

FoodCode

WHITEPAPER V.1.0

Sept 2019

Contents

Legal Disclaimer	3
Executive Summary.....	4
Introduction	5
Objective.....	5
Problem Description.....	6
Solution to Opportunity	6
Vision & Mission.....	7
About Bio nutricia	7
SME Landscape in Malaysia.....	8
Quick Market Facts & Trends.....	12
Market Situation.....	12
Food Waste Industry.....	16
Food Additives Market.....	18
Market Trends	22
Raw material scarcity and its impact on business	28
Market Growth	28
Market Potential.....	29
How It Works: Foodcode Blockchain Ecosystem Business Model	30
Foodcode Business Model.....	32
Business Description.....	32
Value Proposition	32
The benefits of the Foodcode virtual manufacturing platform:.....	32
Features on Blockchain.....	33
Foodcode Token	33
Utility Token Model.....	33
Revenue Stream.....	33
Technology	34
Foodcode Ecosystem Diagram	36
How The Foodcode Chain Works	38
Features of Foodcode Chain	40
Foodcode Marketplace	43
Foodcode Tokenomics	44
Roadmap	45
Product Status	46

Go-to-Market Strategy.....	46
Token Model	47
Token Structure	47
Ecosystem Token (FCDT).....	48
Token Sales Structure.....	48
Token Sales	49
Token Distribution.....	50
Vesting Period.....	51
The Foodcode Team	53
Partnership	55
Existing Clientele.....	55
Appendix.....	56
Patent Registration	56
Patent and Trademark	56
Field of the Invention.....	57
Process for Preparing Nutritional Powder Extract.....	58
Bio nutricia Certification.....	58
Quality Certification	59
Case stories of Blockchain in the Food & Supply Chain Industry.....	59
Agric – Agricultural Chain for Technology Research and Development	59
Ecos – Decentralized Software Inspection and Quality Control in the Food Industry	60
Walmart – Food Safety on Blockchain	60
Carrefour – Nestle – Other Food Companies	61
FedEx	61
Microsoft.....	62
References.....	64

Legal Disclaimer



This whitepaper is for information purposes only and is not a statement of future intent.

Foodcode (the trading name of Bio nutricia Sdn Bhd) makes no warranties or representations as to the successful launch of the Token Distribution Event (TDE), or achievement of any other activities noted in this paper, and disclaims any warranties implied by law or otherwise, to the extent permitted by law. No person is entitled to rely on the contents of this paper, or any inferences drawn from it, including in relation to any interactions with Foodcode, the TDE or the technologies mentioned in this paper.

Foodcode disclaims all liability for any loss or damage of whatsoever kind (whether foreseeable or not) which may arise from any person acting on any information and opinions relating to Foodcode, the Foodcode platform or the TDE contained in this paper or any information which is made available in connection with any further enquiries, notwithstanding any negligence, default or lack of care.

Whilst every effort is made to ensure that statements of facts made in this paper are accurate, all estimates, projections, forecasts, prospects, expressions of opinion and other subjective judgments contained in this paper are based on assumptions considered to be reasonable as of the date of the document in which they are contained and must not be construed as a representation that the matters referred to therein will occur.

Any plans, projections or forecasts mentioned in this paper may not be achieved due to multiple risk factors including without limitation defects in technology developments, legal or regulatory exposure, market volatility, sector volatility, corporate actions, or the unavailability of complete and accurate information.

All TDE information contained in this document is intended to be indicative only and is not a statement of Foodcode's intentions. Any such information may be varied by Foodcode prior to the TDE. This whitepaper has been prepared in English. Any translation of this whitepaper into any language other than English shall be for reference only. In the event of any conflict or inconsistency between a translation and the English version of this whitepaper, the English version shall take precedence over the translated text and/or any new documentation will supersede this document and be available at <https://www.Foodcode.io>.

Executive Summary



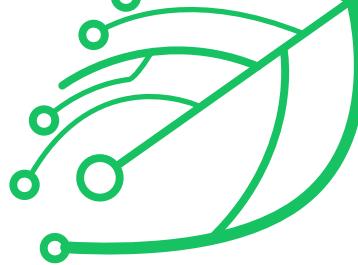
Bio nutricia was incorporated in 2006 as a Specialty Food (Nutraceutical), Beverage & Traditional Plants (Herbs) trading company in Malaysia. Combined, the company has more than 15 years of experience – lead and managed by a team of professional nutritionist, food scientist, and engineer. The goal is to offer a one-stop solution from product design, product registration, write up, and production till finish useful to their customer. Services like dependable research & development are part of the core competencies. Thus, in partnership with the university and the Forest Research Institute Malaysia (FRIM), they are offering customized and practical, proven formulation to facilitate from prototype till commercialization of inventions. Products offered to the market have certifications from GMP, HACCP, MESTI & JAKIM HALAL.

The markets of food ingredients (US\$ 400Bn by 2022), plant extraction (US\$ 92Bn by 2024) or even medical cannabis (US\$ 95Bn by 2024) has the vast potential – Ergo, opportunities that Food code can leverage on to seek for expansion of their business. Generally, the numbers do not only tell the opportunity of organic growth but also the demand of a respective growth rate up 26.7% CAGR (depending on the segment) from 2017 till 2024. This is a field that Foodcode with its business model can participate.

Foodcode is embarking on a digital evolution route by developing an end-to-end marketplace for the supplier, manufacturer, and consumer on the blockchain. This ecosystem does not only bring various players together but also open a global market for anyone who wants to source for manufacturer through the e-commerce platform. Demand and supply will regulate the volume of transactions through the FCDT tokens.

Blockchain has been identified as the most suitable technology due to its robustness and being able to connect with the dominant market player like Nestle, Carrefour, and Walmart. Large corporations are adopting this technology because of the food safety requirements in the supply chain. With Foodcode, the manufacturer of any sizes can leverage this platform to support the compliance requirement. The Foodcode is in the time of building the right infrastructure for all participants in this food and medical extractions businesses to stay in trend of the developments of the food industry.

Introduction



Based on a feasibility study¹⁵, the total market of food ingredients and manufacturing growth is ranging between 5% and 26.7% CAGR from 2017 to 2027, which results in more than > US\$100 Bn. By adding new technology like the blockchain to its core business, it does not only add another level of innovation to its branding but also enhances efficiency and productivity. It includes meeting the demands of future requirements towards trust and traceability on the food safety requirements influenced by big brand players like Nestle, Starbucks, Walmart, Carrefour, and many more.

Foodcode is a marketplace developed with the support of Bio nutricia - a food ingredient and manufacturing company that envisions for a one-stop-shop solution. Bio nutricia has a proven business track records of RM10 million per annum bringing their strength of OEM manufacturing and research & development.

Bio nutricia has formed a unique and strategic business model that encompasses an end-to-end production line for its clients under Foodcode. Bio nutricia held in-house experts as a commitment of ensuring quality and constant research for state-of-the-art technology enhancement.

Foodcode is born with the idea of leveraging the blockchain for all manufacturing and supply chain companies that share the same traditional business model, but do not have the capacities or knowledge to embark on this new technology.

Large corporations are starting to hire sub-contractors and contract manufacturers to register their products for tracking and traceability purposes using the same technology. Experts believe that this will become a mainstream solution for the next few years. But, the added-value of the Foodcode is it can facilitate IP-Protection and enable the use of patents for further commercialization purposes. Thus, traceability and enforcement of patent rights can secure a significant revenue stream without any losses caused by the misuse of patents.

Objective

The ultimate goal is to provide a universal platform of end-to-end virtual manufacturing that can satisfy the needed services of businesses and consumers.

Beyond the context of marketing and selling, the virtual platform will help businesses in determining the production capacity needed to meet the changing demands of their products. Thus, it provides cross-selling and upselling analytics for right planning and decision making. Moreover, it provides an enabling business ecosystem to design and develop goods and services to satisfy the needs of B2B and B2C commerce.

Furthermore, the platform will provide a dynamic and engaging advertisement and marketing campaigns towards scaling-up the marketplace of e-commerce.

Thus, the technology provides innovation that eases the life of business owners of providing

¹ FSB – Feasibility Study (2019), Bitesize Concepts



logistics support on the inventory – consequently providing the transparent tracking and transaction of goods with the secured features of first-mile and last-mile delivery.

Problem Description

The small and medium enterprise is highly dependent on their client performance. Clients buy products based on the right information and referrals. But given the tight competition of products playing in different marketplaces, SMEs have increased requirements for knowledge management, innovation, quality, and flexibility to sustain in the competition.

As competition in the marketplace goes tight, constant lead generation is becoming an evolving challenge for SME's together with price competition. SMEs need to maintain their share of market position to survive.

Moreover, businesses are facing the challenge of adding resources to handle the growing demand because of high capital expenditures. Thus, SMEs will likely result from accessing financing to outsource funds to purchase, improve, or maintain assets to scale-up the efficiency and capacity of the company to satisfy the needs of the clients.

Nowadays, the global market is in a state of volatility that is affected by the dynamics of trade wars (i.e., US-China) and the trade regulations. Consequently, the demand and supply are affected resulting in the high cost of prices.

Furthermore, the fake foods and artificial materials and end products are increasing in the market that affected the demand of authentic products. Thus, most buyers are maximizing the influence of social media where it is difficult to determine the authentic against the bogus products.

Solution to Opportunity

Bio nutricia and other SMEs are facing the challenge of competing with substantial corporate manufacturers and businesses in the market.

The creation of Foodcode Blockchain Ecosystem as the virtual manufacturer market place is the approach of combining the strength of all SME manufacturers. Together, the SMEs can enhance and strengthen their manufacturing capacity. During peak seasons, the SMEs can secure the demand and supply through dual sourcing. The best part of it is that SME manufacturing can share models, lessons, and recommendations.

The innovation of Foodcode will allow sellers the opportunity to combine their resources to establish the brand, market, sell products, share technology, and interconnect the manufacturing capabilities. It will enable linkage among suppliers and sellers in one same platform. It gives comfort among clients to get the right information, sourcing, manufacturing, packaging, buying, and delivery of goods.

The platform strengthens research and development by recognizing technology ownership and



preservation of intellectual property.

Furthermore, the innovation will help guide SMEs in compliance for import and export procedures. To strengthen the dynamics of the marketplace, it allows global sharing database of contacts of the platform members for linkage building. Overall, the blockchain exercise trust, efficiency, and security for businesses and customers.

Vision & Mission

The Vision:

To create one world, one manufacturing, and one solution platform.

The Mission:

To develop a virtual manufacturing platform for suppliers, vendors, business partners, and entrepreneurs.

To secure intellectual property and innovation from prototyping, research, production, scaling-up, marketing, and selling.

About Bio nutricia

Bio nutricia was incorporated in 2006 as a Specialty Food (Nutraceutical), Beverage & Traditional Plants (Herbs) trading company in Malaysia.

Bio nutricia has more than 15 years of experience providing one-stop solution from product design, product registration, write-up, and production of goods. They are managed by a team of professional nutritionist, food scientist, and engineer. The company has reliable research and development capacity in partnership with Forest Research Institute Malaysia (FRIM). It came up with a proven formulation to manufacturing natural supplement products in liquid gel, powder, chewable tablet and herbal gourmet beverage holding GMP, HACCP, MESTI, FDA, and JAKIM HALAL certification to signify product quality, consistency and also safety.

Bio nutricia has established its name as the best one-stop raw material supplier providing quality storage that evolved to manufacturing, research, and development. The company offers the following services:

- Custom label and product registration to BPJK/NPRA and BKKM that includes packaging design.
- Supplier of plants and raw materials of standard plant extracts for practicing Chinese Physicians, Food Supplements of Multi-level marketing.
- The company is also a supplier of bakery ingredients for food and beverage manufacturers.
- OEM manufacturing of high-nutrition products with tropical plant extracts that increase energy levels such as herbal coffee.
- Further, it includes the manufacturing of beauty care products for face and skin beauty, anti-aging, anti-acne/pimple, and anti-wrinkles.



