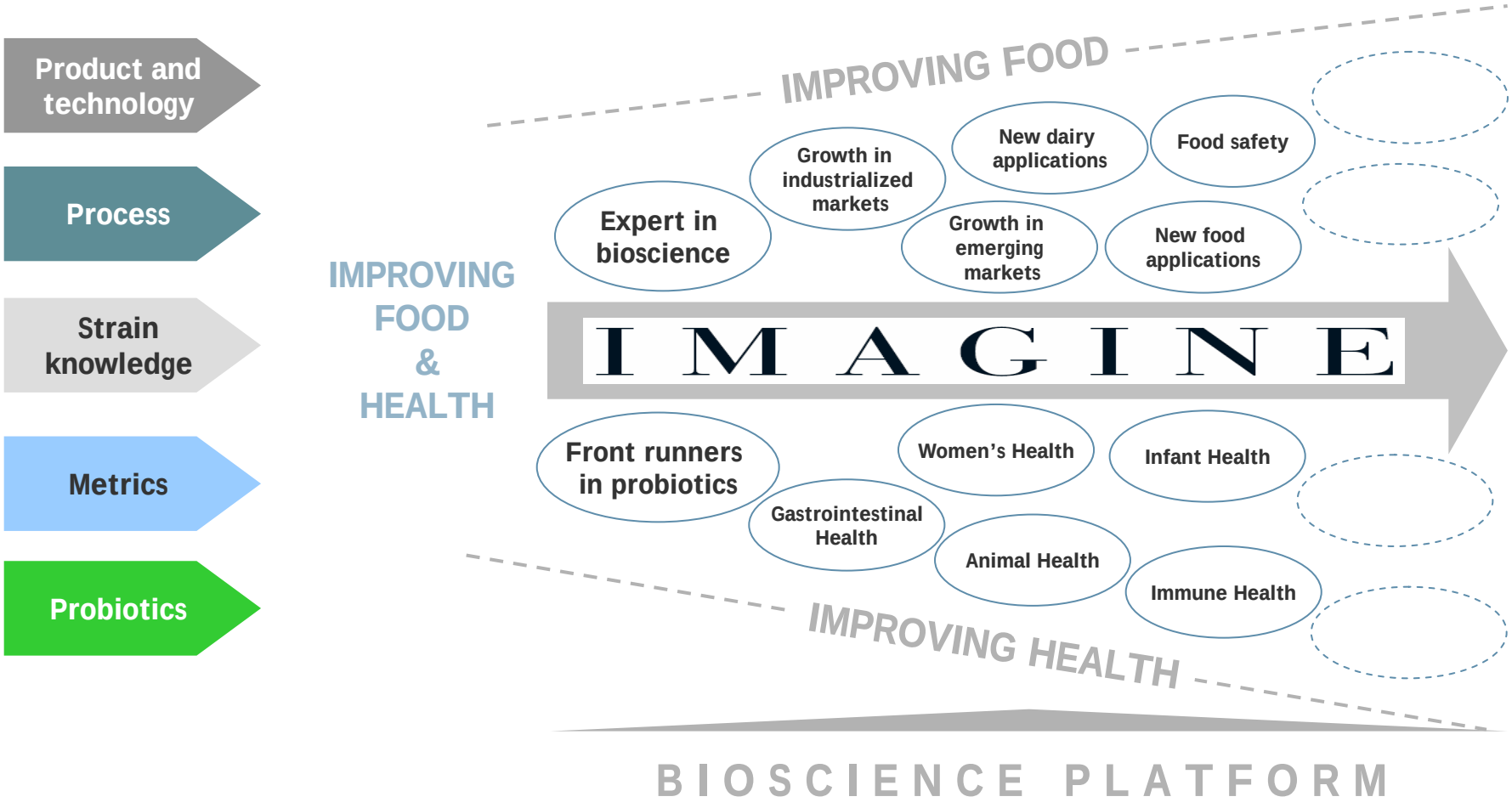
Close customer interaction

▲ Application centers

Application centers meeting local challenges

- Adapt products to customers production processes
- Adapt customers production processes to Chr. Hansen products
- Difference in milk quality
- Local preferences

A company of opportunities



CHR. HANSEN

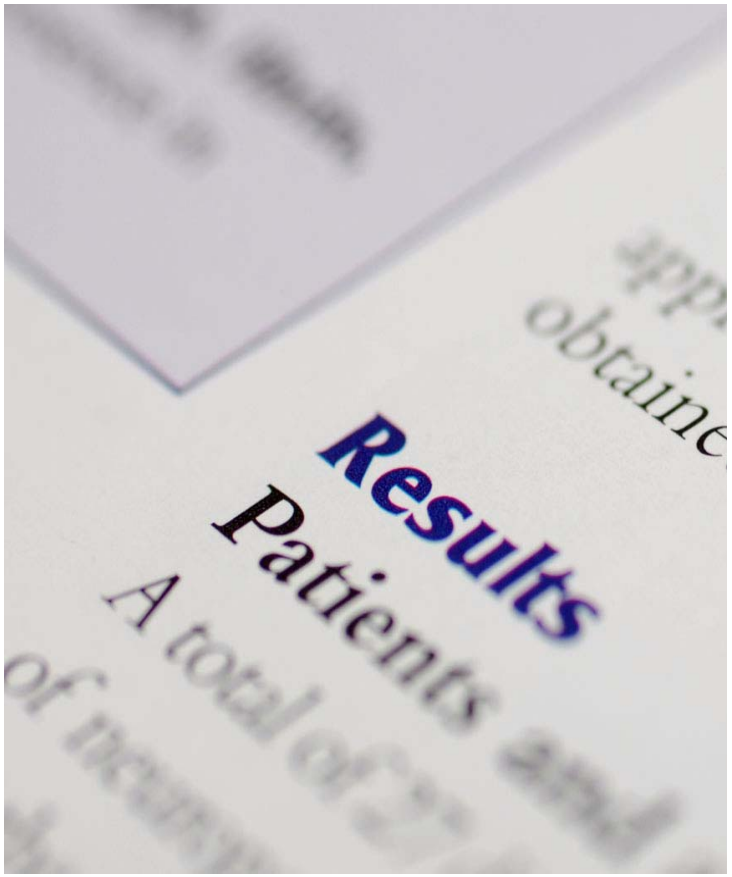
Agenda

Clinical Studies

- Drivers for clinical documentation
- Chr. Hansen's strategy
- Recent Results
- EFSA process update

Clinical documentation
Drivers

- Regulatory demands
- Consumers
- Documentation quality as point of differentiation



Clinical documentation –

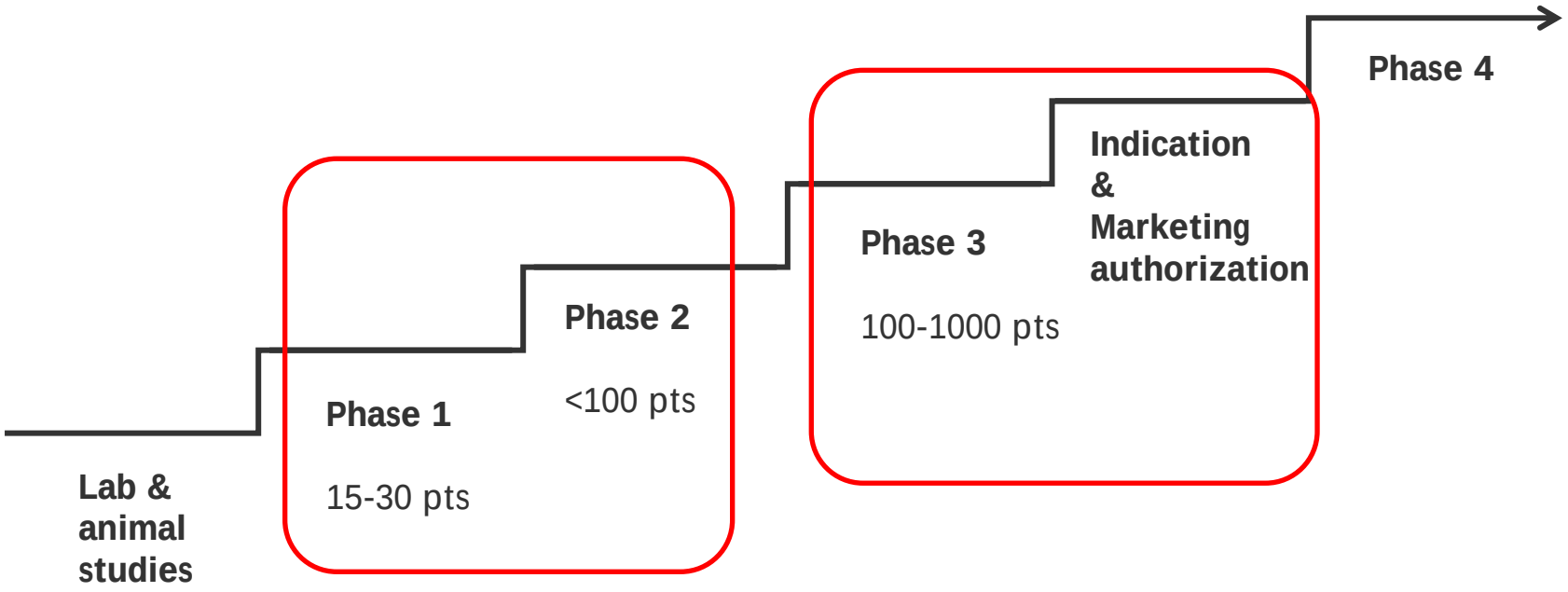
From proof of principle to confirmatory studies

Food supplements pre EFSA:

In market without claim approval

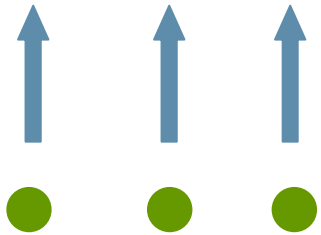
Food supplements now:

Claim approval needed



Documenting effects of probiotics is challenging

Medicinal product	**Probiotic**
Single target	Multiple targets
Large effect	Smaller effects
Patients	Healthy general population



