Summary of

Preliminary Study – Chinese Market for Seaweed and Carrageenan Industry

July 6, 2007

Prepared by The JLJ Group – Solutions for China Entry & Growth

JLJ

PREMISES

- *This presentation include only key highlights from the MsWord Final Report "Preliminary Study – Chinese Market for Seaweed and Carragenan Industry"*
- *For all detailed information refer to*
  - ✓ *MsWord Final Report*
  - ✓ *Excel Database*
  - ✓ *Excel Economic Model to derive future demand*

AGENDA

OBJECTIVES OF THIS RESEARCH

- *"A preliminary report that looked at global trade of seaweed/seaweed derivatives found that the Chinese market has grown rapidly in the last five years, but questions remained as to what China is using seaweed/seaweed products for…"*
- **The main objectives of this study were to:**
  1. **Understand the demand and use of seaweed in China, including the size, structure and nature of processing undertaken in China**
  2. **Identify the supply chains from seaweed producers in Indonesia to processors, solution providers and end-users in China**
  3. **Estimate the derived demand and future trends for seaweed requirement in China**

Final Report also includes more topics (technology dimension, solution providers, end-user industries, etc.)

DOING MARKET RESEARCH IN CHINA

- Generally speaking, doing market research in China is different and significantly more challenging than it is in developed countries because
  1. Size and diversity of China
  2. Lack of reliable general/official information databases
  3. Change is constant and extremely rapid - the whole China economic system is far from being in equilibrium

- Solid market research must be based on a mix of secondary and primary sources
- Using "models" to make estimates is OK

HOW THE WORK WAS DONE

Background
- Understanding original proposal and underlying project objectives
- All materials from IFC, including visit to Makassar

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Secondary
- News sources, websites, B2B websites, publications, etc. (English and Chinese)
- Trade associations, government bureaus, etc

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Primary
- Direct factory visits to ~20 carrageenan manufacturers/ solution providers
- ~200+ telephone interviews with industry players, including carrageenan manufacturers and solution providers
- ~10+ interviews with end-users, food companies
- Visit to food additives expo, face-to-face interviews with ~20+ solution providers

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China knowledge and expertise
- Ongoing analysis and re-elaboration of all facts and data gathered
- JLJ collective China knowledge and in-house expertise/experience
- …

Extensive primary research and analysis

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- Introduction
- Executive Summary
- Chinese market for carrageenan/solution providers
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EXECUTIVE SUMMARY

Market Overview	Value Chain	Key Market Dynamics
• 50-60 processors, also solution providers • 100-130 "pure" solution providers • Fujian, Hainan key locations • Generally low technology levels	• Several parties can be involved • Sourcing considered key success factor • Often processor sell to end-users directly • Significant export, ~30%	• Demand to continue, also for export • Consolidation, increase level of sophistication • Positive government attitude • Usage of carrageenan to go beyond food
Regulatory environment	**End-user industries**	**Derived Demand for Seaweed**
•Several government agencies involved •GB standards •Tariffs and VAT on import and export… •…but also VAT rebates •Yet, no "dumping"	• 3 key industries, meat, jelly, and soft-sweet • Accounting for 95% of the demand of carrageenan • All growing, 10-20% per year • Future demand driven by these industries + new non-food applications	• Economic model based on supply, demand, and trade data • Expected growth of 13% CAGR '07-'12 • Demand at 123,000/year Tons in 2012

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CARRAGEENAN INDUSTRY UNDERGOING CONSOLIDATION

Snapshot	
Number of processors (carrageenan manufacturers)	50 - 60
Total domestic production	~10,000 tons/year
Export	30% (or ~3,000 T/year)
Industry growth rate	~10% annually
Price of RC (2007)	RMB 60,000 – 70,000/T *(or US$ 7,700 - 9,000/T)*
Number of "pure" solution providers[1]	100 - 130

- Industry experienced rapid growth in 1990s – high demand, low barriers to entry, attractive profits
- But currently undergoing consolidation – from >100 processors five years ago, to about 50-60 currently
- Increasing product requirements, and economies of scale force out small players who cannot meet standards or volumes…
- Predominant type of carrageenan produced is K-Kappa – using KCl precipitation
- Only 7 or 8 can produce Iota carrageenan – using alcohol precipitation