- Also, the company produces sports and nutrition products that give strong bones and support body muscle development.
- Moreover, Bio nutricia provides products that provide better immunity boost and digestive and colon health, detox, weight loss, support mental health and child growth, and development.
- On-demand Plant & Herbal Extraction Service.

Office and location

Bio nutricia Manufacturing (GMP, HACCP, JAKIM HALAL) Malaysia Sdn Bhd

No. 37, 39, 41 & 56 Jalan TSB 1, Taman Perindustrian Sungai Buloh, 47000 Sungai Buloh, Selangor, Malaysia

Phone: 0126226918, WeChat: +6012 - 6618 157, WhatsApp: 0126618157

Email: ng@bionutricia.com, business@bionutricia.com, pong@bionutricia.com

Website: www.bionutriciaextract.com

SME Landscape in Malaysia

The Ministry of Entrepreneur Development is looking to boost the contribution of SMEs to the manufacturing of 41% CAGR by 2020⁶

SMALL AND MEDIUM ENTERPRISES (SMEs) PERFORMANCE 2017

"Malaysia's SMEs GDP recorded a strong growth at 7.2 percent exceeded Malaysia's GDP which registered at 5.9 percent in 2017"

7.2%

SMEs GDP

5.9%

Malaysia's GDP

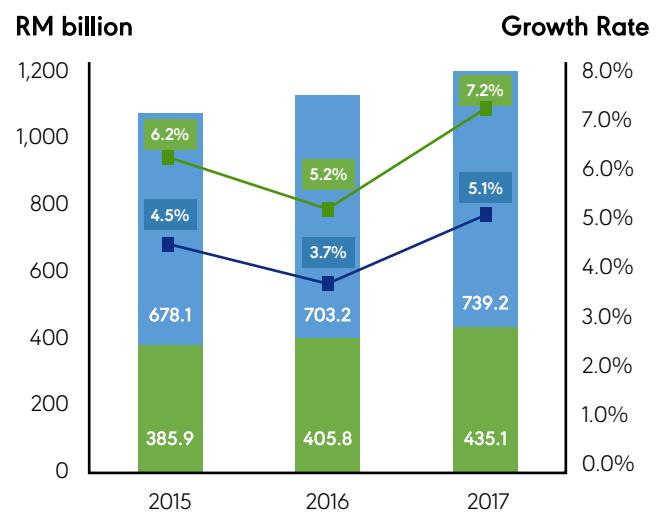
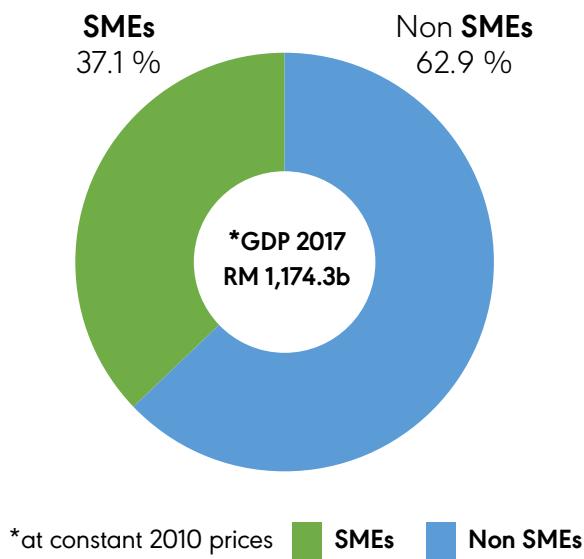
The Small and Medium Enterprises (SMEs) Performance in 2017⁷ shows a strong growth at 7.2 percent as compared to 5.2 percent in 2016. The data shows that the SME performance has exceeded overall Malaysia's GDP (at 5.9%) and non-SME (5.1%) performance. It indicates that SME GDP contributed the 37.1% increase of Malaysia's GDP compared to the 36.6% of the previous year.

²<https://www.freemalaysiatoday.com/category/nation/2018/12/06/ministry-to-boost-contribution-of-smes-to-manufacturing/>

³ https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=159&bul_id=cEl0bklpZHJaTlhRNDB3d2ozbnFIUT09&menu_id=TE5CRUZCblh4ZTZMODZlbtmk2aWRRQT09



"SMEs GDP contribution increased to 37.1 percent as compared to 36.6 percent in 2016"



1

Value Added by Category 2016-2017, Percentage Share to Malaysia's GDP and Annual Percentage Change at Constant 2010 Prices

CATEGORY	VALUE ADDED (RM BILLION)		SHARE TO MALAYSIA'S GDP (%)		ANNUAL PERCENTAGE CHANGE (%)	
	2016	2017	2016	2017	2016	2017
SMEs	405.8	435.1	36.6	37.1	5.2	7.2
NON SMEs	703.2	739.2	63.4	62.9	3.7	5.1
MALAYSIA GDP	1,108.9	1,174.3	100.0	100.0	4.2	5.9

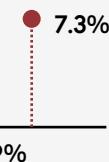


SME is an added-value for the Manufacturing sector which contributed the rose to 6.8 percent (2016: 4.8%) led by Food, beverages and tobacco subsector which registered a double-digit growth of 11.0 percent (2016: 2.9%)

CONTRIBUTION OF SMEs

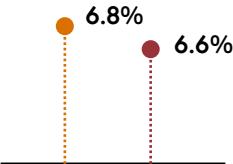
Growth Rate

Agriculture
50.7%



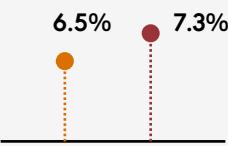
Agriculture sector rebounded which attributed by Rubber, Oil Palm, Livestock & Other Agriculture

Construction
47.1%



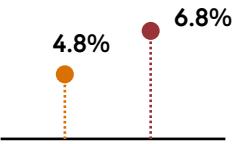
The momentum of Construction sector was influenced by the moderation in Specialised Construction Activities and Civil Engineering

Services
40.6%



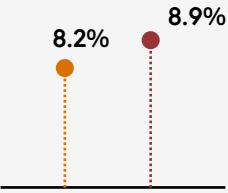
The expansion in Services was accelerated by Wholesale & Retail Trade, Food & Beverage and Accomodation

Manufacturing
34.6%



Food, Beverages and Tobacco led the growth of Manufacturing sector

Mining & Quarrying
1.9%



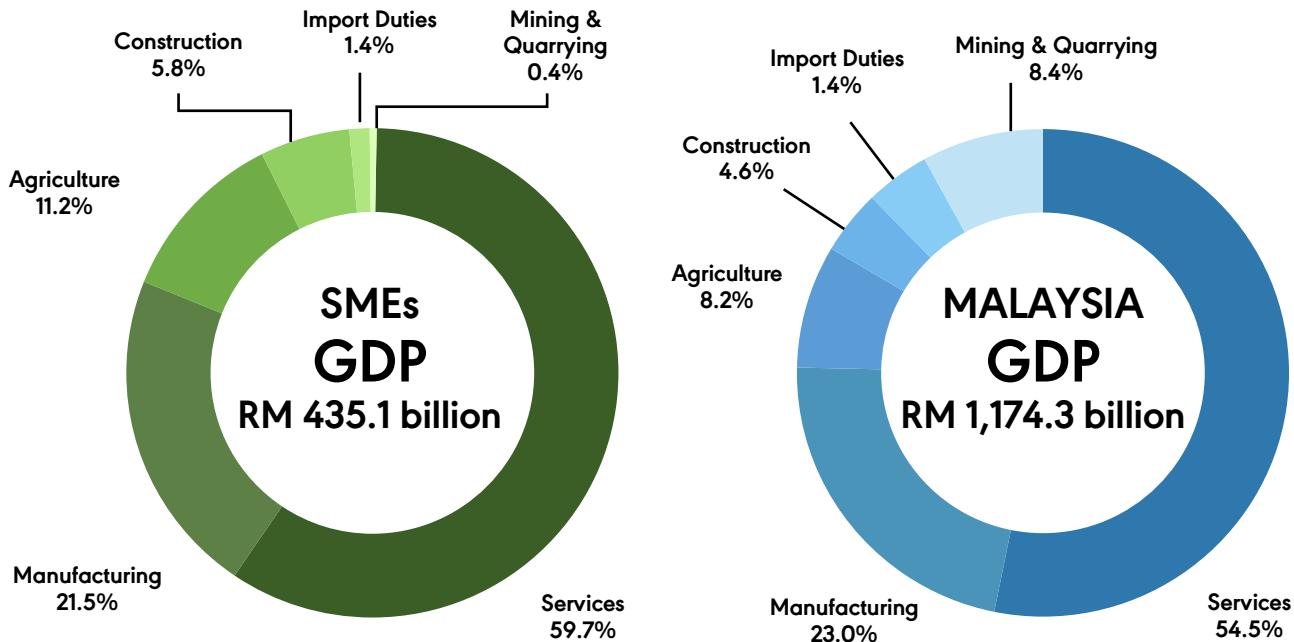
Quarrying of Granite, Sand and Stone drove the momentum of Mining & Quarrying sector

2016 2017

The SMEs activities are dominated by services which contributed 59.7 percent and Manufacturing sectors with a share of 21.5 percent as depicted in Chart 2.

2

Percentage Share of SMEs GDP and Malaysia's GDP for 2017 at Constant 2010 Prices



SMEs GDP of Services sector expanded to 40.6 percent as compared to 40.2 percent in 2016, which was dominated by Wholesale & retail trade, food & beverage, and accommodation subsector.

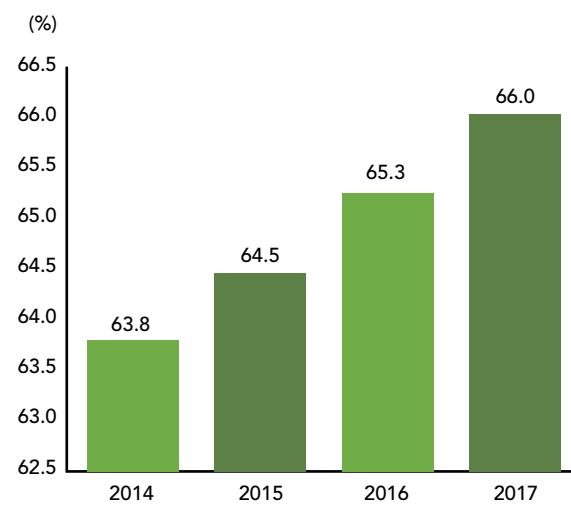
The most significant contributor to SMEs employment was the Services sector. Manufacturing was the second-largest contributor, followed by Agriculture, Construction and Mining & quarrying.

The Malaysian Government⁸ reveals that there is a substantial development in the SME sector for manufacturing contributing 40% of Malaysia's GDP. The digital industry is the next big thing to leverage to the trending success of the SME. The considerable part of this digital evolution is the blockchain technology to help SMEs to take advantage in their manufacturing processes.

The innovation of community manufacturing with the concept of virtual manufacturing is a game-changer that will give a win-win situation to all critical stakeholders of the

3

Contribution of SMEs Employment for 2014-2017



⁴ Department of Statistics Malaysia, Official Portal (2017-2019)



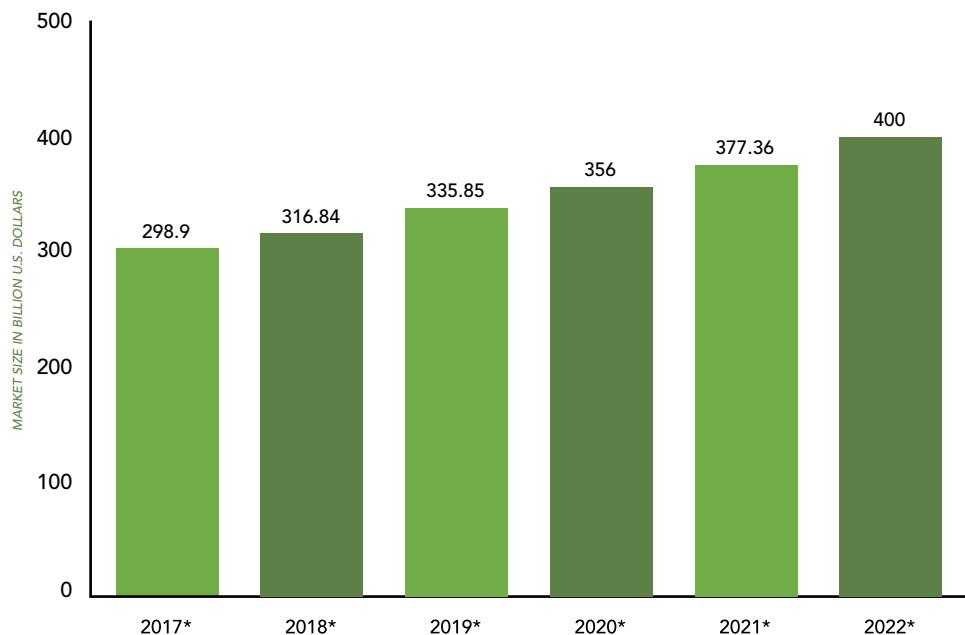
business sectors. The SME community will benefit from the active collaboration and effective production through the one global system approach. This marketplace office the complete supply chain across the online e-commerce platform. It can address business concerns such as marketing costs, reseller contracts, sourcing, lead generation, timelines, IT support, and many more.