Chr. Hansen Strategy
Indication areas

Immune Health

Gastrointestinal Health

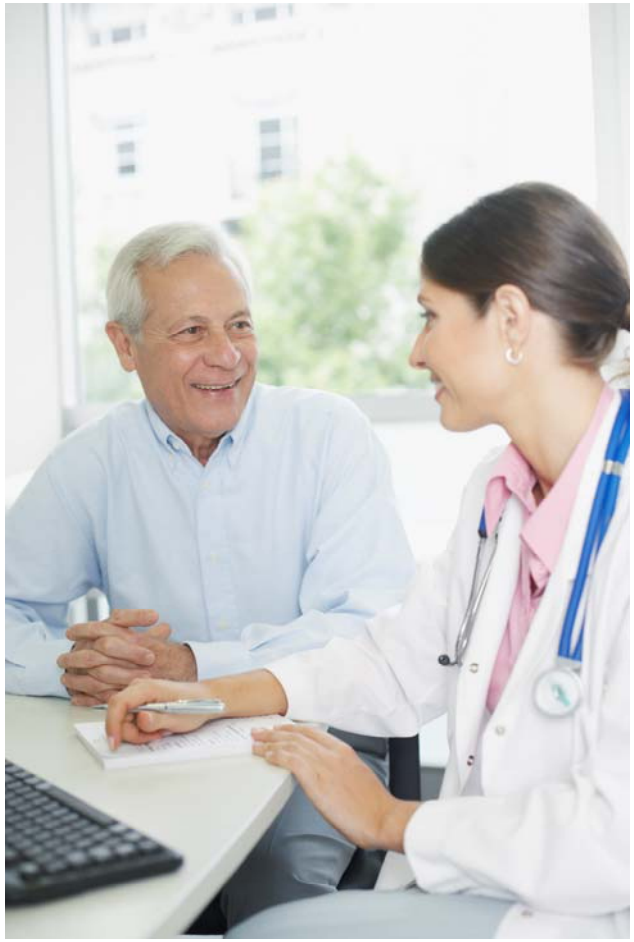
Women's Health

Infant Health

CHR. HANSEN

Our strategy:
Best documented probiotics in market

- Strategic focus area
- In house competencies in clinical research
- Clinical study program
  - Chr. Hansen sponsored studies
  - Academia based clinical research
- Collaboration with key customers



Chr. Hansen sponsored study

BB-12® and L. casei 431® within immune health

Study design

- Randomized, double-blind, placebo-controlled study in 220 healthy adults
- Daily supplementation with BB-12®, L. casei 431® or corresponding placebo
- Influenza vaccine given to trigger response of the immune system
- Immune response (antibodies) to vaccine assessed
- Vaccine study recommended by experts as best model available to study the immune system

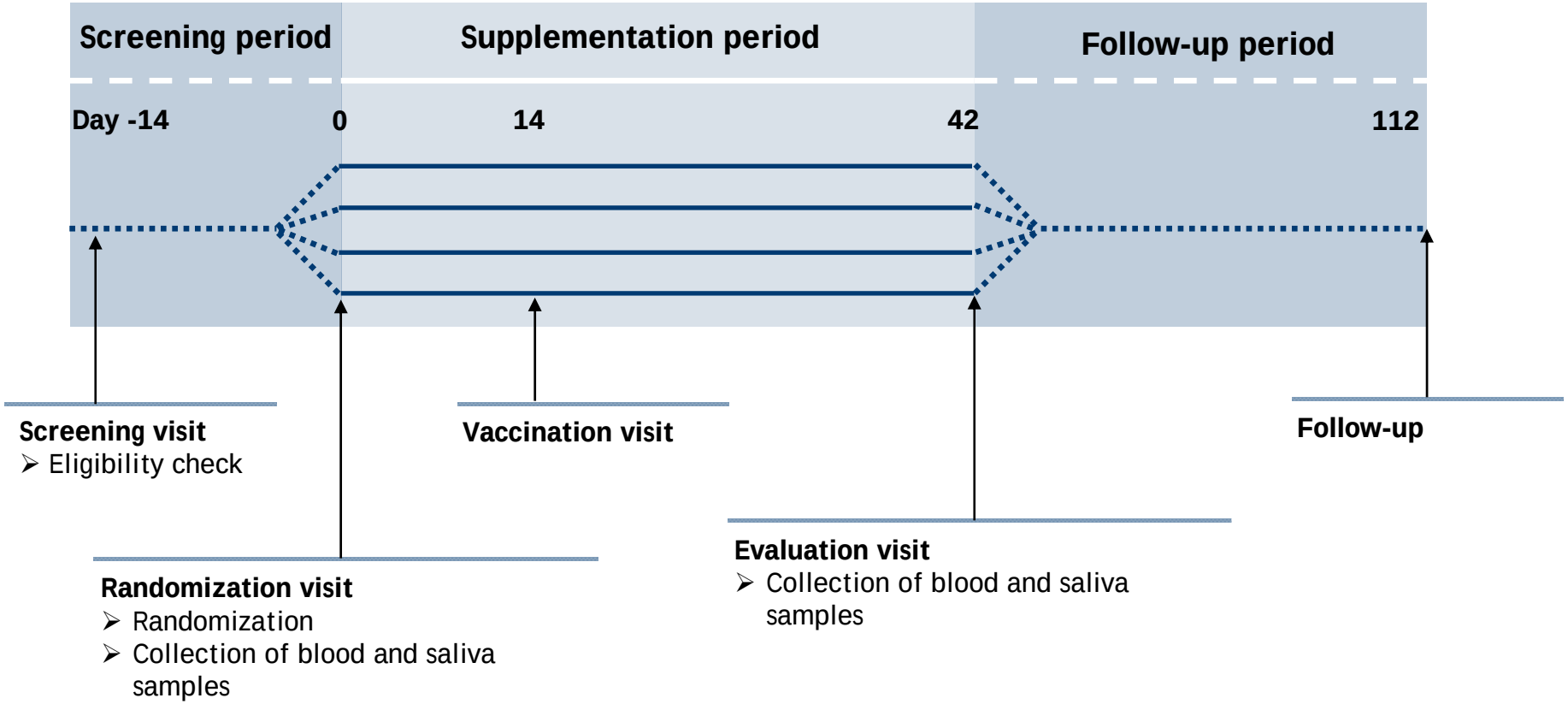
L. casei 431® milk drink

BB-12® capsule

Chr. Hansen sponsored study

BB-12® and L. casei 431® within immune health

Study Flow Chart

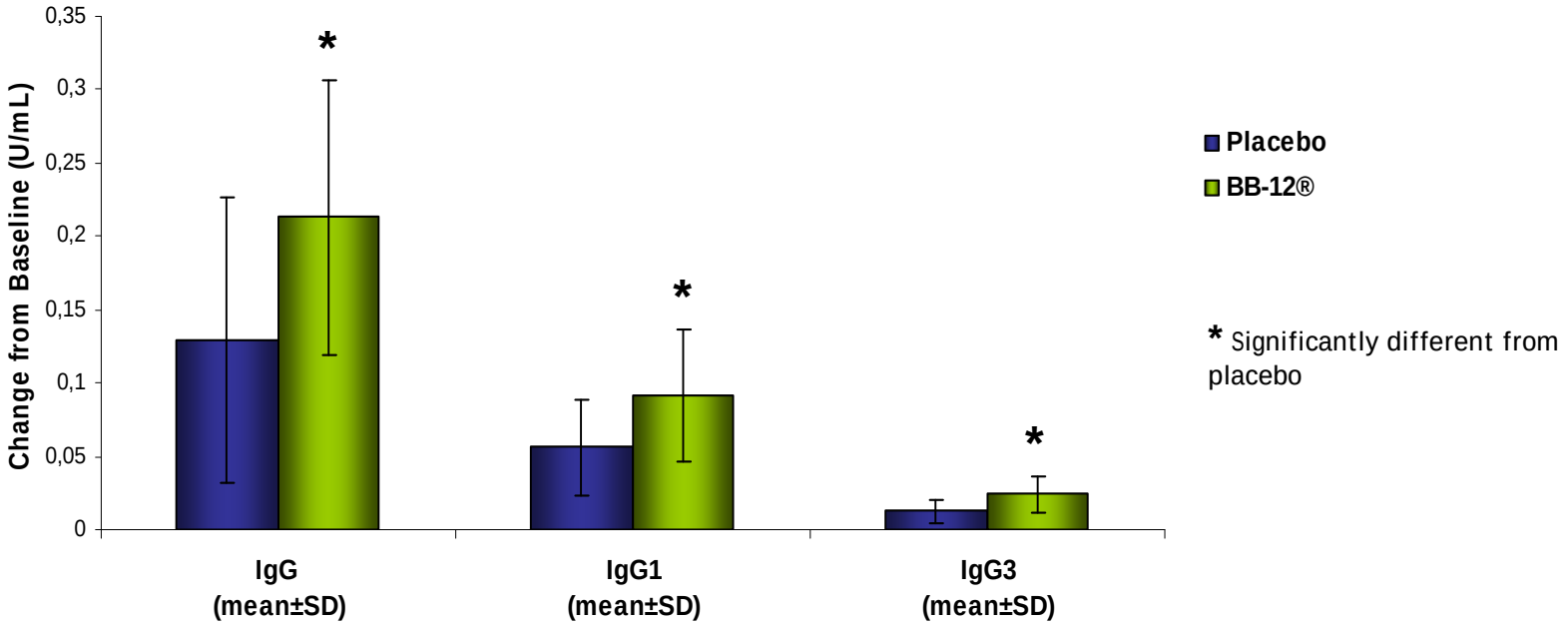


Chr. Hansen sponsored study

BB-12® and L. casei 431® within immune health

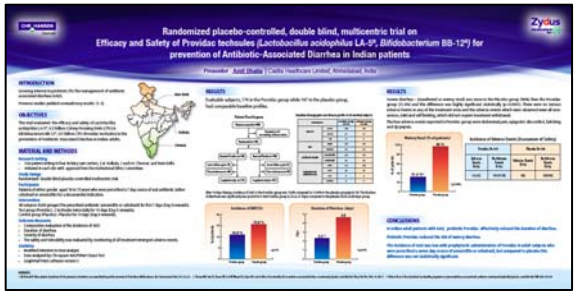
Results:

Greater increase in specific antibody response after vaccination in BB-12® group vs. placebo



Customer collaboration project

LA-5® and BB-12® in the prevention of Antibiotic Associated Diarrhea in Indian adults



Study Design

- Randomized, double-blind, placebo-controlled
- 343 adults under antibiotic treatment
- 4 billion CFU/day in capsules
- 2 weeks duration. First week with concurrent antibiotic treatment

Endpoints:

- Incidence, duration and severity of diarrhea

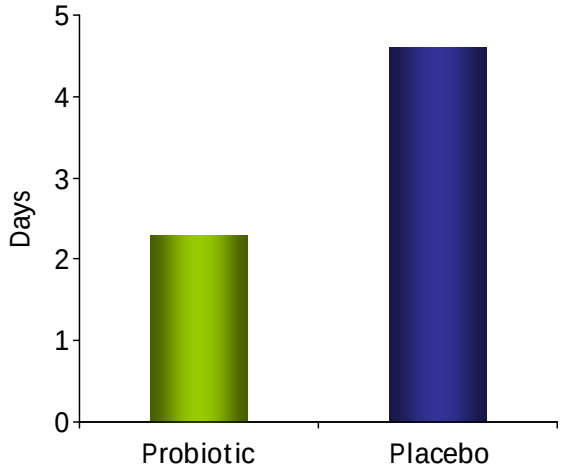
Results

- Significantly reduced duration of diarrhea in probiotic group compared to placebo (figure)
- Significant reduction in severity of diarrhea (manifested as watery stool) in the probiotic group (31.6% vs. 96.0%)
- Non significant reduction of incidence of diarrhea in probiotic group (10.8% vs. 15.6 %)

Conclusion

- BB-12® and LA-5® reduced duration and severity of diarrhea

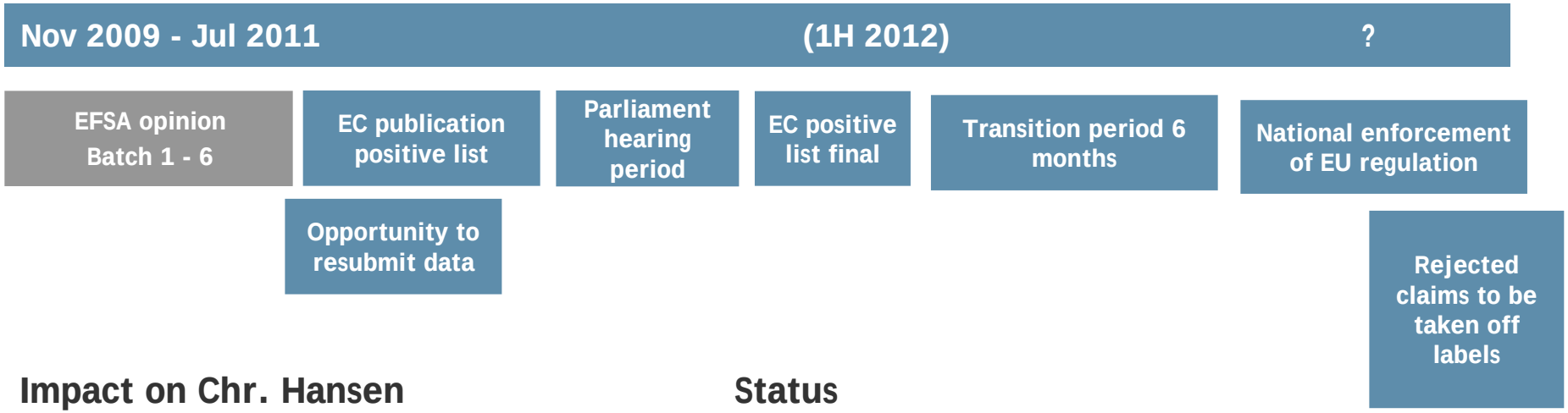
Duration of diarrhea



CHR. HANSEN

EFSA Status

Transition period for all Article 13.1 claims will extend at least into mid-2012



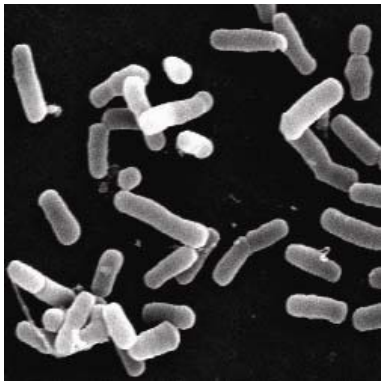
Impact on Chr. Hansen

- **Short term:** Negative effect from uncertainty
- **Long term:** Well positioned with documented strains and competencies to carry out necessary clinical studies

Status

- Positive results from Immune Study
- Three studies in the process
- Filing of 13.5 claims when sufficient data available and solid understanding of requirements

EFSA status



BB 12®

April 2011:

EFSA Guidance document on claims related to gastrointestinal and immune health

September 2011:

EFSA Scientific Opinion on Statistical Significance and Biological Relevance

--

Information gained from negative opinions under 13.5 published by EFSA

Chr. Hansen clinical studies aligned with current EFSA recommendations

CHR. HANSEN

L U N C H

AGENDA

Time	Topic	Speaker
10:00 - 10:30	*Welcome* - Chr. Hansen Business Direction	Lars Frederiksen, CEO
10:30 – 11:30	*Cultures* - What are cultures and enzymes - Emerging markets	Knud Vindfeldt, EVP CED Sten Estrup, Com. Development
11:30 – 11:45	*Break*	
11:45 - 12.30	*Cultures continued* - Innovation - Clinical studies incl. EFSA update	Esben Laulund, Innovation Birgit Michelsen, Scientific Marketing
12:30 - 13.15	*Lunch*	
13:15 - 14:00	*Natural Colors* - What are natural colors - Market potential/consumer trends	Carsten Bennike, EVP NCD Peter Thorninger, Com. Development
14:00 – 14:15	*Break*	
14:15 - 15:10	*Natural Colors continued* - Application technology - Sustainable sourcing - Sales approach	Kim Binderup, Product Development Peter Thorninger
15:10 – 15:15	*Wrap up*	Lars Frederiksen
15:30 - 16:30	*Tour of facility*	

CHR. HANSEN

Natural Color Opportunities

Presentation of Natural Colors Division

Natural red

CHR HANSEN

Improving food & health

Speakers

Carsten Bennike

- EVP head of Natural Colors Division and member of executive management
- Joined Chr. Hansen in 2011
- Previously at Hempel and Cadbury

Peter Thorninger

- VP Commercial Development Natural Colors Division
- Joined Chr. Hansen in 2009
- Previously at Boston Consulting Group

Kim Binderup

- VP Product development Natural Colors Division
- Joined Chr. Hansen in 2009
- Previously at Boston Consulting Group

Agenda

Natural Colors

- What are natural colors
- Market potential and consumer trends
- Application technology
- Sustainable sourcing
- Sales approach

CHR. HANSEN

Natural Colors Division

- Seize the moment

Goals...

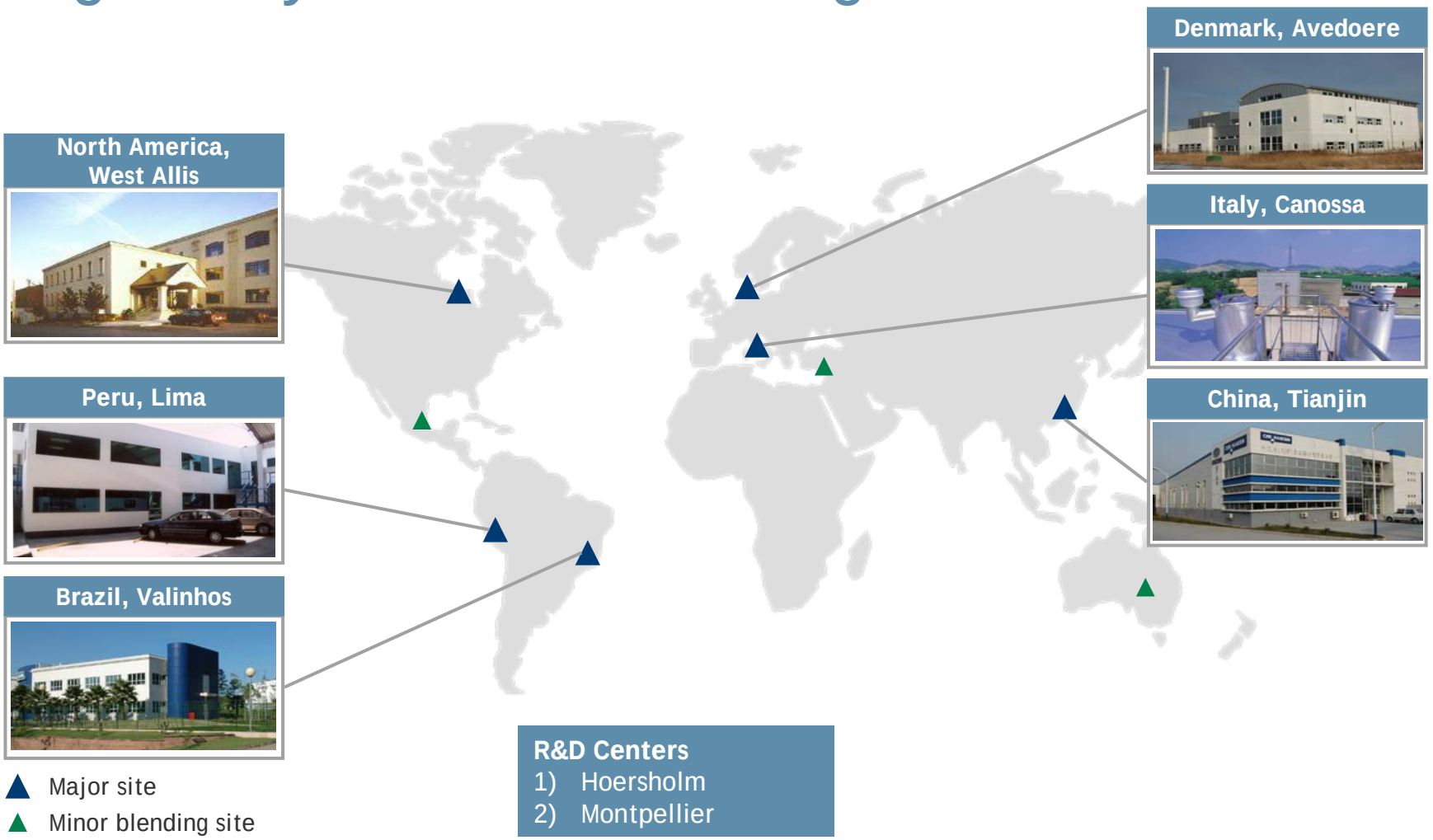
- Expand the use of natural colors through conversion
- Broaden the portfolio through innovation
- Superior application knowledge matching the needs of multinationals