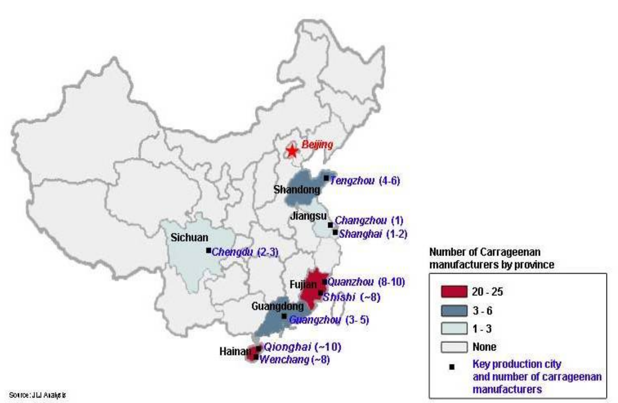
Most use domestic machinery (except for alcohol precipitation)

• "Pure" solution providers defined as using but not producing carrageenan

PROCESSORS MAINLY IN HAINAN AND FUJIAN

Jiangsu and Shanghai also important

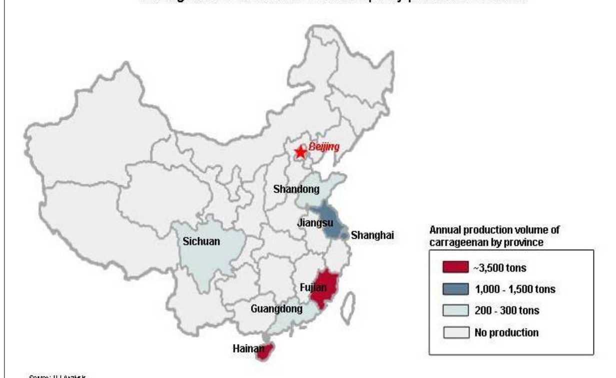
Carrageenan manufacturer landscape by number of manufacturers



PRODUCTION VOLUMES BY LOCATION

Backup

Carrageenan manufacturer landscape by production volume



TOP 5 PROCESSORS ACCOUNT FOR ~50% OF THE MARKET

Company name	Year Established	*Location*	*Annual production capacity*	
			RC (tons/year)	SRC (tons/year)
Shanghai Beilian Gum	1998	Shanghai	1000	500
Jiangsu Changhang Hydrocolloid Technology	2006	Jiangsu	500	500
Hainan Dazhong Ocean Industry	1958	Hainan	700	500
Quanzhou Lubao Biochemistry	1999	Fujian	700	400
Hainan Qionghai Longfeng Carrageenan	1986	Hainan	800	N/A

• Some recent entrants in top 5
• Competitive relationship among top 5…

MAJORITY PRODUCE K-KAPPA CARRAGEENAN

Cleaned & washed seaweed
↓
Extraction
↓
Filtration (coarse and fine)
↓
KCl precipitation
↓
Press
↓
Drying
↓
Milling

• KCl precipitation is used for gum recovery
• Domestic machinery is used

ONLY ~7 PRODUCE IOTA CARRAGEENAN

- **These seven companies have alcohol precipitation facilities to produce Iota Carrageenan**
  - *Hainan Dazhong*
  - *Qionghai Longfeng*
  - *Hainan Haitian*
  - *Quanzhou Lubao*
  - *Shishi Global Agar*
  - *Shanghai Brilliant (Beilian)*
  - *Xieli*
- **However, Iota Carrageenan not a core product (only about 5% of total sales)**
- **These companies may also produce Na/Ca production if there is an order**