Quick Market Facts & Trends

Market Situation

According to the Statista report⁵, the global market size of food ingredients forecasted to value at about 400 billion U.S. dollars by 2022.

The market size of food ingredients worldwide between 2017 and 2022 (in billion U.S. dollars)



- The Food Ingredients Market is forecasted to grow from USD 33.67 billion in 2018 to USD 63.11 billion by 2026, at a CAGR of 7.8%, during the forecast period. A rapidly rising population and higher urbanization have boosted global demand for processed food products, driving food demand.
- The bakery segment is expected to reach USD 20.16 Billion in 2026, at a CAGR of 8.63% whereas the market for meat and meat products is expected to grow the third-highest

⁵ Market size of food ingredients worldwide from 2017 and 2022, Statista



and is expected to reach USD 11.34 Billion in 2026, at a CAGR of 7.03%.

- The market for the Asia Pacific (APAC) is expected to reach USD 20.79 Billion in 2026, at a CAGR of 9.97%. Developing regions are the fastest-growing consumer of food enzymes as their per capita income increases the demand for packaged food.

Plant Extract Market

Industry Research Report 2018-2025, Globally According to the global Plant Extract Market report published by Value Market Research, the market is expected to touch USD 92.52 Billion by 2024, with a CAGR of 10.5% growing from USD 45.37 Billion in 2017⁶. This is a tailored made research service providing informative data and various critical aspects of the market, such as market outlook, market share, growth, and trends. Further, the report also offers evidence-based information that helps to transform the client's business and achieve their business goals.

Herbal Extracts Market

Herbal Extracts Market Size, Rising Trends, and New Technologies Research Forecast to 2024. The herbal extract is based on herbs as raw materials by the needs of the extracted ground, through physical and chemical extraction and separation process, directed to obtain active concentration herbs in one or a variety of active ingredients, without changing its dynamic ingredient structure and formation of products⁷.

Herbal extracts

These are substances which are obtained by crushing, distilling, comminuting, and juicing various herbs⁸. The processes are designed to maximize the potency of an herb. The global herbal extracts market is predicted to exhibit a 7.52% CAGR from 2018 to 2023 (forecast period), as per the latest report by Market Research Future (MRFR) owing to the preference for herbal medicine in developing economies. It is buttressed by the expanded healthcare budget of these countries.

Herbal Medicine Market

Herbal medicine⁹- Also called botanical medicine or phytomedicine refers to using a plant's seeds, fruits, berries, roots, leaves, barks, or flowers for medicinal purposes. Herbalism has a long traditional use of fruits outside of conventional medicine. It is becoming more mainstream as improvements in analysis and quality control, along with advances in clinical research, show

⁶ Sharma, A. (2019): Plant Extract Market - Industry Research Report 2018-2025, Globally, ResearchGate

⁷ Herbal Extracts Market Size, Rising Trends and New Technologies Research Forecast to 2024, MarketWatch, 2019

⁸ Herbal Extract Market Research Report – Forecast to 2023, Market Research Future, 2018

⁹ Global Herbal Medicine Market, 2018 by Manufacturers, Region, Type and Application, Forecast to 2023, Wise Guys Research Consultancy, Global Info Research, 2018

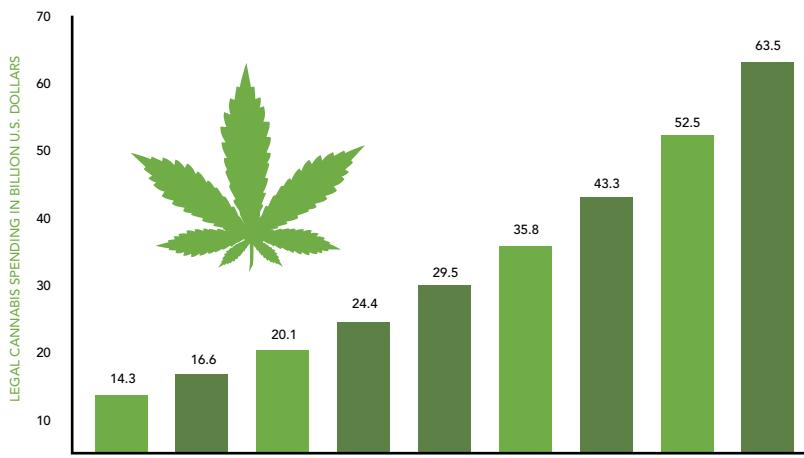


the value of herbal medicine in treating and preventing disease.

The worldwide market for Herbal Medicine is expected to grow at a CAGR of roughly 8.0% over the next five years, will reach 1,980,300 million US\$ in 2023, from 1,250,700 million US\$ in 2017, according to a new GIR (Global Info Research) study¹⁰.

Herbal Supplement Market

The global herbal supplements market size was valued at USD 5.26 billion in 2017 and is anticipated to grow at a CAGR of 6.2% over the forecast period. For the same market, Zion Market Research has published a new report¹¹ that says the global herbal supplement market is expected to reach approximately USD 86.74 billion by 2022, growing at a CAGR of around 6.8% between 2017 and 2022. Some of the key factors contributing to the market growth are rising inclination towards natural products, awareness regarding preventive healthcare, and surging spending on health and wellness. Growing geriatric population coupled with the rising prevalence of chronic conditions is also fueling the demand for herbal products across the globe.



Growing demand for plant extracts from end-use industries such as food & beverages, cosmetics & pharmaceuticals to impart flavor, color, and nutrition is driving the plant extract market¹². A shift in consumer preference towards intake of herbal medicines is again fueling the plant extract market. Side-effects associated with the synthetically prepared drugs leading to various disorders have drastically changed the consumer preference towards the safe & herbal alternative. In turn, it has driven the market growth. Also, rising demand for extracted or herbal supplements is impacting the market growth positively.

Medical Cannabis Market

Medical Cannabis Market: Global Industry Trends, Share, Size, Growth, Opportunity, and Forecast 2019-2024¹³

GLOBAL MEDICAL CANNABIS MARKET OPPORTUNITY AND FORECAST 2019 - 2024
The Global Medical Cannabis Market to Reach
US\$ 44.4 Billion by 2024



¹⁰ Herbal Medicine Market 2018 – Global Share, Trend, Segmentation and Forecast to 2023, Wise Guy Reports, Thomson Reuters, 2018

¹¹ Herbal Supplement Market by source; by; by Function: Global Industry Perspective, Comprehensive Analysis and Forecast, 2017 – 2022, Zion Market Research, 2017

¹² Global Plant Extract Market Report by Types, Forms, End-Uses, and By Regions, 2017-2024, Value Market Research, 2010

¹³ Medical Cannabis Market: Global Industry Trends, Share, Size, Growth, Opportunity and Forecast 2019-2024, imarc Group, 2019



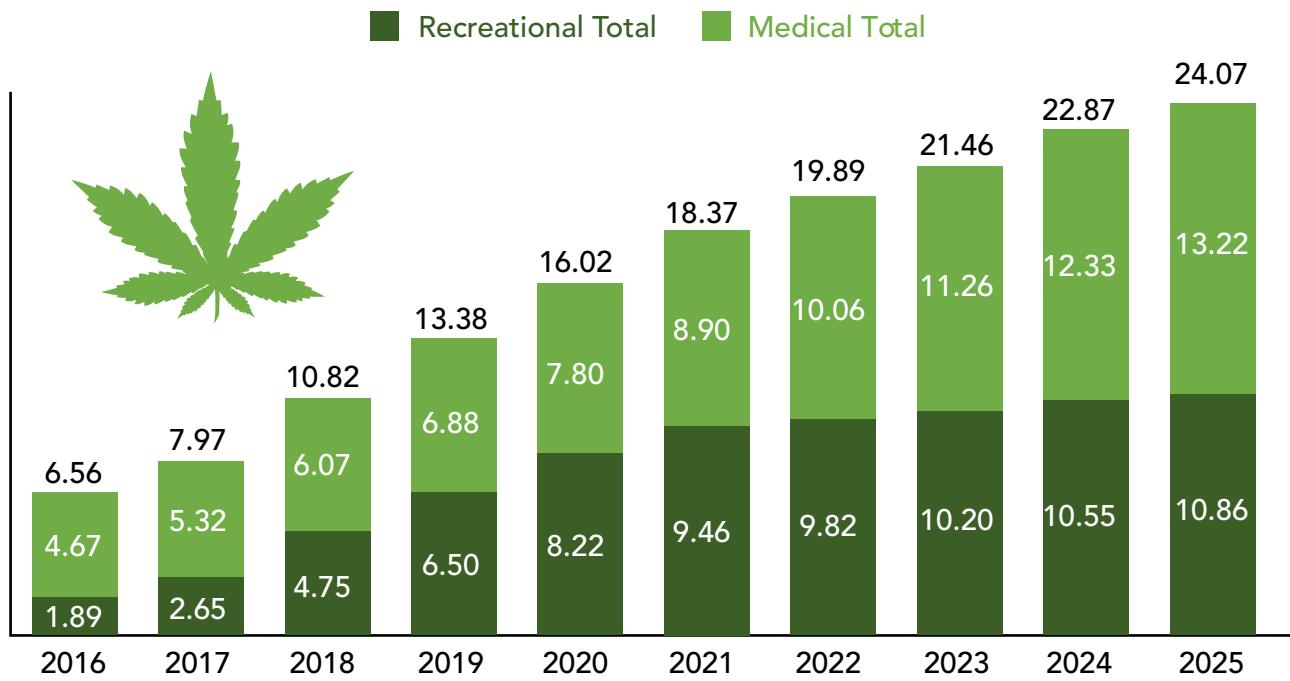
The global medical cannabis market size was estimated to reach a value of US\$ 13.4 Billion in 2018 and US\$16.9 Billion in 2019, according to Statista¹⁴. The market is further expected to reach a value of US\$ 44.4 Billion by 2024, exhibiting a CAGR of 22.9% during 2019-2024. Cannabis is a psychoactive drug which is derived from the cannabis plant of the Cannabaceae family. It has been used medicinally for several years in ancient Indian, Chinese, Egyptian, and Islamic cultures. Nowadays, cannabis finds application in the treatment of a wide range of diseases and symptoms including cancer, chronic pain, depression, arthritis, diabetes, glaucoma, migraines, epilepsy, MS, AIDS, ALS, Alzheimer's, PTSD, Parkinson's, Tourette's. Because of therapeutic benefits, cannabis has been approved for medical use in numerous countries, with varying degrees of legal restriction. Some of these countries include Argentina, Brazil, Canada, Chile, Colombia, Czech Republic, Germany, Italy, Mexico, Spain, United Kingdom, United States, Uruguay.

Forecast legal cannabis spending worldwide from 2016 to 2024 (in billion U.S. dollars)¹⁵

This statistic shows an even higher projected spending on legal cannabis worldwide from 2016 to 2024 compare to Imarc Group Research. Statista predicts that by 2024, spending on legal cannabis is expected to reach 63.5 billion U.S. dollars worldwide, an additional increase of 19.1 billion U.S. dollars.

