

Castor Oil Derivatives

Reaching the Next Orbit

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www.castoroil.in

Castor Oil is unique among vegetable oils

*How can it add unique value to more markets
and products?*

Presentation Topics

- **Current Status of Castor Oil Derivatives**
- **Where Can It Reach?**
- **Reaching New Heights**

CURRENT STATUS

Castor Oil Derivatives

Classification of Castor Oil Derivatives

Main Grades

- Commercial, FSG, BSS
- First Pressed Degummed Grade Castor Oil
- Refined Castor Oil – Extra Pale Grade
- Castor Oil Pharmaceutical Grade
- Blown Castor Oil
- Urethane Grade
- Pale Pressed Grade

Generation I Derivatives

- Dehydrated Castor Oil
- Ethoxylated Castor Oil
- Hydrogenated Castor Oil
- 12-Hydroxy Stearic Acid (12-H.S.A)
- Sulfonated Castor Oil – Turkey Red Oil

Generation II Derivatives

- Sebacic acid
- Heptaldehyde
- Undecylenic Acid
- Polyols
- Ricinoleic Acid
- Other Dimer Acids
- Undecylenic Aldehydes
- 2-Heptanol, 2-Octanol

Generation III Derivatives

- Zinc Ricinoleate
- Zinc Undecylenate
- Methyl 12-HSA
- Methyl Ricinoleate
- Methyl Undecylenate
- Calcium Undecylenate
- Others?

Market Size

CastorOil.in estimates that the global castor oil and derivatives market size was about US\$ 2.3 billion in 2016

- Basic grades and Gen I derivatives
 - **\$1.3 billion**
- Gen II derivatives
 - **\$600 million**
- Gen III derivatives
 - **\$400 million**

Characteristics of Derivatives

Product Category	Type of Product	Margins
Basic grades	Commodity	V low (< 5%)
Gen I derivatives	Value Added Chemical	Low (5-10%)
Gen II derivatives	Value Added Chemical	Medium (10-20%)
Gen III derivatives	Specialty Chemical	Medium-High (%s quite variable, authentic data not available)

Market Segments for Castor Derivatives

Segments with significant short and medium term potential

- **Biopolymers**
- **Personal Care and Cosmetics**
- **Lubricants & Greases**
- **Textiles**
- **Paints, Inks & Coatings**

Others

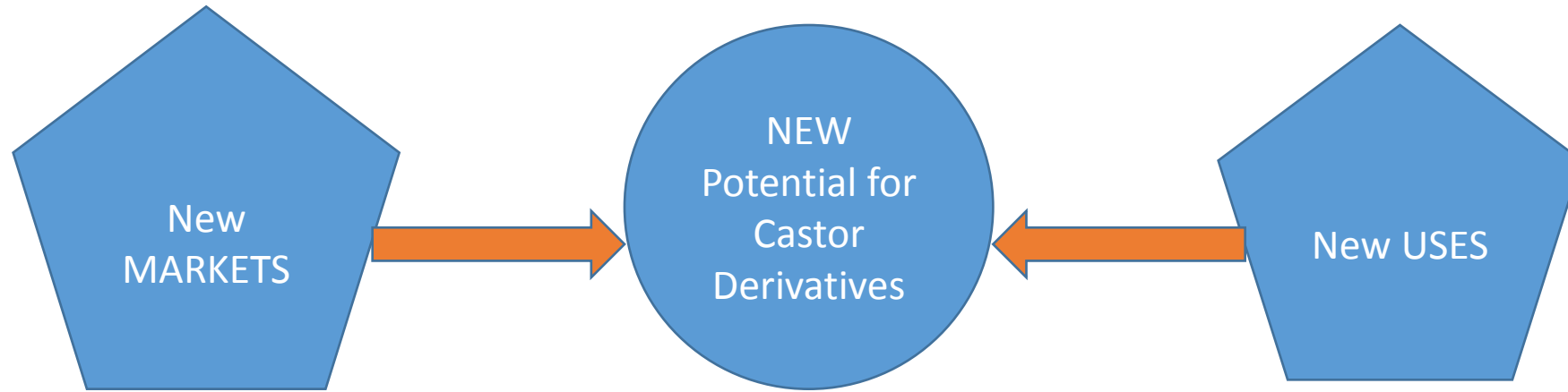
- Pharmaceuticals
- Detergents
- Food
- Plastics & Rubber
- Other Specialty Oleochemicals