Imported machinery used for alcohol precipitation

100-130 "PURE" SOLUTION PROVIDERS

Do Not Produce, but Use, Carrageenan

Solution providers landscape

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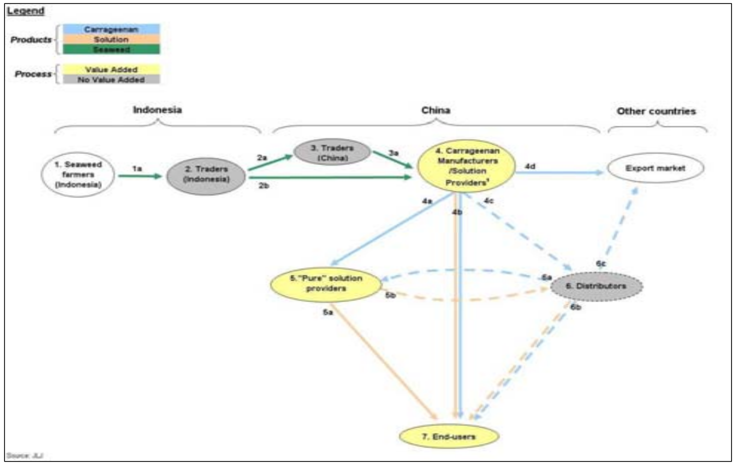
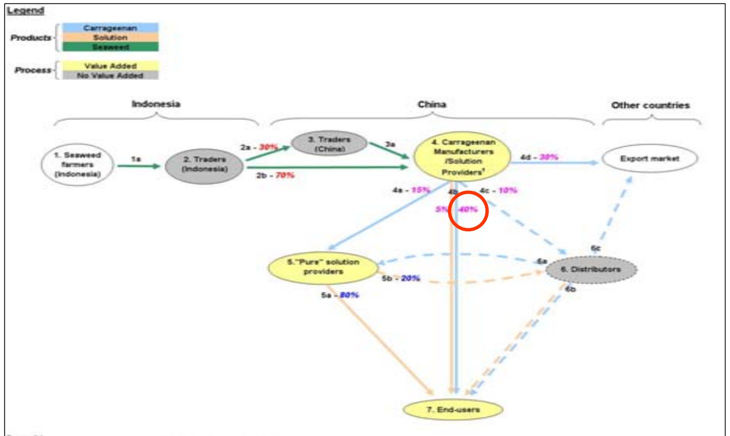
KEY PLAYERS IN THE VALUE CHAIN

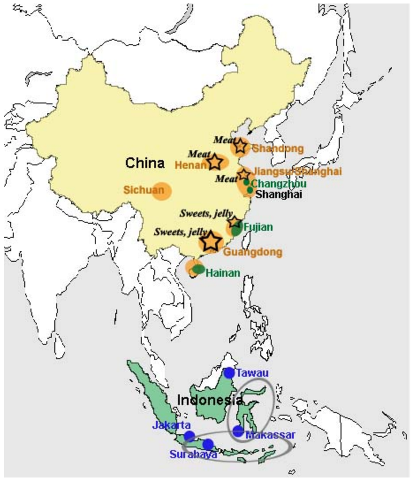


PROCESSORS USUALLY SELL DIRECT TO END-USERS



Source: JLJ
Note: The percentage values are estimates based on (limited) secondary research, field research and JLJ analysis and represents the average scenario. Each company's sales mix will differ depending on individual circumstances.

KEY HUBS ALONG VALUE CHAIN



LEGEND

Indonesia
- Seaplant production areas
- Seaplant hubs

China
- Carrageenan proccessor hubs
- "Pure" solution provider hubs
- *Key food production base and type of food*

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KEY MARKET DYNAMICS

Carrageenan

- Continued strong growth expected for demand of carrageenan
- Increasing carrageenan exports
- Consolidation in carrageenan industry
- Overall, positive government policy
- In the long run, increasing applications and use of carrageenan beyond food industries

Solutions

- Increasing quality of solutions required by food companies
- Increasing R&D for carrageenan-blended solutions

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FACTORIES CAN LOOK VERY DIFFERENT

Old company - 1986

New company - 1998

CASE STUDY 1: WELL-ESTABLISHED MANUFACTURER

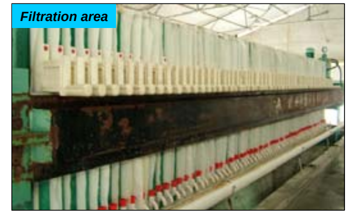

Factory exterior


Processing area

Carrageenan

- Established 1958, one of the oldest carrageenan manufacturers in China
- Owners of two of the top 5 companies were ex-employees
- Produces about 700 tons RC, 500 tons SRC, and 2,000 tons carrageenan-blended solutions annually
- Sells to large Chinese food companies

CASE STUDY 2: A NEW, AGGRESSIVE ENTRANT


Filtration area


Processing area


Drying area

- Hong Kong-invested company
- Imported machinery from Taiwan and Japan
- Produces 700 tons RC and 400 tons SRC annually

