

Field Trip Animal Nutrition

The MetAMINO® Success Story

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EVONIK
INDUSTRIES

What we have heard so far ...

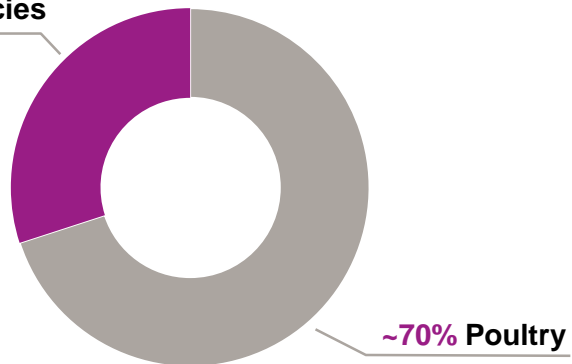


- Strong market growth for amino acids remains unchanged
- Efficiency and sustainability are major growth drivers
- Competences of Evonik Animal Nutrition are well set for further growth in the methionine business
 - ✓ Customer intimacy through direct sales presence in more than 120 countries
 - ✓ Unparalleled global reach and excellence in global supply chain management
 - ✓ Continued innovation in service offers
 - ✓ Differentiation in new markets and animal species such as aquaculture and ruminants
 - ✓ Aspiration to generate additional growth beyond strong amino acid core

Methionine at a glance: Much more than just chicken

Global sales by applications 2014

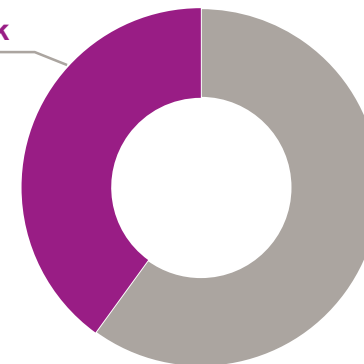
**~30% Swine, Aquaculture
and other species**



- Growth in methionine varies by regions, species, customers

Global Market Share 2014

Evonik



Major Competitors

- Novus
- ChemChina (Adisseo)
- CUC Unisplendour
- Volzhsky
- Sumitomo

- Evonik clear market leader with ~40% of global market share

Methionine at a glance: Bio-efficacy is key regarding the available product-forms



Methionine Product Types 2015

	DL-Methionine (solid)	MHA (Methionine Hydroxy-Analogue, liquid)	L-Methionine (solid)
Market Share 2014	<ul style="list-style-type: none"> ~70% 	<ul style="list-style-type: none"> ~30%¹ 	<ul style="list-style-type: none"> 0%
Supplier	<ul style="list-style-type: none"> Evonik, ChemChina, Sumitomo, CUC, Volzhsky 	<ul style="list-style-type: none"> ChemChina, Sumitomo, Novus 	<ul style="list-style-type: none"> CJ Cheil Jedang
Market Positioning	<ul style="list-style-type: none"> Industry standard established for more than four decades Easy to ship and to handle 	<ul style="list-style-type: none"> De facto not an amino acid Liquid product as alternative to solid DL-methionine 	<ul style="list-style-type: none"> New product launch 2015 Combination of biotech and chemical synthesis
Relative product bio-efficacy²	<ul style="list-style-type: none"> 100% scientific 100% claimed 	<ul style="list-style-type: none"> 65% scientific 88% claimed 80% used for capacity calculations 	<ul style="list-style-type: none"> approx. 100% scientific at least >100% claimed

¹ Based on total volume output

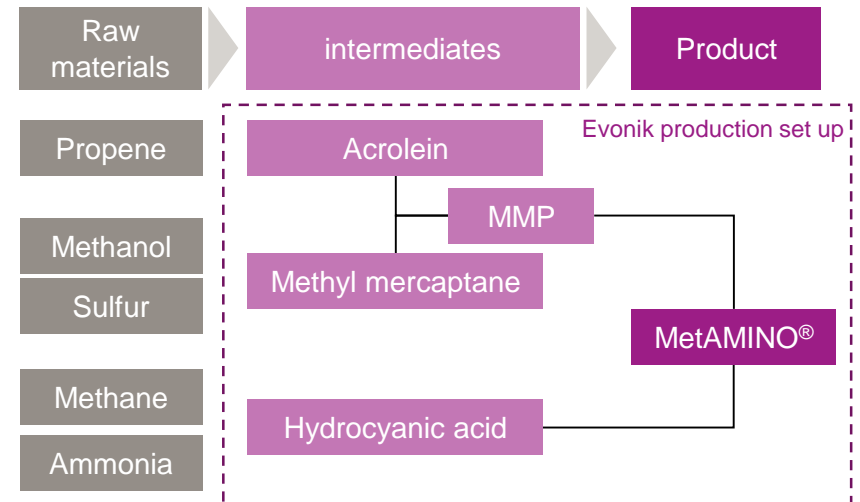
² Relative bio-efficacy: comparison of relevant performance parameter per kg methionine product used in feed formulations

Excellence in technology is one of our key strength for reliable and sustainable supply

Advantages of Evonik

- *“The Right to Play”*: 60 years of experience and process know-how
- *“Setting standards”*: Continuous innovation leadership for cutting-edge safety technology
- *“Best in Class”*: Continuously optimized manufacturing and technology position
- Fully backward integrated production complexes
- Economies of scale with world-scale plants to meet market growth timely