U.S. Marijuana Market: The Grass Is Getting Greener¹⁶

The projected growth of U.S. recreational and medical marijuana sales (billion U.S. dollars) Global Marijuana Sales to grow 38% to \$16.9 Billion in 2019.



Source: The Cannabis Industry Annual Report

¹⁴ McCarthy, N. (2018): U.S. Marijuana Market - The Grass Is Getting Greener, statista

¹⁵ Legal cannabis market worldwide from 2016 to 2024, statista, 2018

¹⁶ McCarthy, N. (2018): U.S. Marijuana Market - The Grass Is Getting Greener, statista



Worldwide consumer cannabis spending should pick up big-time this year, according to a new report¹⁷. Marijuana stocks may not have had a banner year in 2018, but the cannabis industry made waves like never¹⁸. When the curtain closed, Canada had become the first industrialized country in the world to give the green light to recreational weed, paving the way for billions of dollars in legitimate annual sales, and pulling cannabis out of the shadows and into the spotlight as a valid business model.

Food Waste Industry

Fruits and vegetables have a crucial role in our diet and human life, and therefore the demand for such essential food commodities has increased very significantly as a result of the growing world population and the changing dietary habits (Schieber and others 2001; Vilarino and others 2017). Examples of the significant amount of fruits produced globally include 124.73 million metric tons (MMT) of citrus, 114.08 MMT of bananas, 84.63 MMT of apples, 74.49 MMT of grapes, 45.22 MMT of mangoes, mangosteens, and guavas, and 25.43 MMT of pineapples (FAO 2017). Production of some vegetables includes potato (3820.00 MMT), tomatoes (171.00 MMT), cabbages and other brassicas (71.77 MMT), carrots and turnips (38.83 MMT), cauliflower and broccoli (24.17 MMT), and peas (17.42 MMT) (FAO 2017)¹⁹.

In 2016, the Food Aid Foundation (Food Aid) reported that Malaysian had wasted almost 15,000 tons of food, including 3000 tons of edible food every day. A report has shown that Malaysia's food import bill is said to be between RM35 billion and RM40 billion, which means an average income Malaysian spent about a quarter from their income on food and beverages which later gone to waste. In addition to that, the contributors also included hotels, restaurants, supermarkets, and many more production households²⁰.

	Stages	Characteristics of Food Waste
Pre-consumer	Production	Crop residues, crop waste through poor harvest techniques, pest and diseases, poor transport infrastructure and severe weather conditions
	Processing and Manufacturing	Waste through packaging damages and cold storage, poor transport
	Retail	Stock management and compliance with regulation, storage, and packaging
Post-consumer	Consumer	Stock management at home, poor food preparation, confusion over "used by" dates

¹⁷ Williams, S. (2018): 15 Ways Marijuana Has Made History in 2018, The Motley Fool

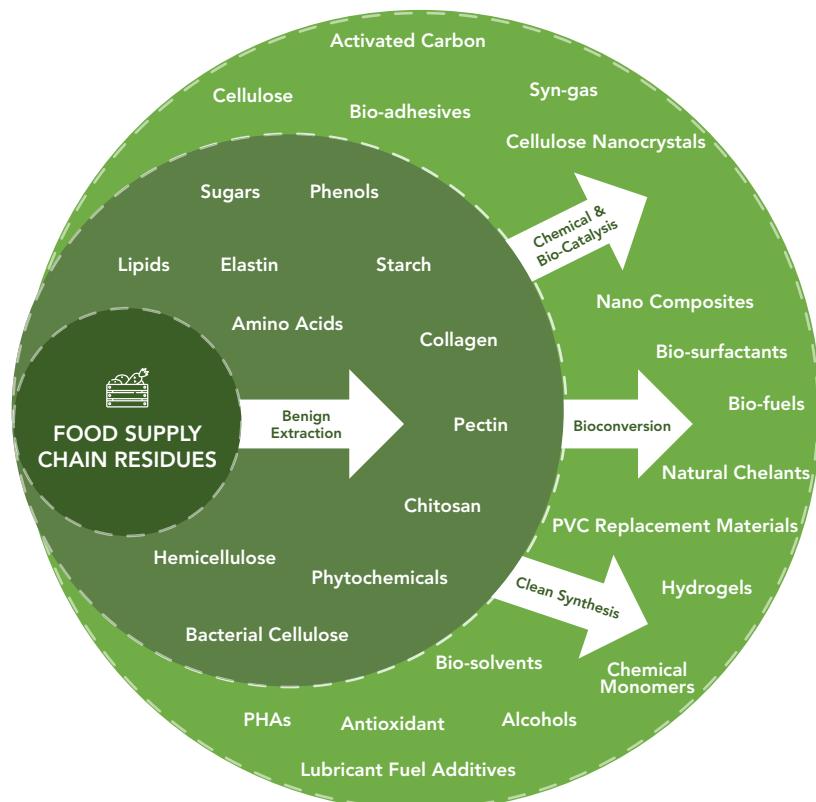
¹⁸ Williams, S. (2018): 15 Ways Marijuana Has Made History in 2018, The Motley Fool

¹⁹ Sagar, N. A., Pareek, S., Sharma, S., Yahia, E.M. (2018): Fruit and Vegetable Waste: Bioactive Compounds, Their Extraction, and Possible Utilization

²⁰ Sulaiman, N. F. A. R., & Ahmad, A. (2018). Save The Food for A Better Future: A Discussion on Food Wastage in Malaysia. International Journal of Law, Government and Communication



FSCW as a renewable source of feedstock²¹

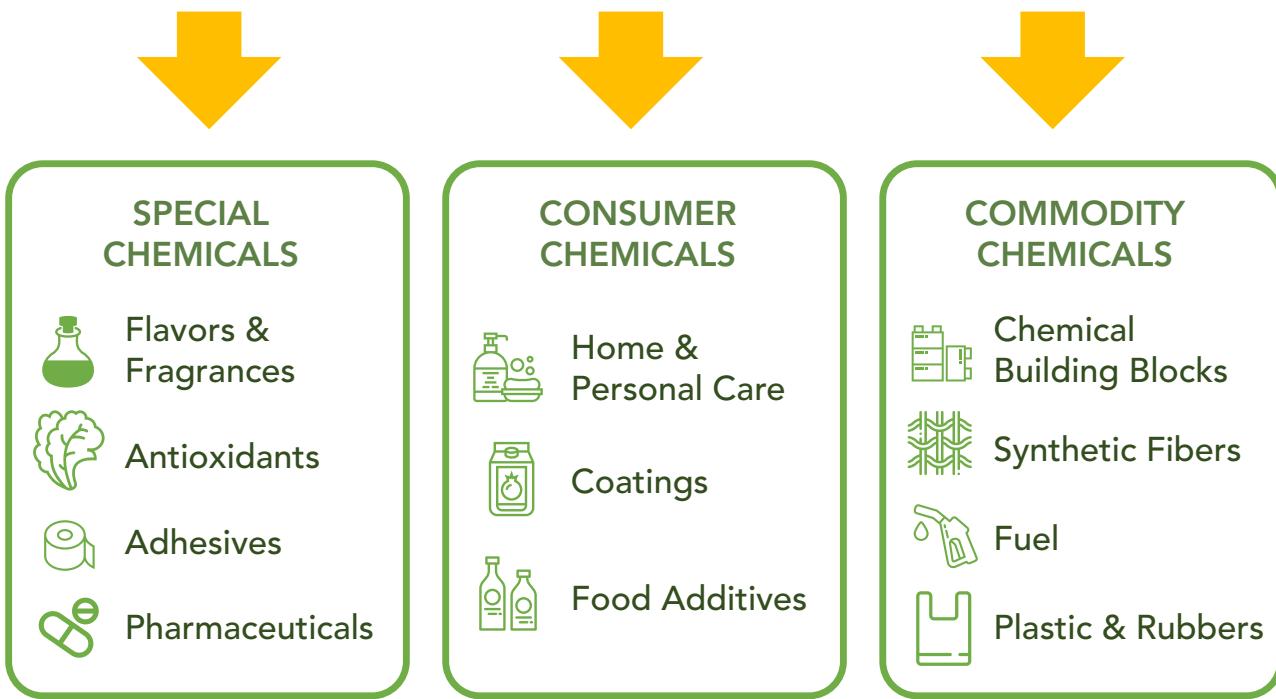


Components present in FSCW and their uses in typical consumer applications

²¹ Food waste as a valuable resource for the production of chemicals, materials and fuels. Current situation and global perspective - Scientific Figure on ResearchGate



FOOD SUPPLY CHAIN WASTE AS A RENEWABLE FOODSTOCK FOR THE CHEMICAL INDUSTRY



Food waste valorization and re-use strategies are becoming popular for the production of higher value and marketable products rather than conventional food waste processing (incineration for energy recovery, feed or composting) while highlighting issues linked to the use of food waste as a sustainable raw material. The influence of food regulations will also be addressed as well as our society's behavior towards food supply chain waste. "There were no ways of dealing with it that have not been known for thousands of years. These ways are essentially four: dumping it, burning it, converting it into something that can be used again, and minimizing the volume of material goods – future garbage – that is produced in the first place." William Rathje on waste (1945–2012) – Director of the Tucson Garbage project²².

Food Additives Market²³

Flavors & enhancers market may witness a significant gain at over 5.5% over the forecast timeframe. It plays a vital role in the consumption & acceptance of quality in everyday life, thereby driving industry growth. Natural flavor market size accounted at over USD 8 billion in 2017, which is predicted to grow with a rapid pace over forecast period owing to the increasing use of enzymes to extract flavor compounds from natural sources to meet product demand.

Sweeteners market size is projected to surpass over USD 60 billion by 2024. Consumers believe in low-calorie sweeteners will be useful for various purposes, which includes weight reduction, weight maintenance, management of diabetes, and reduction in the risks associated with

²² Food waste as a valuable resource for the production of chemicals, materials and fuels. Current situation and global perspective, 2013

²³ Food Additives Market Report 2018-2024 - Industry Size, Growth Analysis, 2018



obesity, thereby driving the industry growth. Asia Pacific natural sweetener market size is likely to witness a significant gain at over 4.5% during the forecast timeframe. Natural sweetener increases stability and is used in milk to enhance the content of bioactive calcium.

Food emulsifiers market size may witness a significant gain of over 4% during the forecast timeline. They are widely used to aid various processed products and also to maintain freshness and quality. Lecithin market is projected to reach over USD 530 million by 2024. Lecithin is generally used in bakery, confectionery and beverage industry owing to significant characteristics that it is smoothening the textures, for dissolving powders, to repel the sticky material, for homogenizing mixtures in liquid and also it is used as an emulsifier and stabilizing agent.