... embedded in four strategic objectives

1. **Capture the conversion potential in our focus industries: Beverages, Confectionery, Ice-cream and Prepared foods**
2. **Maintain market leadership within mature industries: Dairy and Fruit Prep**
3. **Understand our customer's innovation needs and ensure that paradigm shifts originate from Chr. Hansen**
4. **Strengthen set-up and structure of sourcing and product supply**

CHR. HANSEN

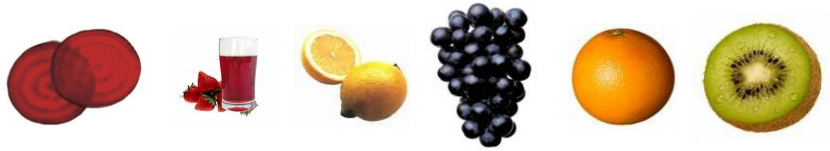
3 extraction sites, 2 R&D centers and 4 regionally located blending sites



Chr. Hansen with focus on natural colors

Coloring foodstuff

- Juices, extracts and coloring food ingredients (e-number free)



Natural colors

- Extracted from biological sources mainly plant-derived, but also from fungi, algae and insects

Nature-identical colors

- Colors found in nature, but produced ‘chemically’

Synthetic colors

- Not found in nature – made ‘chemically’

Inorganic colors

- E.g. TiO_2, gold, silver

CHR. HANSEN

Natural colors are sold into a variety of food industries and applications

Beverages	Dairy & spreads	Confec-tionery	Ice cream	Fruit prep	Prepared food	Other	Meat
Powder soft drinks	Cheese	Dragee	Popsicles	Yoghurt	Bakery	Wine	Sausages
Carbonated soft drinks	Yoghurt	Wine-gums	Ice cream	Cookies	Cereals	Other food and beverage applications	Savory
Functional drinks	Desserts	Soft dragee		Cakes	Soups & sauces	Pet food	
Fruit & vegetable juices	Butter & margarine	Extruded		Beverages	Snacks		
Alcoholic beverages		Chewing gum			Ready meals		
					Preserved food		













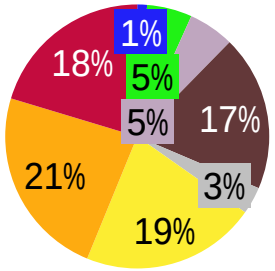
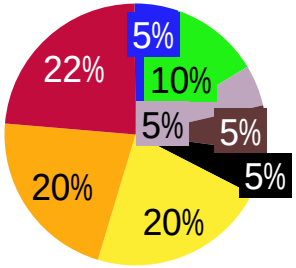
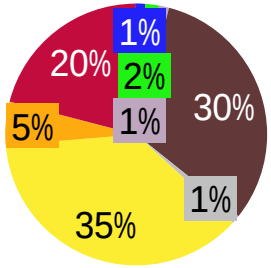







CHR. HANSEN

Main colors
Red, orange and yellow shades

Industry	Share of Shades	Product groups
 Beverage		**Formulated colors** ➢ Encapsulated colors with better stability ➢ Emulsified colors soluble in water
 Confectionery		**Standard Pigments (non-formulated)** ➢ Carmine ➢ Annatto ➢ Turmeric ➢ Beta carotene
 Ice Cream		

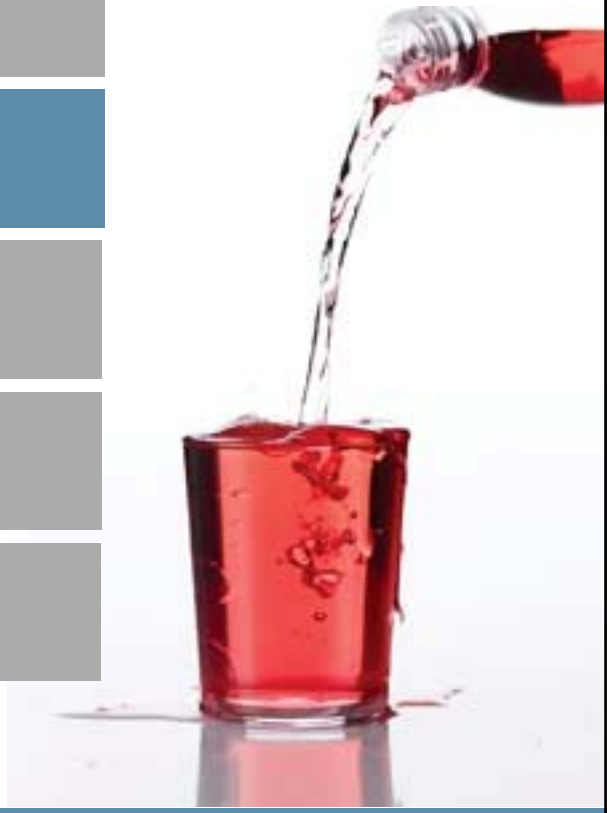
Source: Euro-monitor 2008 & Innova GNPD launches

CHR. HANSEN

Agenda

Natural Colors

- What are natural colors
- Market potential and consumer trends
- Application technology
- Sustainable sourcing
- Sales approach



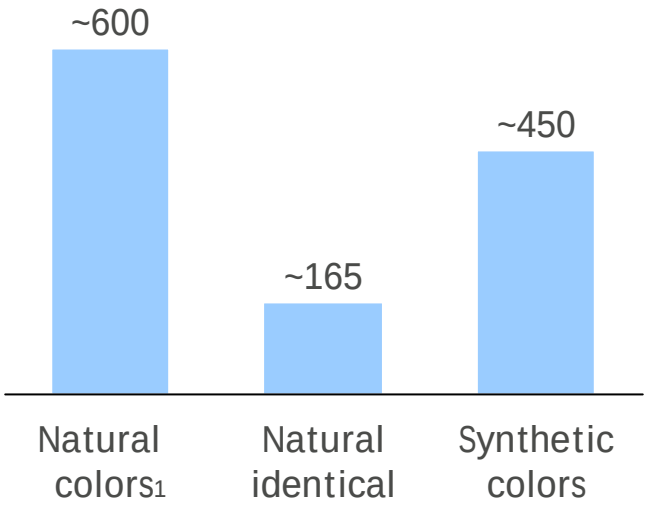
CHR. HANSEN

Three strong growth drivers for natural colors
Regulation, consumer trends and labelling

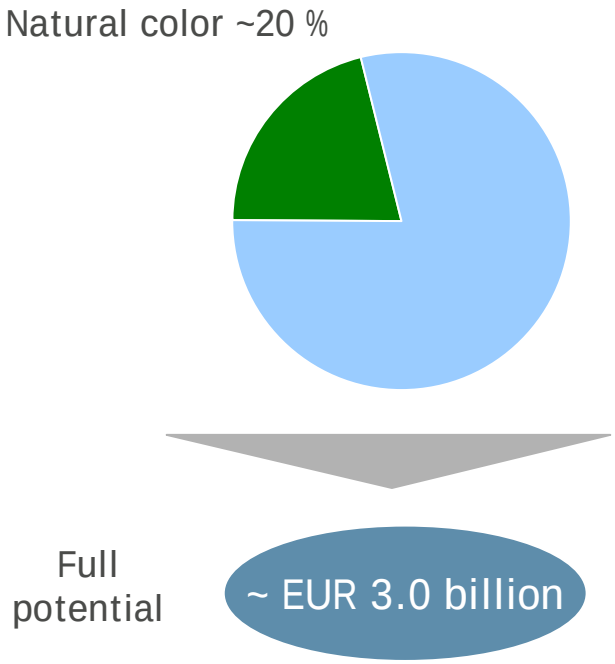
Key growth drivers in natural colors		Implication for natural colors market
Regulation	➢ Warning label on Southampton six colors in EU from July 2010 – latest adopted by Russia ➢ FDA did a public hearing including vote on labelling (March 2011)	↑
Consumer health concerns	➢ Trend towards fewer and more natural ingredients and away from artificial additives ➢ A focus on sustainable and renewable sources	↑
Labelling trends	➢ EU: Push towards clean labelling — no E-numbers ➢ Additive regulation in US	↑
Price pressure & fluctuations	➢ Technical challenges on stability ➢ Price point of natural vs. synthetic ➢ Raw-material fluctuations making conversion more risky for the big brands ➢ CSR issues	↓