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SEVERAL REGULATIONS AFFECTING CARRAGEENAN MANUFACTURERS

No.	Governing agency	Regulation
1	*State Food and Drug Administration*	Regulation on food safety
2	*Standardization Administration*	National standards for carrageenan
3	*State Environmental Protection Agency*	Regulation on the use of water resources
4		Regulation on the prevention of water pollution and protection of water
5		Regulation on pollution fees
6	*State Administration of Work Safety*	Regulations on production safety and clean production

Strengthening enforcement of the regulations partly lead to consolidation

MANDATORY NATIONAL STANDARDS FOR CARRAGEENAN

Category	Unit Measure	China GB Standards	FCC Standards	EU Standards
Sulphur oxide (SO_4^{2-})	%	15 - 40	18 - 40	15 - 40
Viscosity	pa•s	≥0.01	≥0.05	≥0.05
Weight loss after drying	%	≤15	≤12	≤12
Total ash content	%	≤30	≤35	15 - 40
Ash insoluble in acid (%)	%	≤1	≤2	≤2
Lead (Pb)	%	≤0.001	≤0.001	≤0.001
Arsenic (As)	%	≤0.0002	≤0.0002	≤0.0002

All carrageenan manufacturers must meet the GB standards

THREE CATEGORIES OF TARIFFS

- ***General tariff rate*** **– highest tariff rate that is applied to import from all countries that do not fall under the MFN or SPT tariff**
- ***Most Favored Nation (MFN) tariff*** **– lower than the general tariff rate, applies to import from all WTO member countries**
- ***Special Preferential Treatment (SPT) tariff*** **– lowest tariff rate, applies to import from all ASEAN countries**

Import from Indonesia subject to SPT rate

7.5% TARIFF ON SEAWEED FROM INDONESIA

Product	HS code description	HS-code	General tariff rate	Tariff rate for MFN[1]	Tariff rate for SPT[2]	Import VAT rate
Seaweed	Other locust beans, seaweed and other algae, sugar beet and sugar cane, fresh, chilled, frozen or dried, whether or not ground	12122090	70%	15%	7.5%	13%
Carrageenan	Other mucilages and thickeners derived from vegetable products	1302390090	80%	15%	8%	17%

Import VAT Must be paid, regardless of use of seaweed

[1] MFN: Most Favored Nation – includes all countries in the WTO agreement
[2] SPT: Special Preferential Tariff – includes all 10 ASEAN countries: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar (Burma), Philippines, Singapore, Thailand and Vietnam

13% EXPORT VAT REBATE FOR CARRAGEENAN

Product	HS code description	HS-code	VAT rate	Export VAT rebate rate
Carrageenan	Other mucilages and thickeners derived from (non-endagered) vegetable products	1302390090	17%	13%

Rebates only on Export VAT, after carrageenan is exported

VAT ALWAYS PAID ON IMPORTS, VAT PARTIALLY REFUNDED ON EXPORTS

Process

Carrageenan manufacturer imports seaweed from Indonesia

↓

Processes seaweed to make carrageenan

↓

Carrageenan exported to other countries

Import-export tax implication

- Manufacturer pays
- 7.5% import tariff for seaweed +
- 13% import VAT for seaweed

- 17% export VAT for seaweed, but 13% is refunded ("VAT rebate")

- Only exception: if carrageenan manufacturer is located in a bonded export processing zone -> no import/export tariff and import/export VAT
- However no carrageenan manufacturers in China are in such bonded zones

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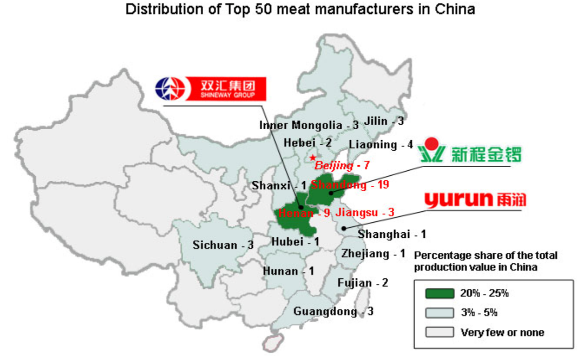
THREE MAJOR END USER INDUSTRIES IN CHINA

~95% of carrageenan demand (Meat, Jelly, Soft sweet)