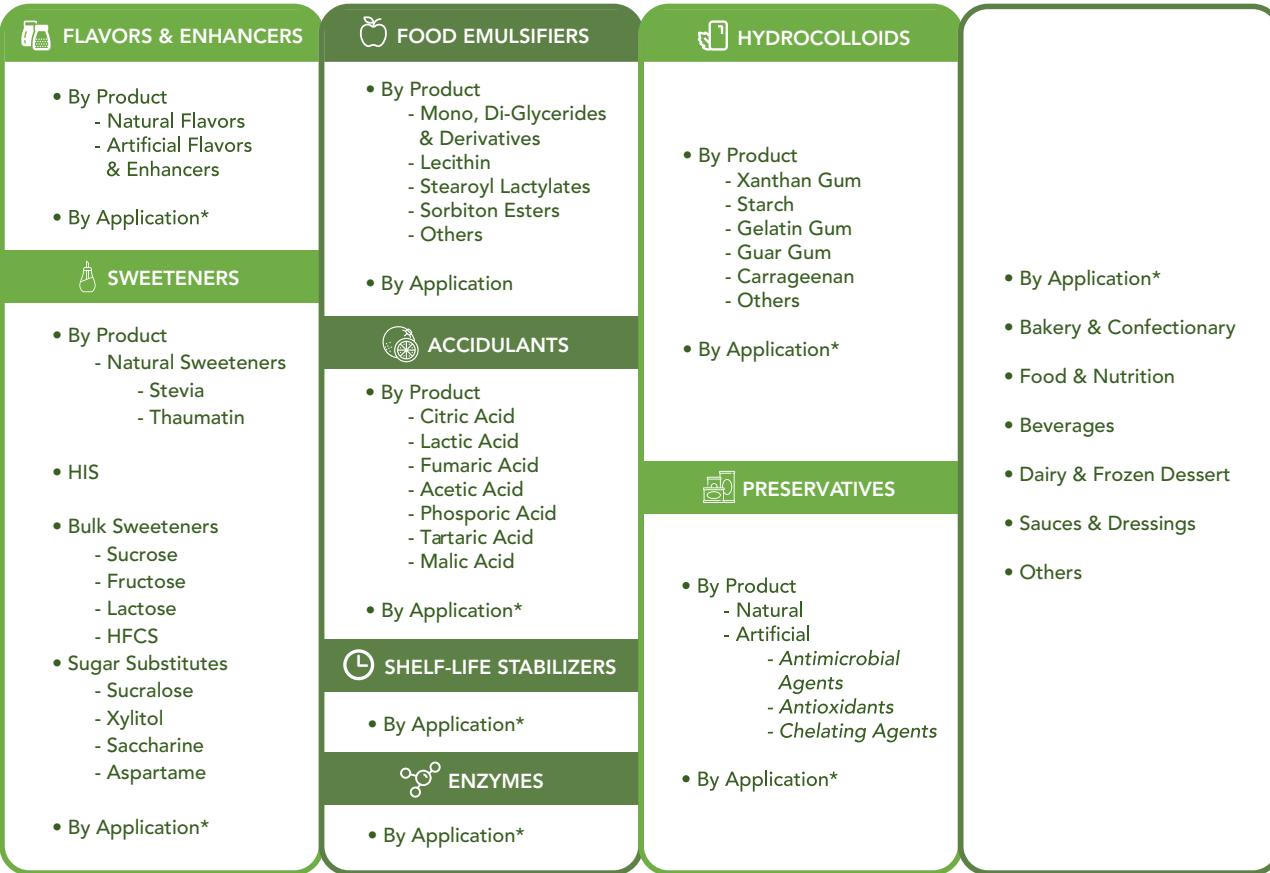
Hydrocolloids market size is projected to surpass over USD 8.5 billion by 2024. They are added to control their functional properties, such as thickening or gelling. As a thickening agent, they find uses in gravies, soups, salad dressings, and sauces while as gelling agents, they are extensively used in products like jelly, jam, marmalade, and low sugar or calorie gels, thereby propelling the industry growth.

Food Additives Market, By Region

- North America, led by the U.S., Mexico, and Canada food additives market size is expected to reach USD 28 billion by 2024. The growing demand for confectionery and beverage products in North America due to hectic lifestyle increased urbanization and growing retail, and hospitality sector is in turn expected to drive demand.
- Europe led by Germany and the UK, Russia, and France food additives market size is expected to reach USD 25 billion by 2024. Growing demand for convenience and organic products in Europe is expected to fuel demand. Increasing awareness about diseases that can be kept at bay by effective use of additives and increasing health consciousness among the general populace in Europe is expected to boost the growth of the market.
- The Asia Pacific, led by China, South Korea, India, and Japan food additives market size is expected to reach USD 40 billion by 2024. The rising of awareness about high nutritional diet and an increasing need to impart ethnic taste are playing a pivotal role in accelerating demand in Asia Pacific food additive market.

Competitive Market Share

Manufacturing companies are focusing on expanding business across regions and developing strategies to size up production capability and a robust global presence. Companies are also forming partnerships and acquire with local & regional companies to open new market opportunities and further accelerate food additives market demand.



The increase of consumer awareness regarding health consciousness along with favorable government initiatives, has led to extensive usage of food additives in the market. The change of lifestyle and the tendency of the consumer towards shifting with convenience, processed and packaged products may stimulate market size. They are added in small quantities in various products to improve and maintain its freshness along with enhancing its flavor, taste, aroma, texture, and appearance. Increase in women workforce and changing lifestyle patterns of consumers has initiated the high consumption of processed products thereby stimulating the food additives market size.

Global processed foods market size was valued at over USD 2 trillion in 2016 and is expected

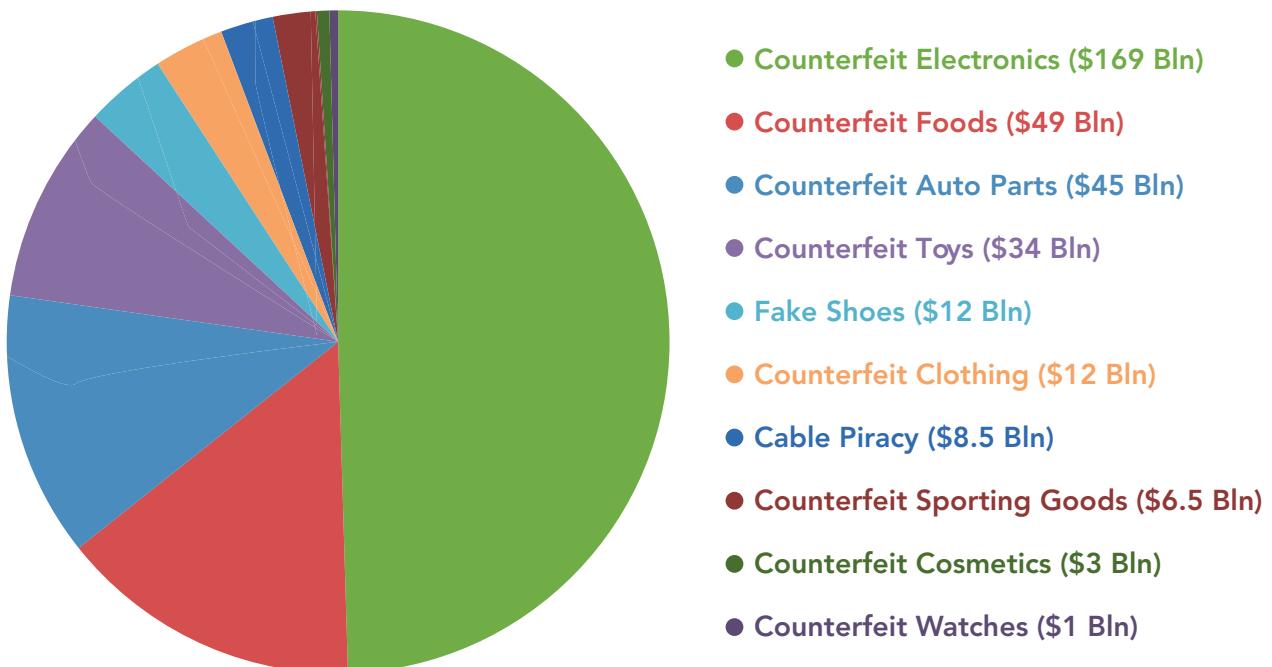


to witness significant gains in the foreseeable timeframe owing to rapid urbanization and population growth.

The rapid expansion of technology in the industry about consumer's demand for healthy and organic food options will positively affect market growth. Asia Pacific food & beverage market was valued at over USD 3.0 trillion in 2016 and may witness gains at over 10%. Food additives derived from natural sources are readily available at minimal cost, which is providing a cost advantage to the manufacturers. Further, these products require less processing as compared to artificial sources and provide nutritional benefits. Over 15% of bakery and 23% of dairy & confectionery are used as packaged products in APAC. The increase of consumer awareness regarding the beneficial usage of food additives mainly in bakery and confectionery, dairy and meat products is expected to foster the market growth.

Raw materials used in the production process are derived from either natural source such as plants or chemically produced to prevent contamination and preservation. Essential raw materials used in the production include soybean, sunflower, rapeseed, palm oil, glycerol, and sugarcane. However, fluctuating raw material prices may hamper the market growth. Companies are primarily engaged in collaborations and joint ventures to cater to high demand from the food and beverage industries.

Lastly, the scale of the problem is impressive in the fake goods and counterfeit market. According to the International Chamber of Commerce (ICC), the global counterfeit goods market is worth over \$ 650 billion a year, which is 7% of the world trade turnover and is omnipresent throughout industries and countries²⁴.

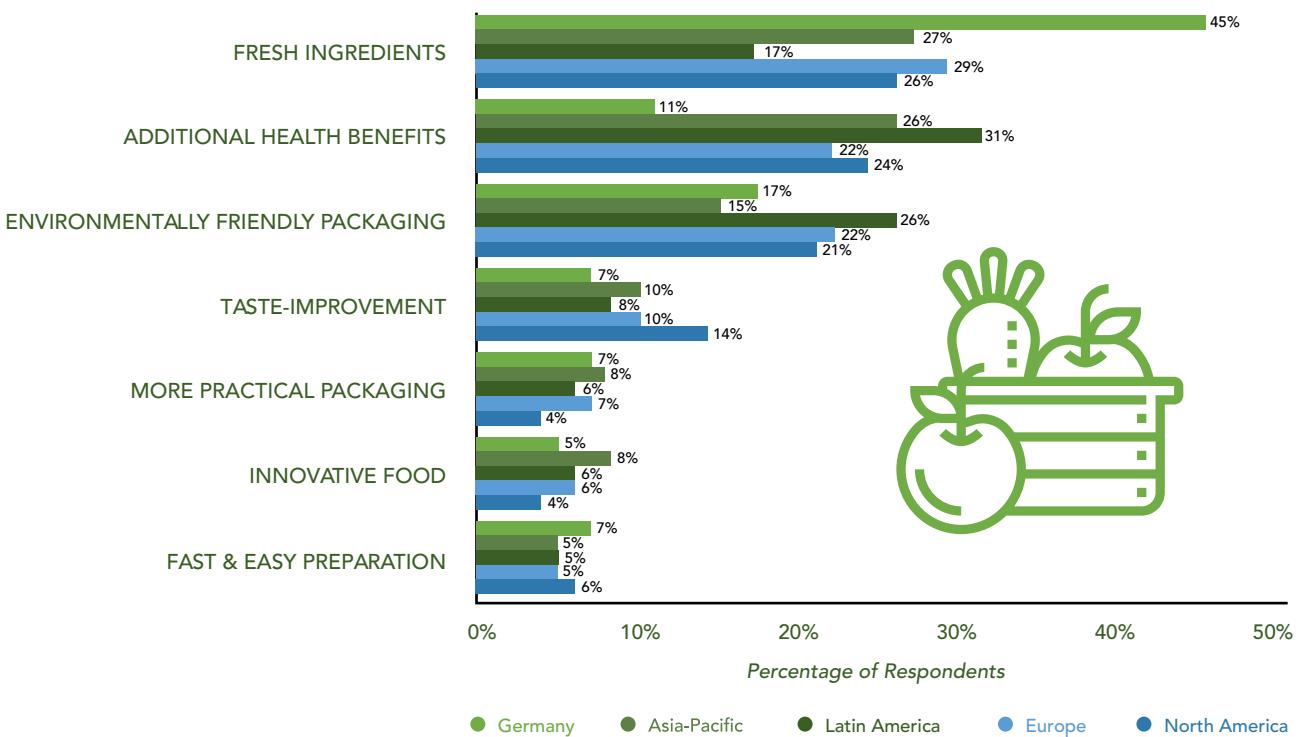


²⁴ Stryszowski, P. (2016): Trade in Counterfeit and Pirated Goods, OECD, <http://www.oecd.org/gov/trade-in-counterfeit-and-pirated-goods-9789264252653-en.htm>



Market Trends

Besides traditional market demand of food ingredients, the statistics shows the opinions of consumers on essential aspects in the development of new food products. There are 26% of Americans feels that companies should consider fresh ingredients when developing new food products²⁵.



“With sustainable ‘green trade’ valued at more than \$1 trillion per year — and rapidly gaining political and economic importance — companies will need to do more to assure the origins, identity, and traceability of their goods.” – **US Council for International Business²⁶**

Next, to that, cost-saving, traceability, and transparency are the top three drivers behind blockchain use cases and investments²⁷.