Strong conversion potential for natural colors in food and beverages

2011 Est. global food & beverages color market (EUR millions)



2011 Est. natural color penetration (Volume)

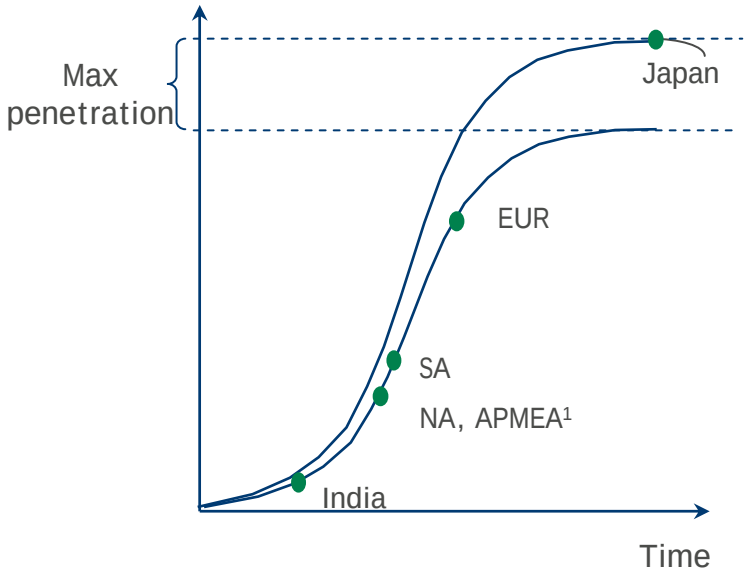


Note1: Natural market includes coloring Foodstuff segment of EUR 50–100 millions
Source: Industry reports (SRI, F&S, RTS; The Food Group); EIU; Management estimates

CHR. HANSEN

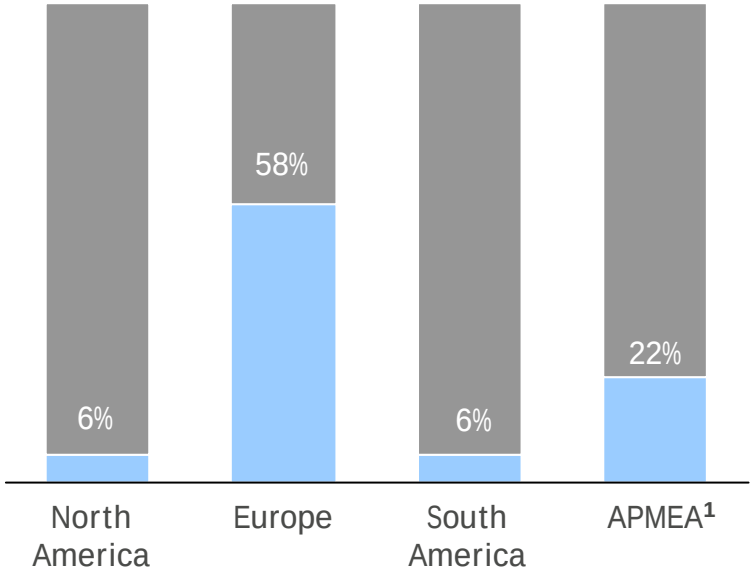
Largest potential
in Asia (ex. Japan), North America and South America

Natural colors penetration in food and beverages (volume)



Source: Management estimate

% of new launches of confectionery that contains natural colors



Note 1: Asia, Pacific, Middle East and Africa excluding Japan
Source: Mintel NPD database, 2007-10

Different stages in different regions

Private label move in “mature” markets; Branded products in “emerging” markets

North America

Canada, 2009

Claim ”natural colors”

Europe

UKs largest supplier in the private label’ sector

Europe's largest producer of jelly beans

17% growth since change to natural

South America

Peru

Claim ”without artificial colors”

Confectionery giants head industry move to natural, Leatherhead

By Helen Glaberson, 29-Aug-2011

Related topics: Financial & Industry, Chocolate and confectionery ingredients

Confectionery giants such as Nestlé, Haribo and Cadbury have been at the forefront of efforts to move away from artificial additives, as the general industry makes a shift to natural food products, according to Leatherhead Food Research.

Over the past few years, confectioners have been responding to consumer concerns over artificial additives and ingredients, said the market researcher in its recent *Food Industry Update* report.

Studies questioning health risks posed by artificial colours such as tartrazine have also helped sparked the trend towards natural, with high levels of new product activity in this area, said Leatherhead.

APMEA

Private label

Country: Australia 2010

Claim: Natural color

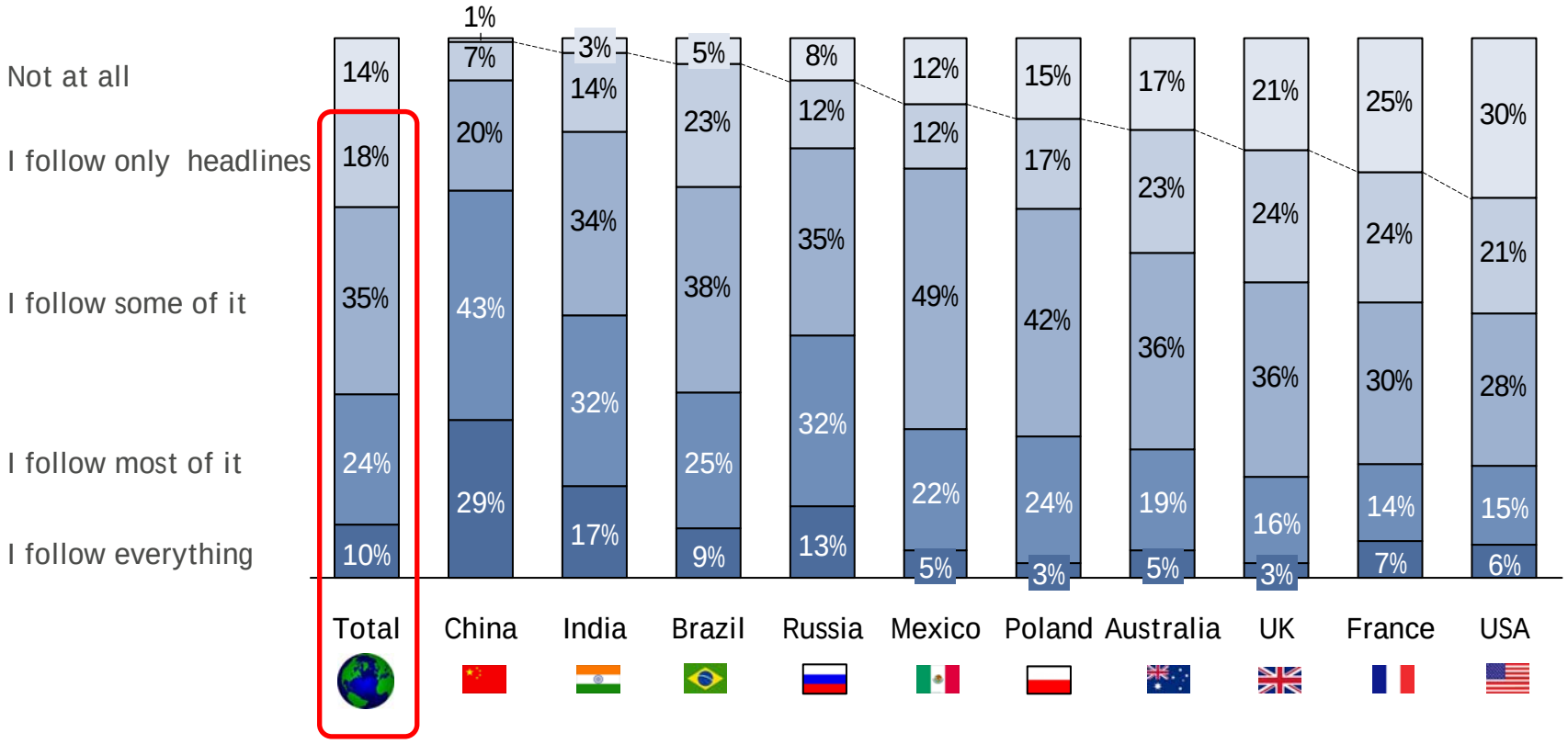
Source: GNPD, Mintel Group

CHR HANSEN

Recent Chr. Hansen and AC Nielsen study

86% of consumers follows news stories about colors

Question: **To what extent do you follow (read, watch, listen to) news stories about the use of synthetic vs. natural colors?**