Growth of Some Key End User Segments

Industry	Global Market Size	% Growth (CAGR)
Bioplastics	4.2 million tons (2016) – 75% durable bio-plastics	10% (2016-2020)
Biolubricants	\$1.9 billion (2015)	5.3% (2016-22)
Organic Personal Care Products	\$10.2 billion (2015)	13% (2016-21)
Organic Surfactants	0.36 million tons (2015)	5% (2015-23)
Green coatings	\$61 billion (2012), est \$86 B (2018)	6% (2012-18)

WHERE CAN IT REACH?

“New” Potential for Castor Oil Derivatives



Emerging/New Markets

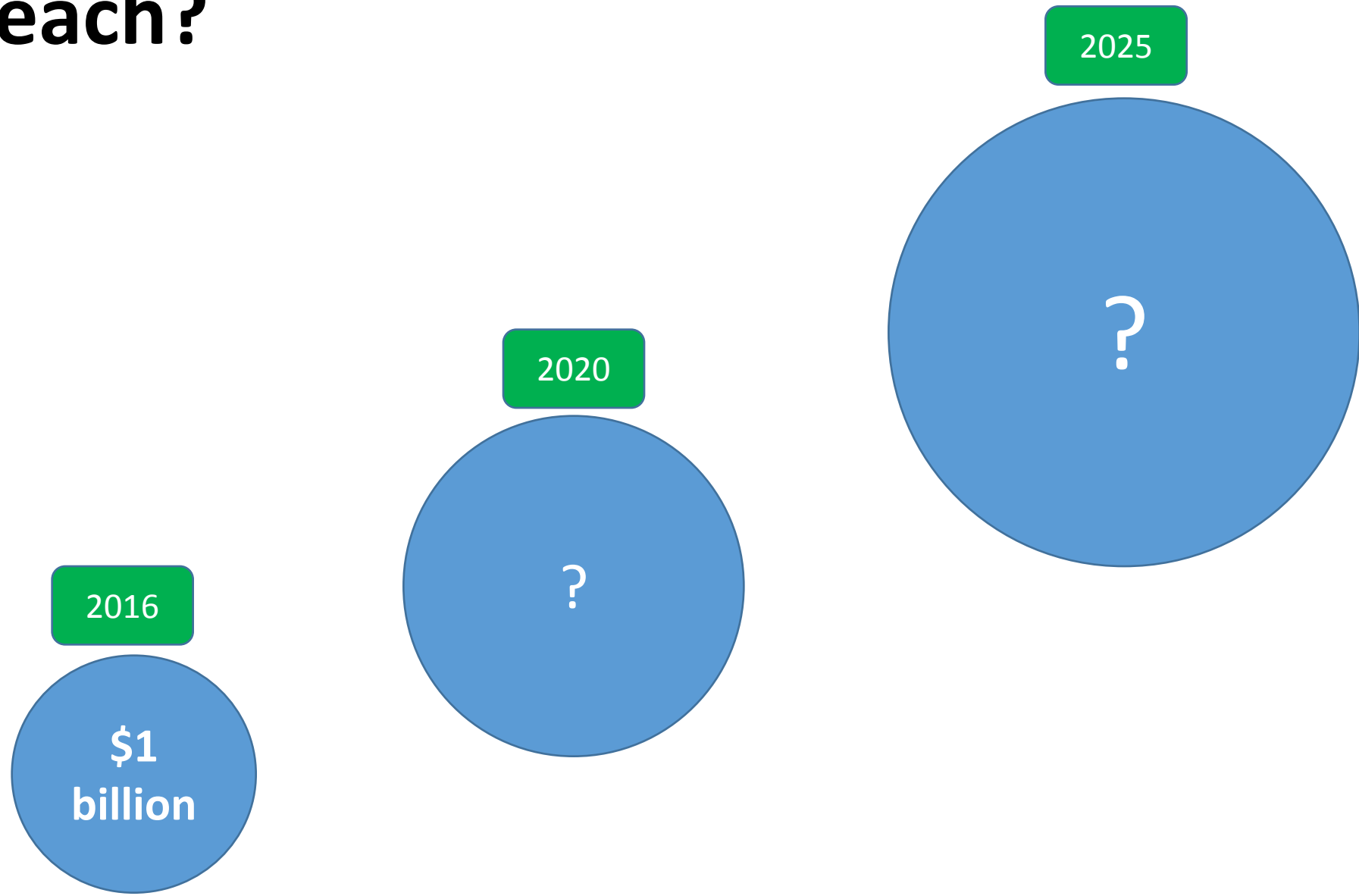
- The top 3 markets for castor oil and derivative consumption have been China, India & EU
- The **North American, already a significant consumer, market could consume significantly higher** quantities in near future for some derivatives
- Potential can increase significantly in Asian markets such as **Japan and S Korea and select S American markets in the short term**, and perhaps in completely new markets in the medium term