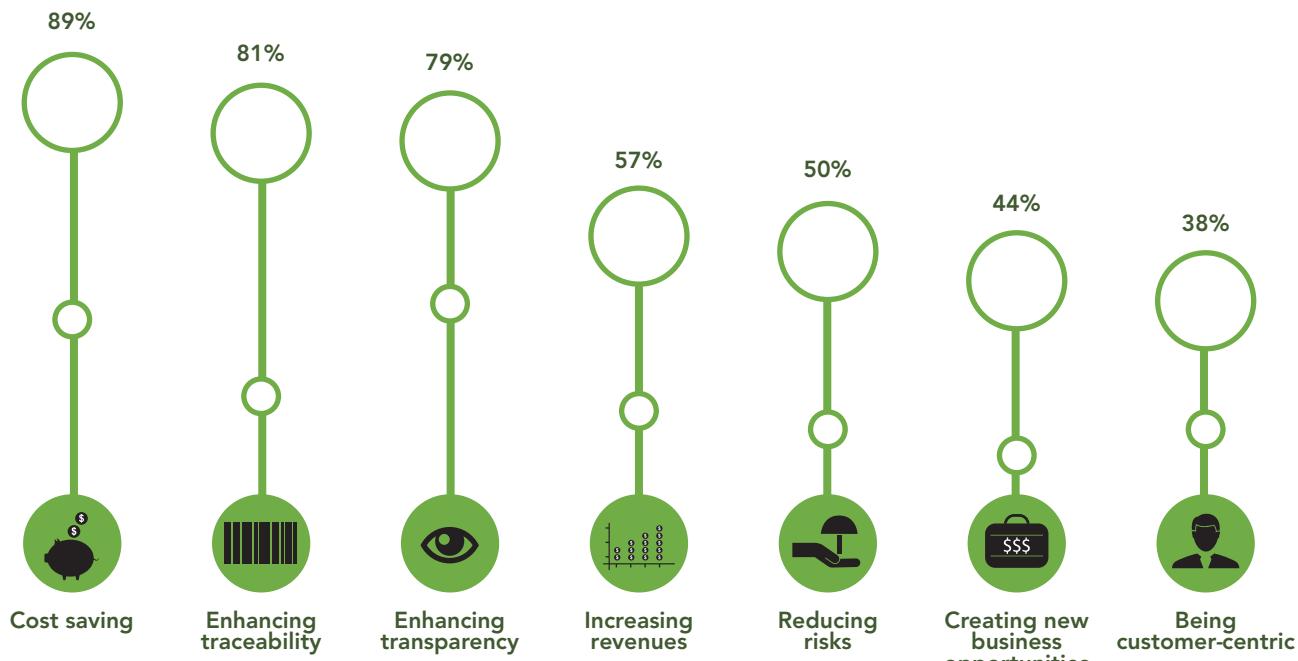
²⁵ Important aspects in the development of new food products, statista, 2019

²⁶ Report: Tracing the supply chain, Accenture, 2019

²⁷ Columbus, L. (2018): How Blockchain Can Improve Manufacturing in 2019, Forbes



Cost saving, traceability, and transparency are the top three drivers behind blockchain investments



Source: Capgemini Research Institute, Blockchain Survey; April-May 2018, N=447 organizations.

GLOBAL HALAL MARKET²⁸



reach over the coming years.

Growing Muslim consumers, coupled with the increased offering of halal-certified products, is expected to drive the global halal market over the projected period. Developed Islamic economic ecosystem coupled with investments in the halal industry by Philippines, China, and Thailand is expected to increase market concentration over the coming years. Technological advancement in the global halal sector to offer halal-certified products has gained consumer attraction over the past few years. For instance, evolving blockchain technology to confirm halal compliance during each stage of the production has eliminated fraud and increased product quality.

Operating in the global halal food industry are offering halal-certified ingredients in their product under growing consumer demand. Multinationals are grabbing the opportunity by

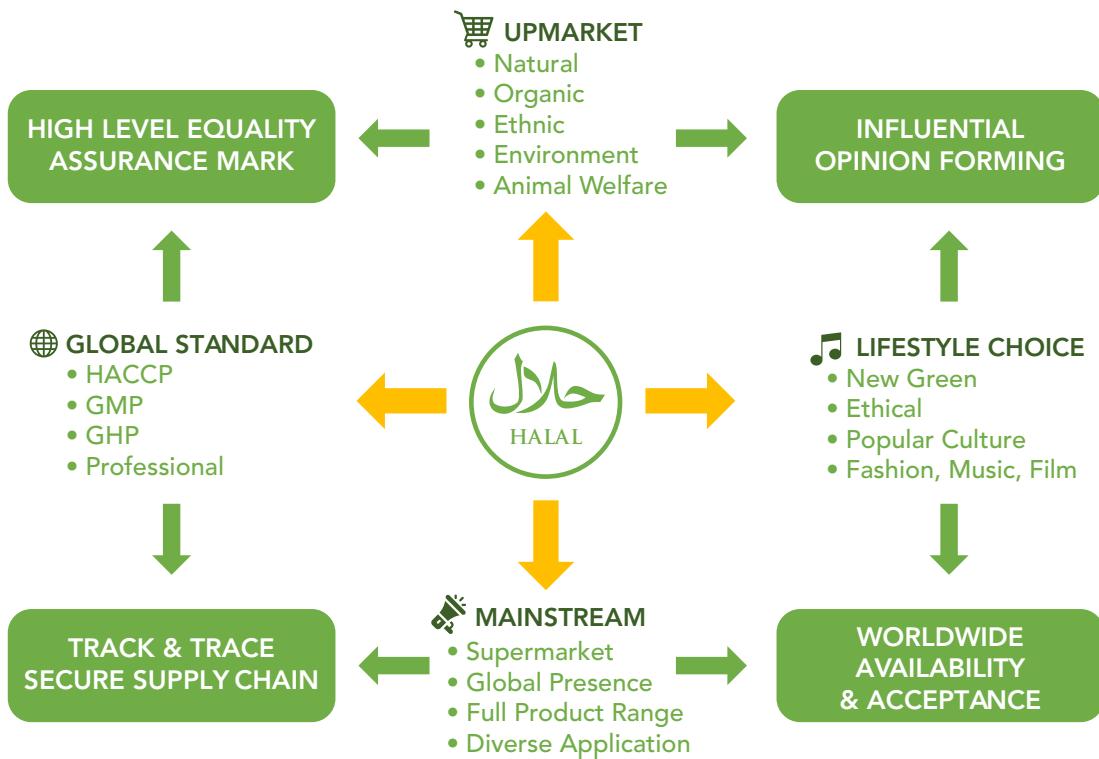


The global halal market size is expected to reach USD 9.71 trillion by 2025. The economic development of leading Islamic countries such as Indonesia, Malaysia, India, Pakistan, Nigeria, and Iran is expected to boost the global halal products market

²⁸ Johnson, R. (2019): Global Halal Market 2018 Consumption Analysis, Health Benefits, Production Growth, Regional Overview and Forecast Outlook till 2025, Thomson Reuters, Adroit Market Research, <https://www.reuters.com/brandfeatures/venture-capital/article?id=74528>



expanding their facilities. For instance, in 2018, Haribo, a gummy manufacturer, opened a halal candy store in the UK. Moreover, growing halal consumption all over the world has encouraged multinationals to enter the market. For instance, in 2018, Japan's Mitsubishi Corporation invested in Al Islami Foods, a UAE-based halal manufacturer. This strategic initiative will not only increase the production of Al Islami Foods but also accommodate the demand for halal products domestically and globally.



Halal pharmaceutical and halal cosmetics together accounted for nearly 4% of the overall market share in 2017. Over the past few years, halal pharmaceutical and halal cosmetic products market is gaining leaps as more products are manufactured with halal standards. The increasing popularity of halal nutraceuticals followed by technological development in the pharmaceutical industry, such as halalopathy, is expected to drive the market over the coming years.

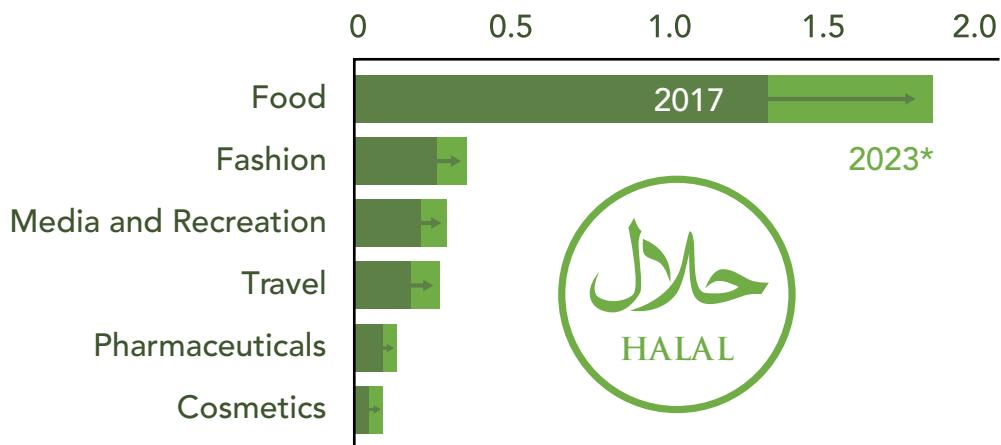
Al Salam Bank-Bahrain, Al Rajhi Bank, INAYAH, MMA Bio Lab Sdn Bhd, Pharmaniaga, Midamar, Nema Food Co., Ivy Beauty Corporation Sdn Bhd, CLARA INTERNATIONAL BEAUTY GROUP, and Crescent Foods are the leading players present within the global halal market. Manufacturers operating in this industry are adopting merger & acquisitions and new product development to increased market competitiveness. For instance, in 2015, Beijing Xiauxun Agriculture acquired Linxia Qinheyuan Halal Food Co.



GROWTH OF THE HALAL PRODUCT SEGMENT²⁹

GROWTH OF THE HALAL ECONOMY

(In Trillions of Dollars)



*Projection

*Source: State of the Global Islamic Economy Report 2018/19

US KOSHER MARKET³⁰

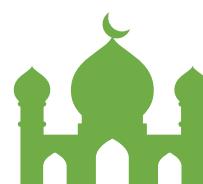
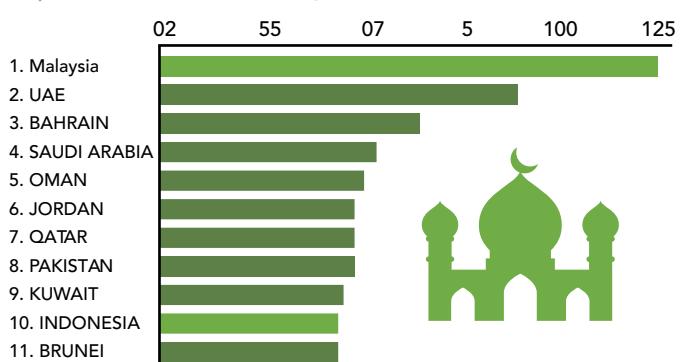
There are 5-6 million Jews in the US that is a potential population for the Halal products in the shelves of the US supermarket; there are 86 kosher products. The Muslims in the US are spending \$16 billion annually on Kosher products because there are no available Halal products. In a glimpse, the consumer profile is 15% Jews (5% strict kosher), 55% Health conscious, 38% Vegetarian, 24% Dairy-free, and 16% Muslim.

UK Halal Market

In London, over 50% boroughs ethnic majority and 4% compose the Muslim population that accounts for the 12% total meat sales. Further, 100% of Asian Muslims go to supermarkets for grocery shopping, but Halal products are too limited. Meanwhile, 51% of all UK education authorities require to serve Halal meat.