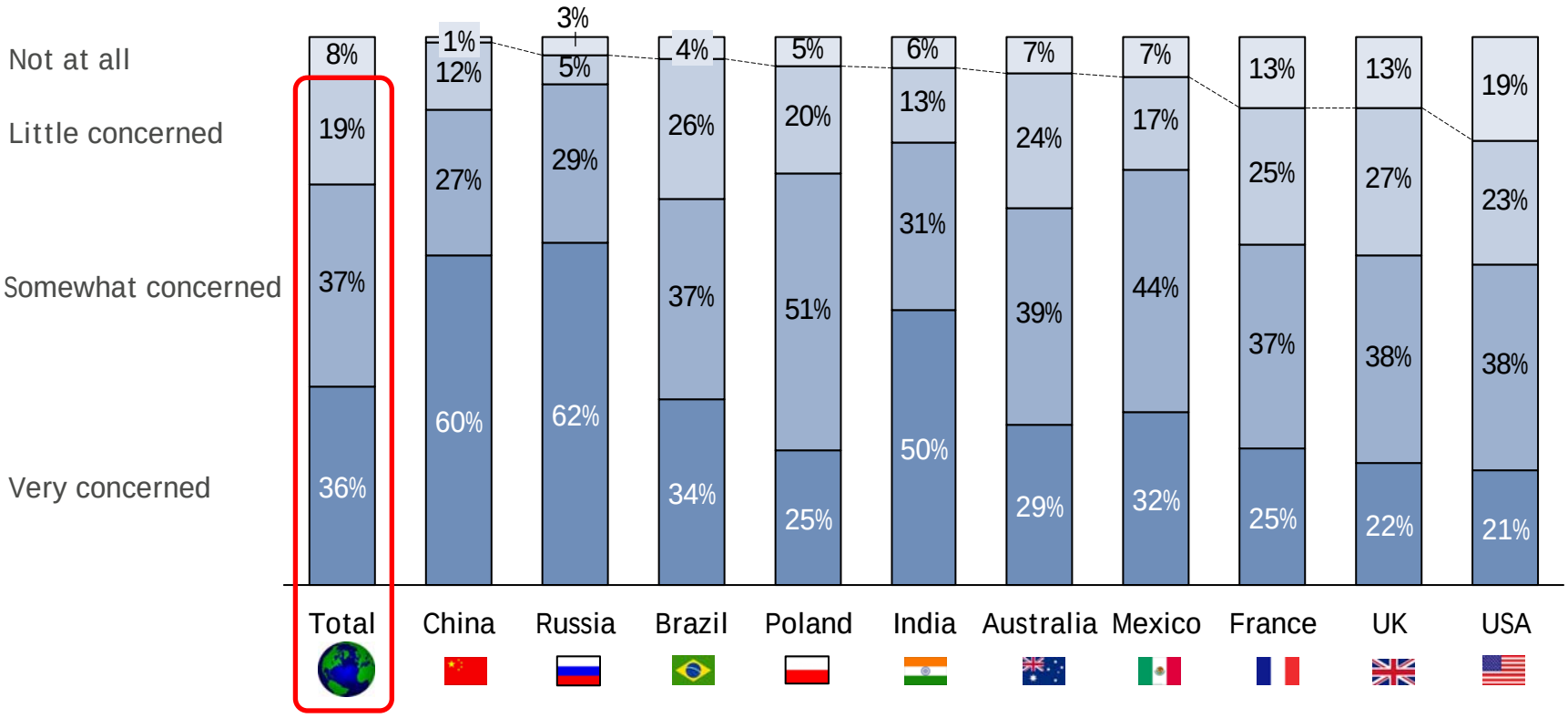


CHR. HANSEN

Recent Chr. Hansen and AC Nielsen study

92% of consumers are concerned about synthetic colors

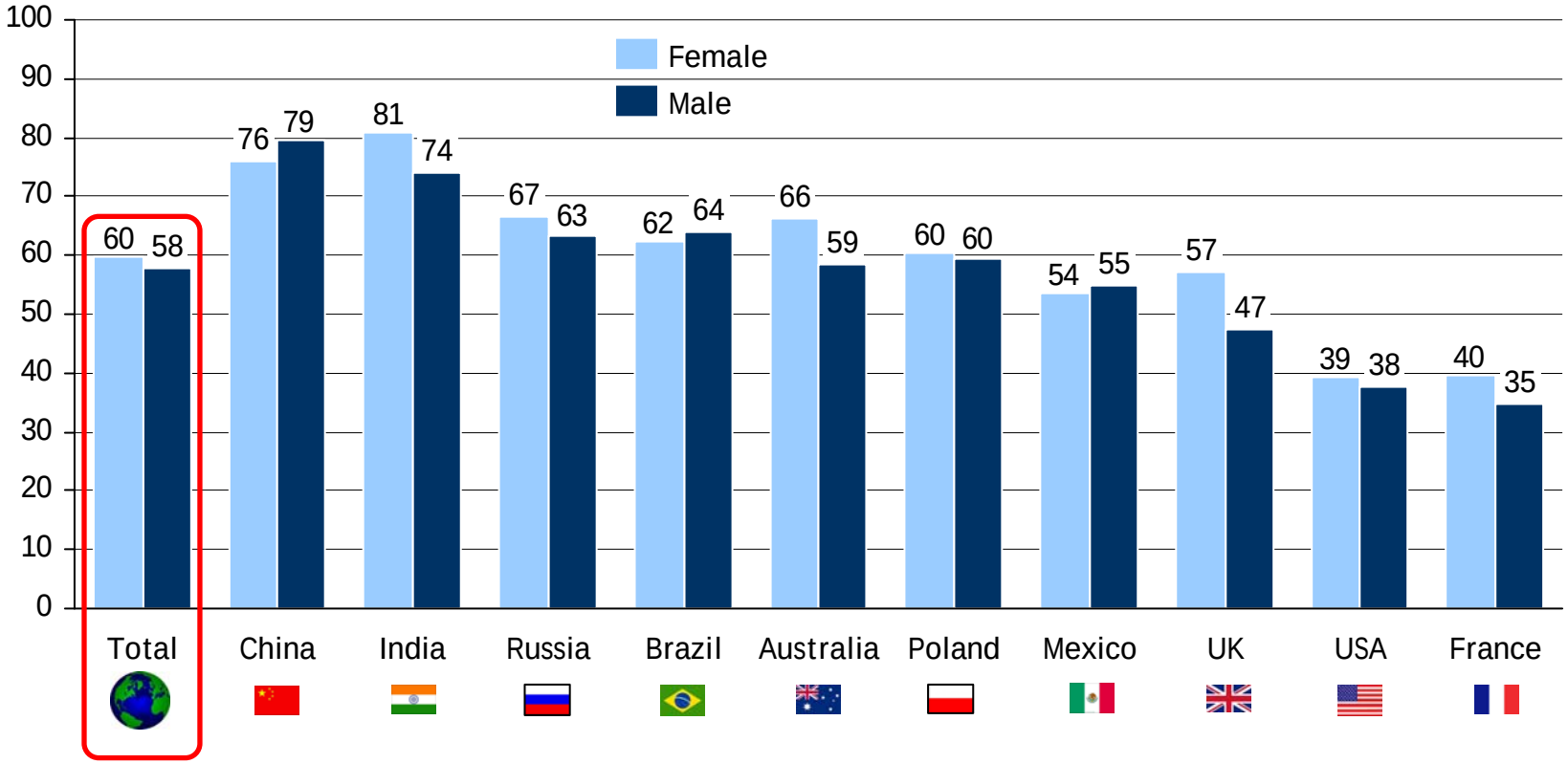
Question: **To what extent are you concerned about usage of synthetic colors in food & beverage?**



Recent Chr. Hansen and AC Nielsen study

Most consumers have noticed color claims

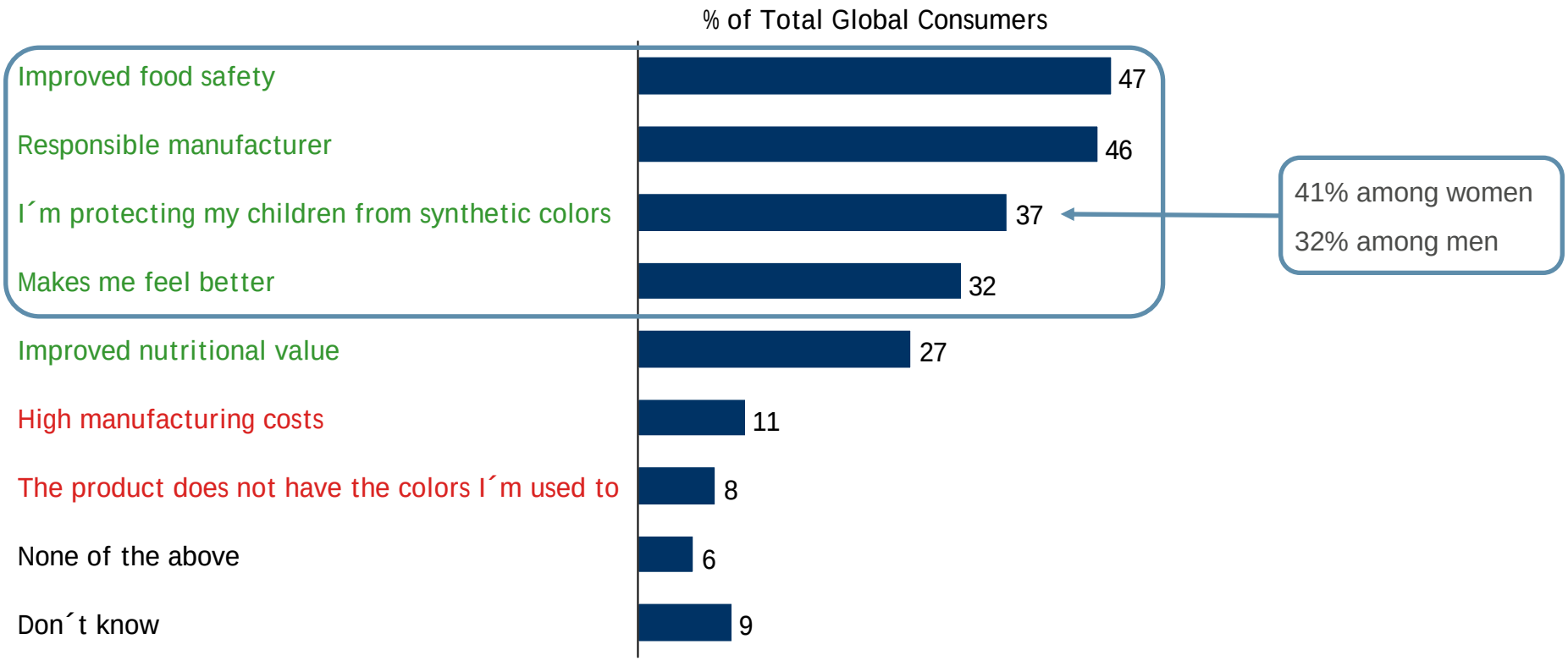
Question: **Have you ever noticed a color claim on front of a food & beverage product?**



CHR. HANSEN

Recent Chr. Hansen and AC Nielsen study
Different reflections upon natural colors