End-users	Description
Meat	• Industry still developing, growth of ~10% annually • Processed meat – 60% western style, 40% Chinese traditional products • Account for about 38% of carrageenan demand
Jelly	• Highly popular snack in China • 20% growth rate • Account for about 54% of carrageenan demand of
Soft sweet	• 10-15% growth rate annually • China also Asia's largest soft sweets market • Account for about 3% of carrageenan demand
Others	• Include dairy products, milk powders, vermicelli, etc • Account for about 5% of carrageenan demand

~ 1000 MANUFACTURERS OF PROCESSED MEAT

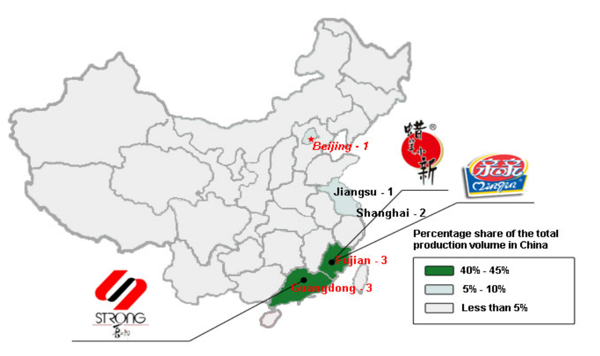
Distribution of Top 50 meat manufacturers in China



Top 3 brands account for ~60% of processed meat market

HUNDREDS OF JELLY MANUFACTURERS

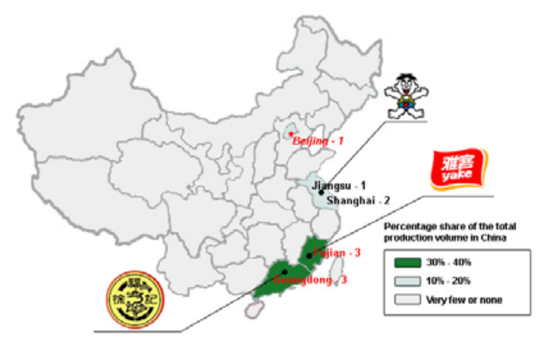
Distribution of Top 10 jelly manufacturers in China



Top 3 account for 50% of the market

SOFT SWEETS INDUSTRY ALSO CONSOLIDATING

Distribution of Top 10 soft sweets manufacturers in China



Production mainly concentrated in Fujian and Guangdong

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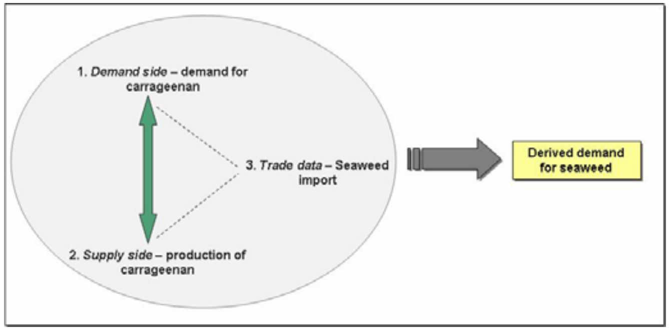
MODEL BUILT TO ESTIMATE SEAWEED DERIVED DEMAND



Seaweed derived demand estimated with a model based on three angles

KEY ASSUMPTIONS OF MODEL (I)

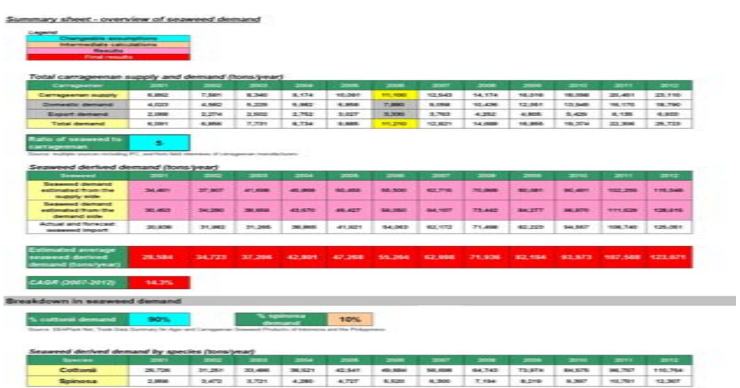
Category	Assumption	Assumed value	Source and rational for assumption
Overall	Ratio of seaweed to carrageenan	5	Derived from multiple sources including IFC and interviews of carrageenan manufacturers
	Percentage cottonii demand out of total demand	90%	From IFC-Pensa, SEAPlant.Net report
Demand side	Total number of manufacturers by industry	Meat - 1,263 Jelly – 525 Soft sweets – 251	Sum of total number of small, medium and large manufacturers, based on industry reports and primary research
	Average production capacity of manufacturers by industry by size	*Example for meat (T/year):* Small – 300 Medium – 6,000 Large – 30,000 *All other data in appendix*	JLJ estimates based on industry reports and primary research
	Average percentage of carrageenan	Meat – 0.1% Jelly – 0.7% Soft sweets – 0.2%	Refers to the amount of carrageenan needed in the product.
	Forecast CAGR (2007- 12)	Meat – 9% Jelly – 20% Soft sweets – 13% Others - 8%	Based on industry reports, news reports, and interviews
	Export percentage of carrageenan out of total supply	30%	Means that about 30% of carrageenan produced in China is exported. Assumption is derived from field research