COUNTRIES BEST-POSITIONED TO CAPITALIZE ON THE ISLAMIC ECONOMY

(Top 10 Global Islamic Economy Indicator Scores)



Scores assess "National Ecosystems for supporting Islamic Economy Companies," in sectors including food, finance, travel, health, etc.
Source: State of the Global Islamic Economy Report 2018/19,
Compiled by Thomson Reuters, DinarStandard

29 Tan, CK., Tani, S. (2019): Malaysia and Indonesia rush to slice up \$3tn global halal market, Nikkei Asian Review, <https://asia.nikkei.com/Spotlight/Asia-Insight/Malaysia-and-Indonesia-rush-to-slice-up-3tn-global-halal-market>

30 Mintel 2016



South East Asia pushing the Halal Market

There is a regional competition in Southeast Asia. The countries lashing the Halal Market arena are Malaysia, Thailand, Singapore, Brunei, Philippines, Indonesia, and China. The multi-cultural diversity of Southeast Asia is the driving factor that stimulates the development of the world's most advanced Halal Standards and certification agencies. Halal is stimulating the economy through exports, tourism, value-add, trade & research;

- In Thailand, the government initiated the Halal Science Centre, Halal Science Symposium and IMT-GT programs.
- In the Philippines, the healthy BIMP initiative, New Certification Authority, the new progression of the developments in Mindanao is setting the market of Halal.
- In Indonesia, as the largest Muslim population in the Region have their MUI Halal authority that oversees the raw material source and quality control.
- In Singapore, they are housing the certification expertise through the MUIS authority
- China is an attractive emerging market that caters a substantial Muslim population and is on the top as the raw material supplier.
- Malaysia is setting the advanced Standards & Certification, MIHAS expo, World Halal Forum, HDC programs, Media focus (HJ, HJTV) and Centers of Halal Excellence.

REGION VALUE	2005 MUSLIM POP	PER CAPITA FOOD EXPENDITURE P/A USD	HALAL FOOD MARKET MILLIONS USD
Africa	461.77 m	250	115,443
West Asia	195 m	570	111,150
South Central Asia	584.8 m	300	175,440
South East Asia	266.37 m	350	93,230
China	39.1 m	175	5,865
Europe (Inc. Russia)	51.19 m	1,250	63,988
N. America	8.26 m	1,750	14,455
S. America	1.64 m	500	820
Oceania	0.35 m	1,500	525
Total	1,565 m		US\$ 580,915

Source: www.islamicpopulation.com, Euromonitor

Halal Islamic Industry³¹

Future of the Halal Industry – How the Industry will Grow Tomorrow

The global Halal industry is estimated to be worth around USD2.3 trillion. It is growing at an estimated annual rate of 20 percent, making the industry worth about USD 560 billion a year. Moving forward, here are the trends we see happening for the years to come.

In recent years, due to the increase of affluent Muslims, the Halal industry has expanded further into lifestyle offerings including Halal travel and hospitality services as well as fashion

³¹ <https://asia-research.net/infographic-5-reasons-halal-market-next-big-thing/>



and cosmetics.

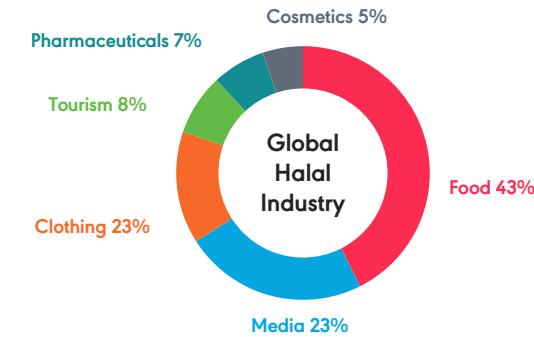
There is also an increase in Non-Muslim consumers, noting "health," "food safety" and "great taste" as reasons to seek Halal food. This development has been triggered by the change in the mindset of healthy eating, as well as the call for more ethical practices worldwide. The global Halal market has emerged as a progressive component in the global economy. With a Muslim and Non-Muslim consumer base increasing every year, the Halal industry is set to become a competitive force in the international business world.

The halal industry³² has now expanded beyond the food sector to include pharmaceuticals, cosmetics, health products, toiletries, and medical devices as well as service sector components such as logistics, marketing, print and electronic media, packaging, branding, and financing. Besides, the halal food marketplace is emerging as one of the most profitable and influential market arenas in the world food business today.

In the consumption market, the global consumption value of halal food increases with the 8.14% average growth rate. East Asia and the Middle East & North Africa are the center of consumption regions due to the more significant demand of downstream applications. In 2015, these two regions occupied 56.83% of the global consumption volume in total.

Halal food has mainly three types, which include fresh products, frozen salty products, processed products, and others. With large number of Islam population and economy development, the consumers will need more halal food products. So, halal food has vast market potential in the future. Manufacturers engaged in the industry are trying to produce high purity and good taste halal food through improving the technology.

The primary raw materials for halal food are fresh meat, food seasoning, packing materials, and other additives. Fluctuations in the price of the upstream product will impact on the production



Total Spend \$1,149 Billion

- 16.6% of Global Expenditure, expected to reach \$1,914 billion by 2021
- Growing need for "Healthy" and "Ethical" food among Non-Muslim millennial consumers
- Steady rise in affluent Muslims - the biggest factor in current market growth trend

Total Spend \$189 Billion

- 5.1% of Global Expenditure, expected to reach \$262 billion by 2021
- Growing need for Muslim storytellers or accurate representation in the Media
- Steady rise in Halal media like digital content marketplaces and Muslim books

Total Spend \$243 Billion

- 11% of Global expenditure, expected to reach \$368 billion by 2021
- Growing need for "Modest" clothing options among Muslim women
- Steady rise in mainstream brands catering to Muslim women needs with more fashionable modest options

Total Spend \$151 Billion

- 11.2% of Global Expenditure, expected to reach \$243 billion by 2021
- Growing need for more Muslim-friendly travel countries and accomodation
- Steady rise in Muslim-friendly vacation platforms and resorts

Total Spend \$78 Billion

- 7% of Global expenditure, expected to reach \$132 billion by 2021
- Growing need for Halal-certified vaccines
- Steady rise in holistic approaches to medicine

Total Spend \$56 Billion

- 7% of Global expenditure, expected to reach \$81 billion by 2021
- Growing need for more resources for R&D as well as marketing
- Steady rise in Halal nail polish being produced by major companies

Source: State of Global Islamic Economy Report 2016/17

³² Costello, H (2019).: Global Halal Food Market 2019 Key Companies Profile, Market Size Estimation, Consumption, Supply and Demand Analysis by 2024, Thomson Reuters, Orbis Research, <https://www.reuters.com/brandfeatures/venture-capital/article?id=96232>



cost of halal food, and then affect the price of halal food. The production cost of halal food is also an essential factor which could impact the price of halal food. The halal food manufacturers are trying to reduce production cost by developing production method³³.

The worldwide market for Halal Food is expected to grow at a CAGR of roughly 6.1% over the next five years, will reach 1630 million US\$ in 2024, from 1140 million US\$ in 2019, according to a new GIR (Global Info Research) study.

Overall the growth rate of this industry regarding extraction and manufacturing ranges from 5% to 17% CAGR from 2017 to 2027 with a valuation beyond a double-digit growth in billions of U.S. dollars. Various source supports not only organic growth but also the additional demand of processed raw materials, especially if considering the other Halal market.

Raw material scarcity and its impact on business

The rapid population growth and economic boost, as well as the emergence of new technologies, place the high demand of usage of natural resources³⁴. Moreover, factors such as climate change, water scarcity, and political instability contribute to a shortage of raw materials and give impact to business.

The growing, long term imbalance of supply and demand threatens business performance across the board. Firms that unable to insulate themselves against the threat of scarcity will face significant challenges with their financial performance, growth, and long-term competitive advantage³⁵. Today, it is imperative for all business to secure efficient and sustainable long term supply.

KPMG research reveals that firms across a wide range of industries have typically been slow to develop long term strategies and responses. Thereby missing the opportunities to make early moves and position themselves competitively. Despite the recognition of the businesses on the scarcity of raw materials, they responded too slow and typically reliant to traditional procurement levers.

There is a need to develop a comprehensive and innovative response with a long-term impact. A business must be foster strategic, cross-functional collaboration and address problems across relevant functions.

Market Growth

The Global Plant Extract Market has valued USD 45 Billion in 2017 and expected to reach USD 93 Billion by 2024, with CAGR of 10.5%.

³³ Tan, CK., Tani, S. (2019): Malaysia and Indonesia rush to slice up \$3tn global halal market, Nikkei Asian Review, <https://asia.nikkei.com/Spotlight/Asia-Insight/Malaysia-and-Indonesia-rush-to-slice-up-3tn-global-halal-market>

³⁴ Raw material scarcity and its impact on business, Supply Chain Movement, 2012, <https://www.supplychainmovement.com/raw-material-scarcity-and-its-impact-on-business/>

³⁵ Raw material & supply markets VI, New Hope Network, 2004, <https://www.newhope.com/managing-your-business/raw-material-supply-markets-vi>



- Herbal extracts lead the plant extract type
The herbal extract has shown dominance over the segment. It leads the segment because of the rising health consciousness among people. Also, people are inclined towards consuming natural and organic products.
- Powder form to gain maximum share by the end of 2024
The powder industry has dominated the plant extract market. As a highly water-soluble compound, along with better shelf life is one of the factors of widening the application of the product in cosmetics, research, and other industries.
- Food and beverage lead the end-user segment
Food & beverage is dominating the end-use segment. Plant extracts are widely used in the food & beverage industry as an antioxidant, color & flavor enhancer, and immunity booster, thereby, fueling the market growth.

Market Potential

- The rapid increase of population and urbanizations will increase the global demand of processed food products. Global Food Ingredients Market is expected to grow 7.8% CAGR from 2018 to 2026³⁶ (US\$78 Bn).
- Increase of demand on clean-label products to give flavor to bakery products, health drinks, frozen desserts, nutraceuticals, nutrition bars, and liquids will trigger the global food flavors market to grow at 5% CAGR from 2019 to 2024 (US\$17 Bn).
- The nutrition supplement drinks for children and women are on the rise resulting in the global malted food drink market to grow by 11% from 2018 to 2024 (US\$16.4 Bn).
- The demand for fruit powders is increasing resulting for the global fruit powder market to grow by 7.2% CAGR from 2017 to 2023.
- Global food acidulants market to grow by 7.3% CAGR from 2015 to 2020³⁷ with the major players like American International Foods, Bartek Ingredients, Cargill (2016).
- Global Functional Food Ingredients Market to grow 6.7% from 2016 to 2023³⁸ (US\$3.4 Bn).
- Global Food Coating Ingredients Market to grow 6.13% CAGR from 2015 to 2022³⁹ (US\$4.43 Bn).
- There is a high prevalence of cardiovascular diseases because of the rising number of people suffering from obesity which leads to the global Phytosterols market to grow by 9.6% from 2018 to 2025⁴⁰ (US\$1.1 Bn).
- Global Plant Extract Market to grow 10.5% from 2018 to 2025 (> US\$92 Bn).
- Global Medical Cannabis Market to Growth 17.2% from 2019 to 2027 (US\$81.5 Bn).
- Food Additives Market size was over USD 55 billion in 2017, and the industry expects consumption above 385 million tons by 2024.

³⁶ Food Ingredients Market to Reach USD 63.11 Billion By 2026, Reports and Data, 2019

³⁷ Food Acidulants Market: By Application Type Source - Forecast 2017-2022, Research and Markets, 2017

³⁸ Functional Food Ingredients Market Size, Share and Forecast To 2023, Credence Research, 2016

³⁹ Food Coating Ingredients – Global Market Outlook (2015-2022), Statistics, Market Research Consulting, 2015

⁴⁰ Phytosterols Market Size, Share, Trends | Forecast 2026, Acumen Research and Consulting, 2018

How It Works: Foodcode Blockchain Ecosystem Business Model



Creation of Bio nutricia Blockchain Ecosystem that connects supplier, manufacturer, and end-customer

The benefits of using the business model:

- Discounted investment tokens can be utilized through the demand and supply of the platform
- Liquidation through top tier crypto exchanges
- The use of utility tokens to acquire Bio nutricia services
- Utilization of production capacity booking and reselling system
- Pay per Performance - Manufacturing Yield
- Supplier – Manufacturing – Consumer Food Ingredients Safety Traceability
- Payment Gateway for Transactions without Intermediaries
- Advertisement for Product Selling
- Marketplace for Product Manufacturing and Wholesale Trades
- Reward and Loyalty Program
- Research & Development Services
- Licensing of protected IP
- Claim & Recall Production Batches

Why Blockchain?

