

[Tryptophan]

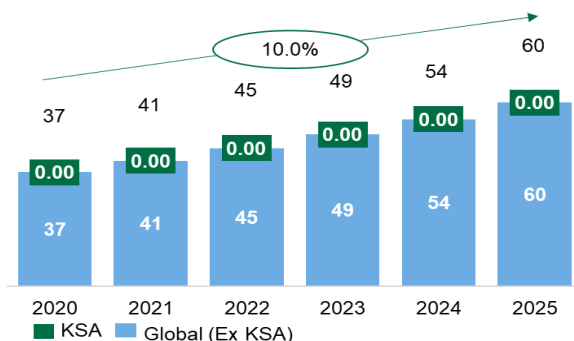
INVESTMENT OPPORTUNITY

[Base Chemicals]

**OPPORTUNITY DESCRIPTION:** Opportunity to develop Tryptophan production facility of 5 KTA in KSA to cater regional and global demand.

## DEMAND

### MARKET SIZE, KT



### INVESTMENT HIGHLIGHTS

- Expected investment size of ~USD 145 MN
- Plant capacity: ~5 KTA
- Expected IRR: ~>20% (high margin specifically for animal nutrition and dietary supplement)

## INVESTMENT OVERVIEW

### VALUE PROPOSITION

- KSA has a strategic location and could consider developing a portfolio of larger volume amino acid production including methionine, lysine, threonine, as well as tryptophan. This would form part of an animal feed business development.
- KSA can leverage favorable trade agreements (eg : GAFTA) and strong logistics infrastructure to enhance export capability for distributing the products in Middle East
- KSA is one of the largest chemical producers in the world and contributes ~10% to the global output.
- Increasing global demand and no producers in the region provides an opportunity to penetrate local markets in vicinity.

### KEY DEMAND DRIVERS

- Tryptophan is an essential amino acid and is produced by the fermentation of carbohydrates
- Tryptophan markets are growing strongly as animal nutrition knowledge drives demand higher on a global basis.
- Growing populations and improved standards of living, such as in Other Asia, will lead to increased demand for meat products and thus, increased amino acids use for livestock production.
- Continued production advances in genetics and balanced diets could increase livestock weights and amino acids use.

### KEY PLAYERS

- CJ Cheil Jedang
- Ajinomoto
- Fufeng group Hebei Meihua
- Henan Julong
- Hebei Meihua

## MARKET OVERVIEW

### GLOBAL TRENDS

- Estimated at 37 thousand metric tons in 2020, the global consumption is expected to increase at an average rate of 10% from 2020-25.
- Tryptophan is consumed mainly in Western Europe and demand is met by imports from China. Following West Europe, consumption was led by Central and Eastern Europe , China, Other Asia, US, and Japan.
- China tops tryptophan capacity, with over 50% of the global share. Most Chinese tryptophan production is for export markets.
- Animal waste regulations will lead to adding more amino acids to livestock diet and reducing nitrogen pollution.
- Animal feeds are tightly regulated within the EU to ensure animal and human health.

## SUPPLY

### SCALABILITY AND LOCALIZATION

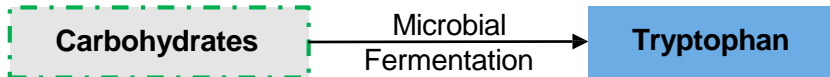
Grade: Low Medium High

- Tryptophan is not produced on a commercial scale in the Middle East.
- L-Tryptophan is used mainly in animal feed formulation. There is a local animal feed market with three producers; Al-Khumasia, Al-Jazeera and United Feed. Local amino acid developments could local customers as well as export markets.
- L-Tryptophan is made using the biotransformation of sugars and/or carbohydrates. Access to low-cost energy is beneficial as well as access to ammonia.

### IMPORT DEPENDENCY

- The region does not have commercial production of Tryptophan.
- Demand in the Middle East is covered by imports mainly from China.

### VALUE CHAIN



#### Served Applications

- Animal Feed
- Dietary supplements

Key raw materials
Investment scope
End use applications
Raw materials available in KSA

### KEY STAKEHOLDERS



## ENABLING FACTORS

### ENABLERS & INCENTIVES

- Up to 75% of project financing by Saudi Industrial Development Fund (SIDF).
- 2-year grace period for the repayment of loans
- Expat worker levy waived-off for industrial manufacturers until October 2024.
- HRDF covers 30-50% of Saudi employee's monthly salaries (additional 10% for females) for 2 years, provide that it does not exceed USD 4,000

### COST OF DOING BUSINESS IN KSA

Factor	Ranking amongst regional peers
Electricity tariffs for industrial players	\$48 /MWh
Productivity adjusted wages	\$3.3 /hour
Logistics Performance Index (1-5)	3.2
Construction Costs (Indexed to US, % 0 is cheapest)	74
Ease of getting credit (0-100)	50

Bottom 25%
Top 75%
Top 50%
Top 25%

# DEFINITIONS

#	SCORECARD SECTION	DEFINITIONS
1	Market size	Size of market in value/volume in KSA and/or Region (MENA/GCC) covering future projections based on available estimates from published /government sources
2	Business drivers	A select number of factors that will influence future demand for the related product/service
3	Investment highlights	An overview of key financial metrics summarizing the investment opportunity along with the expected return based on the suggested investment size
4	Value proposition	Summary of key differentiators that position KSA as a strategic choice over other regional/global peers
5	Market readiness	An overview of KSA market structure, market maturity and level of participation by local and global players
6	Global trends	Latest business developments within the sector/product category
7	Scalability and localization	Ease of scaling the business across the value chain or into new adjacent products or geographies that would maximize the opportunity's investment returns and the ability and potential to locally manufacture the product and its components
8	Import dependency	An overview of the countries from which Saudi Arabia is importing the product and their value/volume and share in total imports
9	Value chain analysis	The process or activities that would potentially need to be carried out to deliver the underlying product or service
10	Key stakeholders	Government institutions, organizations, and/or authorities that participate or influence the market for the underlying product/service
11	Enablers	Factors that enable investment in the underlying opportunity
12	Cost of doing business in KSA	Key factors that position KSA as a competitive destination for investment in the region. Productivity adjusted wages do not include cost of \$1.23/hour towards annual recurring charges including work permit, resident identity (iqama) and health insurance

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