KEY ASSUMPTIONS OF MODEL (II)

Category	Assumption	Assumed value	Source and rational for assumption
Supply side	Total number of carrageenan manufacturers	57	Sum of number of manufacturers by province, based on field research
	Average production capacity of manufacturers by size	*(T/year):* Small – 60 Medium – 200 Large – 500 Top 5 – 1,000	JLJ analysis based on field research
	Forecast CAGR (2007-12) for carrageenan supply	13%	Based on historical growth rate and demand trends
Trade data	Forecast seaweed import	15%	JLJ analysis based on historical CAGR and the past trends vs. estimated future trends in seaweed import

About 100 assumptions in total…

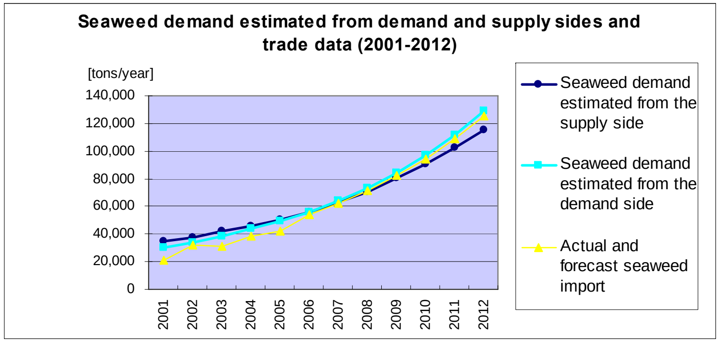
SNAPSHOT OF MODEL



Model built in Excel, key assumptions highlighted and easy to change

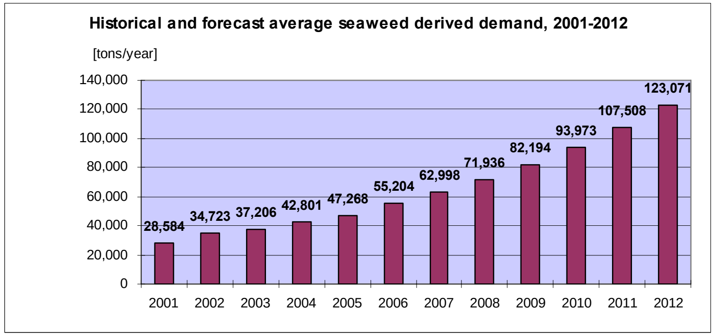
ESTIMATES WERE MADE FROM THREE ANGLES

Supply, Demand, Trade data



Estimates from three angles resulted in very similar values

DERIVED DEMAND FOR SEAWEED



• Expected CAGR '07 –'12 about 13%
• Demand of 123,000 tons/year in 2012

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KEY CHALLENGES IN CARRAGEENAN INDUSTRY

1. ***Intense price competition*** **– industry undergoing consolidation**
2. ***Predominantly low technology level*** **– most processors are in low-mid end, poor product quality**
3. ***Limited R&D capabilities*** **– limited research in solutions, carrageenan sold directly to food companies**

• Trend is toward consolidation and higher overall level of sophistication
• However, it will take some time

POTENTIAL AREAS FOR FURTHER STUDY

- ***Further study on end-users***
- ***In-depth study on top carrageenan manufacturers***
- ***Study on other types of blended solutions***
- ***Other opportunities for further study identified by IFC (marketing…)***
- ***…***

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