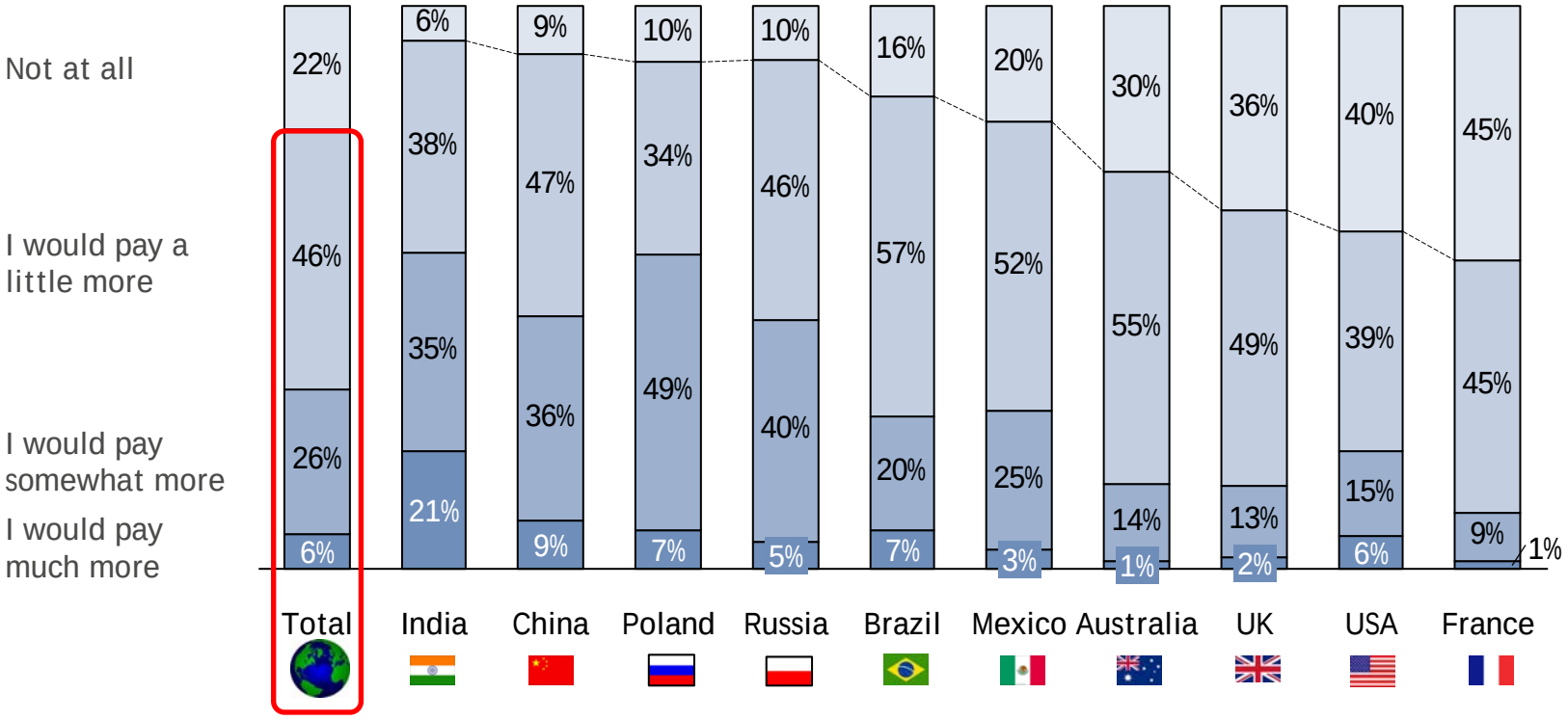
Question: **What does color claims imply to you, when you are buying a food & beverage product?**



Recent Chr. Hansen and AC Nielsen study

78% of consumers are prepared to pay more for natural colors

Question: To what extent would you be prepared to pay more for a food & beverage product if it contains natural colors compared to the similar product containing synthetic colors?



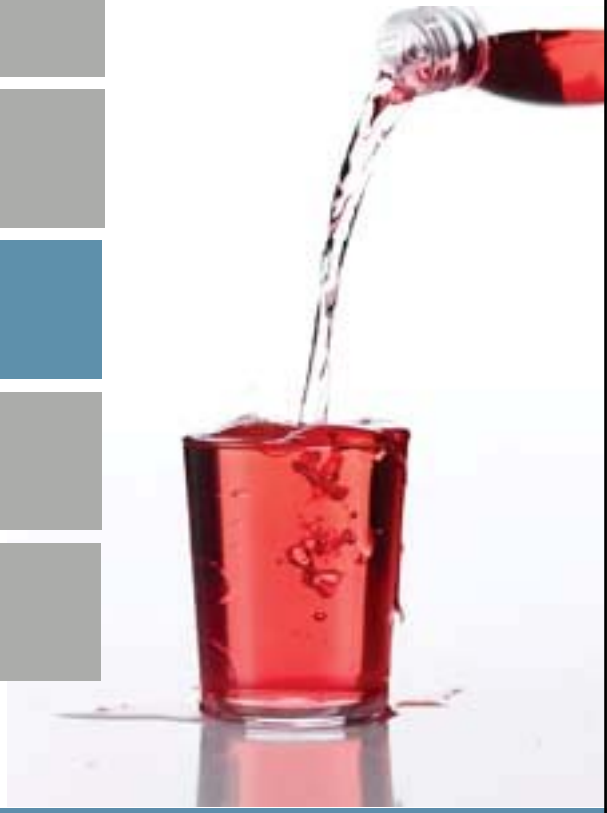
B R E A K

CHR. HANSEN

Agenda

Natural Colors

- What are natural colors
- Market potential and consumer trends
- **Application technology**
- Sustainable sourcing
- Sales approach



CHR. HANSEN

Key issues working with “mother nature”

	Natural colors	Synthetic colors
Stability	Often light, oxygen, pH and heat sensitive	Very stable at typical conditions
Shades	Gaps in color palette for some applications	Full spectrum available
Raw material variation	Often difference between suppliers, harvests, and sources	None
Food/ beverage matrix	Occasional interaction with other ingredients (e.g. flavors)	Rarely issues
Impurities	Compound found naturally in product occasionally gives issues (e.g. off-flavor)	Rarely issues

We work with our customers at different stages...

Customer type	Typical level of engagement
International key account	• Joint R&D projects covering entire value chain
Focus customer	• Customization to optimize products for customer applications
Other customers	• Blending of existing products and technical support
Distributors	• Blending of existing products

...Creating value from four platforms

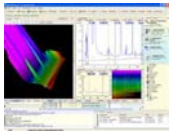
Platform	
1 **Pigment chemistry**	• Evaluate new & existing raw materials for natural colors • Pigments & contaminant analysis
2 **Formulation**	• Recipe for converting pigment into natural color product
3 **Process**	• Design extraction and formulation processes
4 **Application**	• Customize products to ensure performance in customer's application

Pigment chemistry and formulation knowledge required

Pigment chemistry is basis of our business

Identify new pigment sources

Optimize line & growth conditions



Develop analysis methods

Develop extraction process

Formulation: Effect of emulsion

- Extraction raw materials with approved solvents
- Oleoresins and purified crystals

- Yellow/orange pigments are oil-soluble
- Formulation to avoid separation & creaming

- Emulsion to make pigments water-dispersible and to bring technical features

- High color potency, excellent brightness
- Easy-to-use formulation, concentrated colors

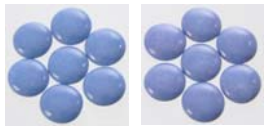
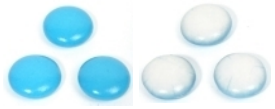
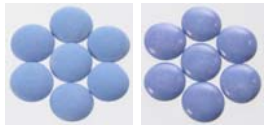
CHR. HANSEN

Different challenges in converting
Typical considerations when panning with natural colors

Dimension	What you must consider	
Type of panning	 soft hard	Type of panning influence color appearance
pH of syrup	 pH 3.3 pH 7.5	Many natural colors change shade according to pH
Syrup heat treatment	 20º 80º for 2 hrs	Heat treatment of syrup can change the shade
White precoating	 $-TIO_2$ $+TIO_2$	Dark background color from e.g. chocolate gives dull colors
Ingredients in centers	 +shellac -shellac	Flavors and low pH in centers may change the shade

Low pH + heat = inversion

Different challenges in converting
Typical considerations when panning with Natural Colors

Dimension	What you must consider
Drying	 proper improper Humidity can cause resolution and recrystallization of sugar
Metals	 steel pans Copper Colors like red beet and anthocyanin sensitive to metallic ions
Light stability & packaging	 brilliant blue +/- light Light exposure might influence colors
Polishing	 before after Color changed by water based polishing material
Off-flavor	 Inherent off-notes for certain pigments at high dosages

CHR. HANSEN

Red Strawberry Fragaria: Re-inventing Carmine

New carmine solution for yogurt & fermented milk

New patent pending carmine solution improves the color stability in yogurt fruit preparations.

Applications:

- Yogurt fruit preparations
- Fermented milk

Significant product benefits

- Reduces cost-in-use due to 15 – 20% lower dosage
- Less batch to batch variation as more robust in pasteurization process
- Prolongs product shelf-life
- Requires less space in stock due to the higher color unit content

FOOD INGREDIENTS EXCELLENCE AWARDS 2011

Finalist in dairy category

CHR. HANSEN

Agenda

Natural Colors

- What are natural colors
- Market potential and consumer trends
- Application technology
- **Sustainable sourcing**
- Sales approach

CHR. HANSEN

Our sourcing strategy ensures supply in a sustainable way

Pigment	Region	2011-2015	Lead time	Sustainibility
Cochineal	Peru, Chile, Spain	25%	3 months	
Red beet	Europe	50%	12 months	
Paprika	Europe, China, India	13%	3 months	
Annatto	Brazil, Peru, India	46%	12 months	
Grape skin	Europe, USA	329%	12 months	
Purple carrot	Turkey, Poland, India	378%	12 months	
Natural Carotene	Japan, Malaysia, India	396%	3 months	
Beta carotene	Europe, China	207%	NA	
Turmeric	India	61%	12 months	
Chlorophyl	Europe	22%	6 months	
Spirulina	Japan, India		NA	
Carbo	Europe	79%	NA	
Malt	Europe	56%	12 months	
Chalk	Europe		NA	