Emerging & New Uses

Many niche, emerging uses

Segment	Details
Biopolymers	Diverse end uses for PA and PUR in <ul style="list-style-type: none">• Auto components• Apparel• Electronics
Personal Care	<ul style="list-style-type: none">• Natural exfoliation (HCO beads) as alternatives to plastic micro particles (PE and PP)• Premium deodorants, lipsticks, sunscreen lotions
Health & Pharma	<ul style="list-style-type: none">• Neuro-protective ingredients
Others	<ul style="list-style-type: none">• Flame retardants• Textile accessories• Sub-components in solar panels and wind turbines• Optics

Gen II & III Derivatives - Where Can they Reach?



Where they can reach depends partly on external drivers, but also partly on how the industry stakeholders move

REACHING NEW HEIGHTS

Market & Regulatory Drivers

- Corporate aspirations for a **lower carbon footprint**
- Market & regulatory moves towards **safer products for plastics & packaging**
- Momentum in specific industries such as automobiles & textiles towards **environment friendly options** for their products
- The **sustainability movement** among end users

Challenges & Constraints

For New Market Creation for Derivatives

- **Global reliance on India** for Castor Oil supplies
- Low and fluctuating **prices of crude oil**
- **Proprietary technologies** for derivatives production
- **The China Factor**
- **Low market awareness** of the possible new uses of castor oil
- **Insufficient end user market intelligence** for companies to make decisions on new product development
- **Large, and sometimes risky, R&D investments** required for derivatives

Leveraging Drivers & Overcoming Challenges

For all global stakeholders

- Promote **greater diversity in the cultivation of castor crop**, both across the world, and within India.
- Focus on products for which the **driver is not price** but some utility that cannot be provided by crude or synthetic alternatives (health, safety, CO2 abatement...)
- Focus on **specific emerging segments that show sustained growth**, based on strategic market research.
- **Create greater awareness** among target end use application companies about the benefits of using castor oil for their ingredients.

What Should India Do?

- **Streamline Supply** - Reduce volatility of supply and prices of castor oil through a more diverse cultivation and better systems, thus creating an overall global momentum for larger investments into R&D
- **Select Derivative Focus** - Focus on select derivatives where India can have a competitive advantage vis-a-vis China. This could be either in generation II or even generation III derivatives.
- **Partner for R&D** - For R&D, rather than go solo, a more practical approach would be to have joint ventures in which the Indian firms are able to bring something specific to the table, more than just castor oil! - An example of such a JV is Vithal Castor Polyols – an Indo-Japanese-Korean JV, with Jayant Agro from India, for polyurethanes catering to auto, furniture and packaging markets

Thanks!

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