Setup of Methionine complex



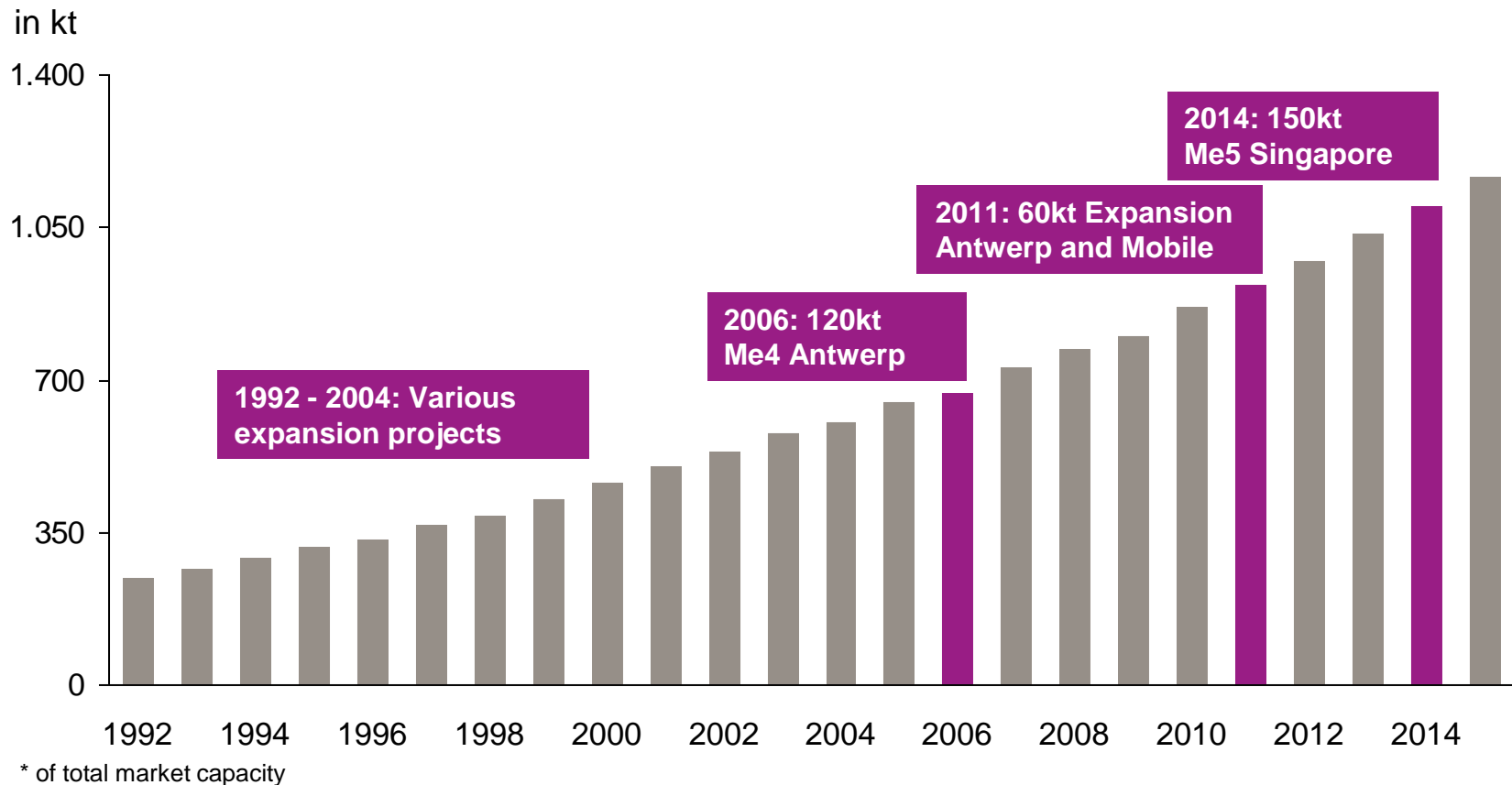
Implemented innovations 2014 in Singapore:

- ✓ Further minimization of toxic intermediates
- ✓ Realization of economy of scale (150 kt)
- ✓ New highly efficient energy integration concept

Evonik has demonstrated its commitment to customers over the years by investing considerable funds both in additional capacity and supply chain



Methionine market supply development



Me4 investments and expansions build world's largest methionine complex and global export hub



2006 Me4 Investment -- 2011 Expansion of Methionine Complex Antwerp

- Significant investments made in Antwerp to meet growing global market demand
- All investments in the Antwerp methionine complex completed on time and budget
- Embedding of Evonik supply chain into harbor infrastructure of Antwerp: A globally reliable export and distribution hub for methionine

Features

Largest methionine complex worldwide today

- Long methionine history with first production in 1975
- Two methionine plants
- Well-integrated logistic hub of site and harbor
- Best cash cost delivered

**Me4 Complex:
260 kt capacity**



Me5 investment complemented asset footprint and established production capacity in fast growing Asian market



Me5 Investment

- Backward integrated Me5 complex constructed as greenfield plant and executed on time and budget
- Successful ramp-up from November 2014 onwards as per plan and according to Evonik market commitments made by press release in 2010
- Favorable export logistics to secure supply to Subcontinent, Asia and Australia/Oceania

Features

- Placed in growth region
- World-scale capacity
- Further advanced integration of production complex
- State-of-the-art safety technology
- In the center of the leading Asian logistic hub
- Start-up in H2/2014

Largest world-scale plant in Asia

Me5: 150 kt plant in Singapore



Lever of sustainable feed formulations on global methionine demand



Me6 investment answers future market needs on reliable and sustainable global supply

Rational of Me6 Decision

- Evonik will reliably meet customer and market demand for methionine, indispensable for efficient and sustainable animal nutrition
- The recent plant in Singapore took up its operations at the time Evonik had announced in 2010
- New project to be completed in the same timely manner to secure supply to Asia

Requirements

- Start-up in H1/2019
- World-scale plant (150 kt/a)
- Again well placed in growth region
- Fast-track project mandates existing methionine sites

Decision

**Construction
of Me6 Complex
in Singapore**