Acknowledge the changes

Natural Colors
on the move

Ensuring supply

Global sourcing network

Sustainable Farming

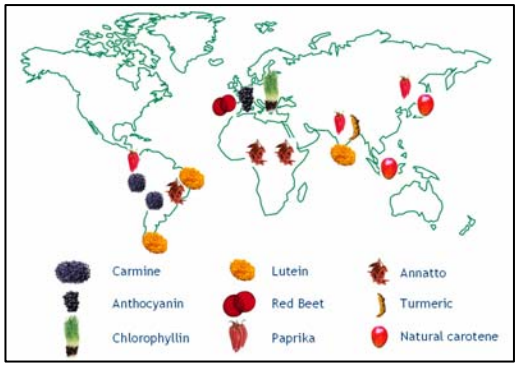
Quality control

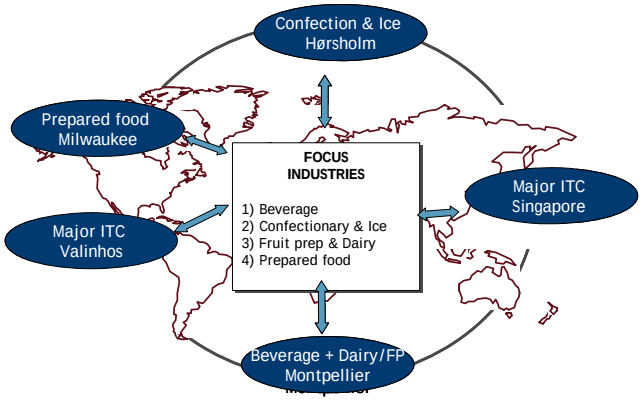
CSR audit

Product Safety

Global expertise in formulation

Sourcing from multiple regions ensures supply

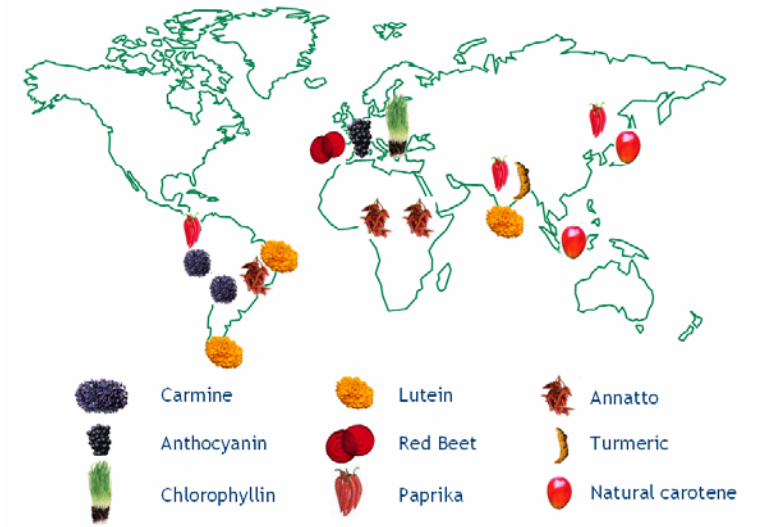




Buying from farmers and their associations – partnerships that ensures long term sustainability.

CHR HANSEN

Raw material market specifics



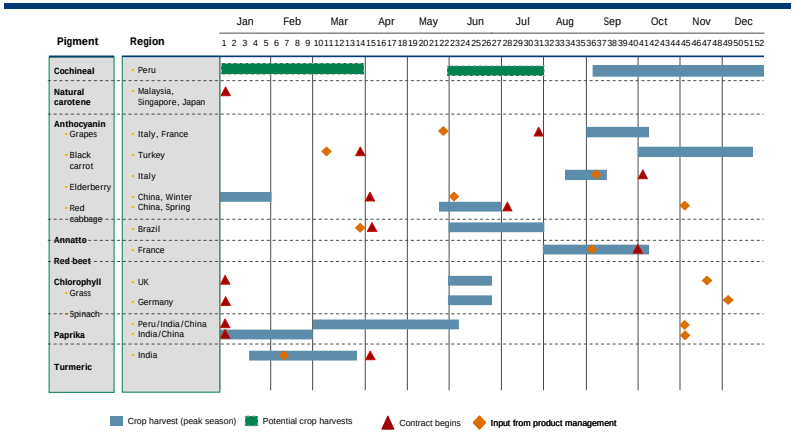
Characteristics

- Fragmented and opportunistic supplier base
- Crop uncertainty
- Price fluctuations
- Various regions and countries
- Political risks

Strategies

- Global sourcing network
- Supplier partnerships
- Long term strategies
- Time of purchase key to ensure supply and price
- Sourcing in both hemispheres
- Precise demand forecasting
- Security stock to accommodate fluctuating prices

Contract/Harvest Calendar



CSR - Starts at our suppliers

Vendor management
Approval, Assessments, Audits and performance evaluation

Starting with the high risk vendors

Sustainable Partnerships
Technical and commercial support

High raw material quality

High yields

Good Agricultural Practices

Sustainable both economic, social and environmental

Committee and use of certificates

Round table membership on Natural carotene from Palm oil

"Mais Vida" in Brazil

Sustainability at work

Aiming at improving the life quality of the people in Araçoiaba city in the North Eastern part of Brazil

Chr. Hansen render its expertise and technical and commercial support in all steps of the annatto production process

Improved quality and food safety
Bonding between farmers and our site

Example: Black carrot anthocyanins

Identification of new sourcing markets

Today: **Turkey supplies the majority**

- Today Turkey represent majority of the world production of black carrot
- Special species used for black carrot
- Both juice and for coloring purposes

Future: **More geographies to be added**

- Identification of new supplier countries will allow an increased production
- Positive aspect of black carrot is that sowing more surfaces we can obtain higher quality of raw material
- The limit is that sowing period has a window of 2-3 weeks (one crop only is possible per year)

Agenda

Natural Colors

- What are natural colors
- Market potential and consumer trends
- Application technology
- Sustainable sourcing

Sales approach

Customer needs vary by industry

Differentiated solutions required

Application	Stability needs: Acidity	Heat	Light	Emulsion needs	Price
Beverage	●	◑	●	●	◔
Confectionery	○	◔	◑	◔	◑
Confectionery	◑	◑	◑	◑	◑
Fruit prep	◑	●	◑	◑	●





Unique product offering per industry

- Differentiated value propositions to different industries
- Unique price lists
- Distinct launch materials

◔ Low

● High

CHR. HANSEN

Chr. Hansen engages in working partnerships with multinationals

Solving technical issues

- Improving the stability of our colors through
- Sourcing anthocyanin
- Improving the yield in the product through improvement of processes

Make it work in the application

- Demonstrate technical superior product
- Outline value of the technical benefits

Allura Red 0.035%

ColorFruit® Red 160 WS 0.07%

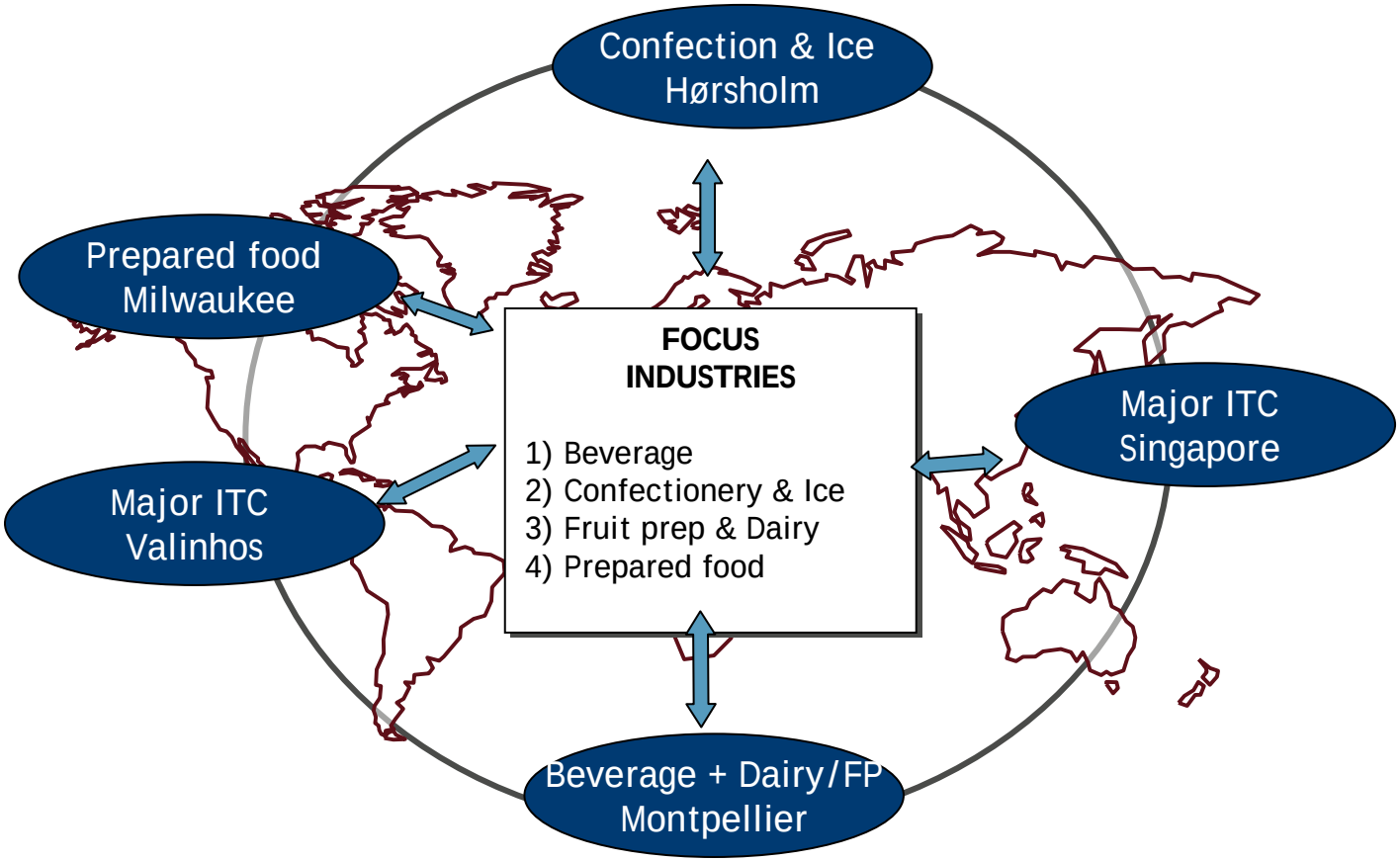
Blackcarrot extract WS 0.065%

Be involved in launching products

- Establish the benefit of the product with customer
- Market it not only centrally but at all Customer sites globally

CHR. HANSEN

Multiple projects for conversion at multinationals done in Global Expertise Centers (GEC) world-wide



ITC: International technology center
GEC: Able to do customization and create new products

CHR. HANSEN

WRAP UP