The two main reasons why we should use the blockchain: 1.) trust as a transparent record, and (2) secure as a complication of encryption (cryptography).

The key of the Blockchain module in FCDT is the data interaction, which is uploaded for essential traceability information in the blockchain. We target the inefficiencies of modern e-commerce and supply chains and will utilize smart contracts of a blockchain

1. Building the trusted, transparent record;

- a. Blockchain technology can be leveraged to decentralize trust in supply chains. It can bring measurable benefits and transparency of data across the public and private sectors. Hence, it encourages consumer participation in the supply chain.
- b. The distributed database holds records of digital certifications or events in a way that makes them tamper-resistant. No one can change or delete data even if many users can access, inspect, or add to the data. The original information stays put, leaving a permanent and public information trail of transactions for anyone around the world to verify.
- c. The use of blockchains and Smart Contracts in supply chain management systems can help to ensure interoperability between different systems in manufacturing, storage, and transportation.
- d. With all the proven factors, trust transfer takes place when information interaction occurs between two non-adjacent transaction nodes in the supply chain.

2. Using the blockchain is secure;

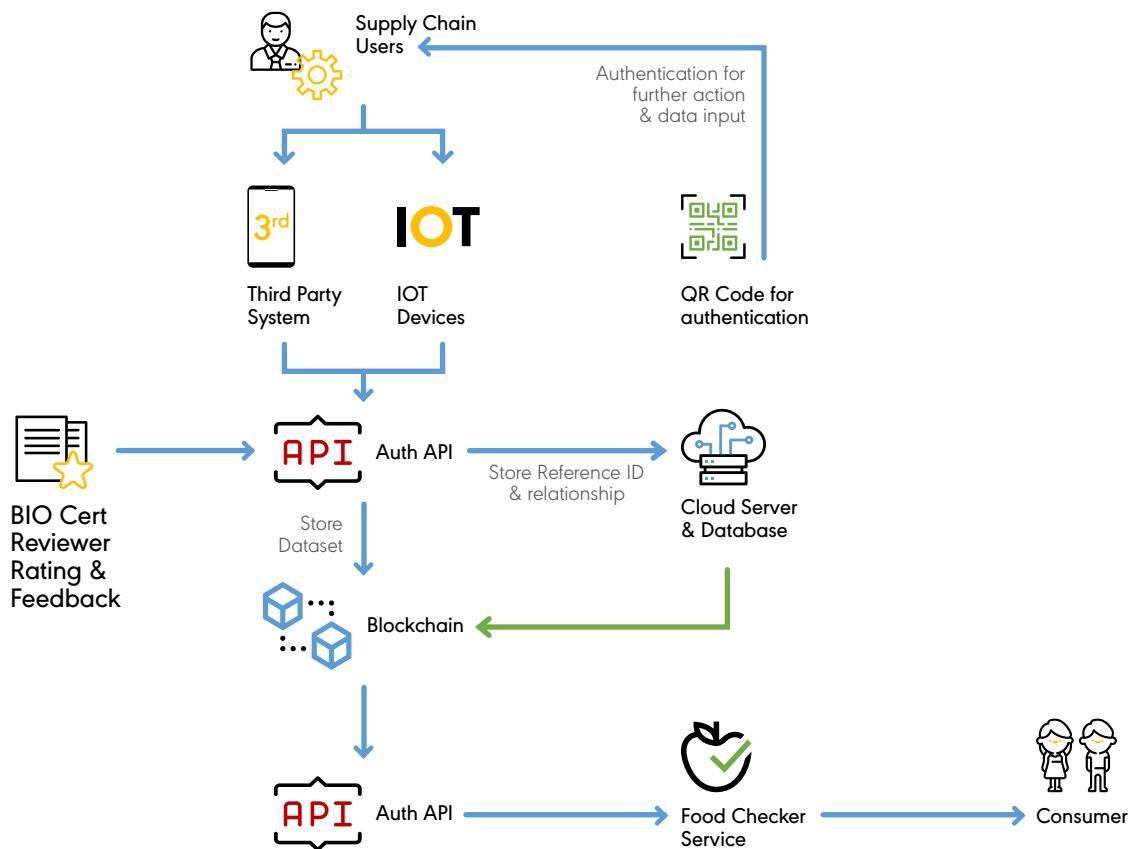
- a. The hashes serve as the links in the blockchain: each block includes the previous block's



unique hash. So if you want to change an entry in the ledger retroactively, you have to calculate a new hash not only for the block it's in but also for every subsequent block. However, you have to do this faster than the other nodes can add new blocks to the chain.

- b. The SHA-256 hash algorithm is used to encrypt event information in the event information verification submodule. The asymmetric cryptographic algorithm is used for identity verification in the smart contract registration submodule. Through these cryptography technologies, system reliability and information authenticity can be further guaranteed.

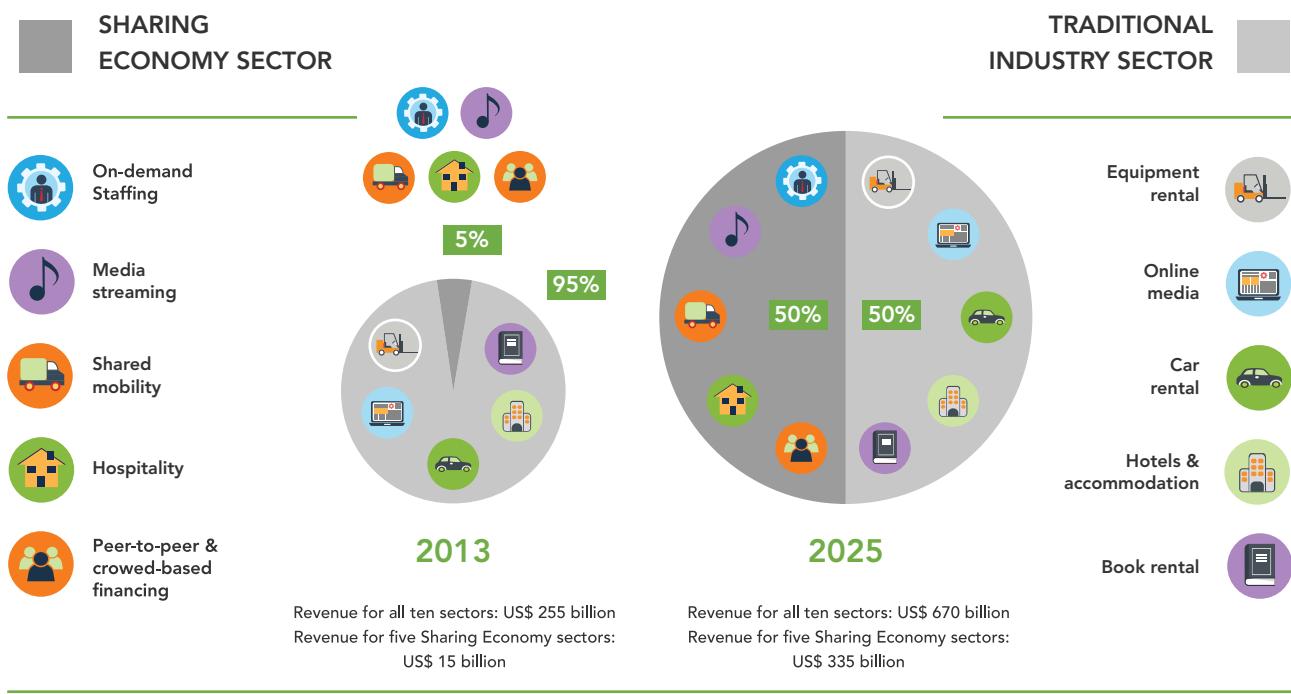
System Architecture



Foodcode Business Model



SHARING ECONOMY SECTOR AND TRADITIONAL RENTAL SECTOR PROJECTED REVENUE OPPORTUNITY



Source: PWC - The Sharing Economy

Business Description

A manufacturer can register to the virtual manufacturing platform and offer their goods and services to sell within the platform and to external buyers.

Then, the business owners can source for the qualified manufacturer of their new products or find additional qualified manufacturers to cope with the demand of production due to seasonal patterns.

It gives easy features for big projects to outsource because of the virtual in-house supply chain. Also, it consists of a central body system that provides support for import and export, research and development, certification, shipping, marketing, and online store.

Value Proposition

The benefits of the Foodcode virtual manufacturing platform:

1. It shortens the lead-time of the business for sourcing and manufacturing
2. Speed in scaling up with the access of the community of manufacturers, sellers, and buyers
3. Combination of B2B2C agreements in one smart contract
4. Credit scoring and self-regulated peer-to-peer review
5. Cost-efficient manufacturing matching capabilities
6. Provision of marketing services and marketplace platform for distribution and wholesale



7. It has a cloud computing software-based platform with API connections for existing manufacturing software (data hub exchange/export)
8. 24/7 marketplace accessible across the globe

Features on Blockchain

- It has one CRM contact database for all members
- It has a record of transactions (ledger) across all services (auditable)
- Cross-border trade via utility tokens
- Ensures leveraging of security due to the distributed ledger technology
- Offers E-Wallet, Fiat-to-Crypto, Crypto-to-Crypto and traditional payment gateway integration
- E-commerce transaction with the certification of origin
- Presence of a consumer food safety tracking compliance system for a large corporation
- Smart contract trusted execution
- Reward system for transactions across the platform and community members

Foodcode Token

The Foodcode token FCDT is a requirement to perform transactions within the platform. Tokens can be exchanged on listed cryptocurrency markets. The token holders are also entitled to receive reward tokens.

Utility Token Model

The FCDT utility tokens are required for any transaction on the platform. The Tokens can be purchased on listed cryptocurrency exchanges subject to Fiat-to-Crypto KYC/AML requirements via crypto exchanges.

Investment tokens are exchangeable with board rate fixed by the in-house treasury of Foodcode that is based on the average performance of the traded market price on the crypto exchange (ideal monthly or 3-month average price).

Reserve tokens are used for airdrop, incentives, rewards or sold-to-market for stability purposes.

Revenue Stream

- Revenue Streams can be generated via services offered by the Bio nutricia Ecosystem
- Freemium Offering (Free and Subscription-based Membership)
- Access to Rebate, Consignment, Warehouse Preferred Pricing
- Special Order Request (Prio 1, Prio 2 Manufacturing)
- R&D Order Request, Certification & Analysis
- Cross border Transaction Fees
- Access to Supply Chain Related Traceability Data
- Advertisement and Placement Fees



- Sales of Production Capacity
- Marketplace for Trades & Supplier Smart Contracts

Technology

The small manufacturing sector is the key player of making the dynamic and boost of the economy. However, the manufacturing entrepreneurs are facing the top challenges;

- China, in particular, has been a source for intense competition since they can produce products for a fraction of the price it costs to make those same products stateside. It is because the labor costs in China were roughly 10 percent as high as they were in the US back in 2011.
- The changing government regulations affect the manufacturers to stay in fierce competition. In the US, the government is constantly adding regulations and compliance requirements causing the manufacturers forwards high spending.
- The manufacturing business is facing the challenge of outsourcing for skilled workers.
- Large manufacturing players are putting investment into automation. It allows them to run with high efficiency and lower costs. However, for small businesses, investing in that same type of equipment isn't always possible or as cost-effective. They would need affordable financing options or limit their position in the marketplace.
- Technology is rapidly advancing constantly. Being updated to technology is not always possible for small business. However, a business has to take the ride of the trends of technology to survive in the market.
- Today's customers are more informed about where their products come from than ever before. Information usually comes from the feedback of other consumers. These are in the form of reviews, comments, and emoticons.

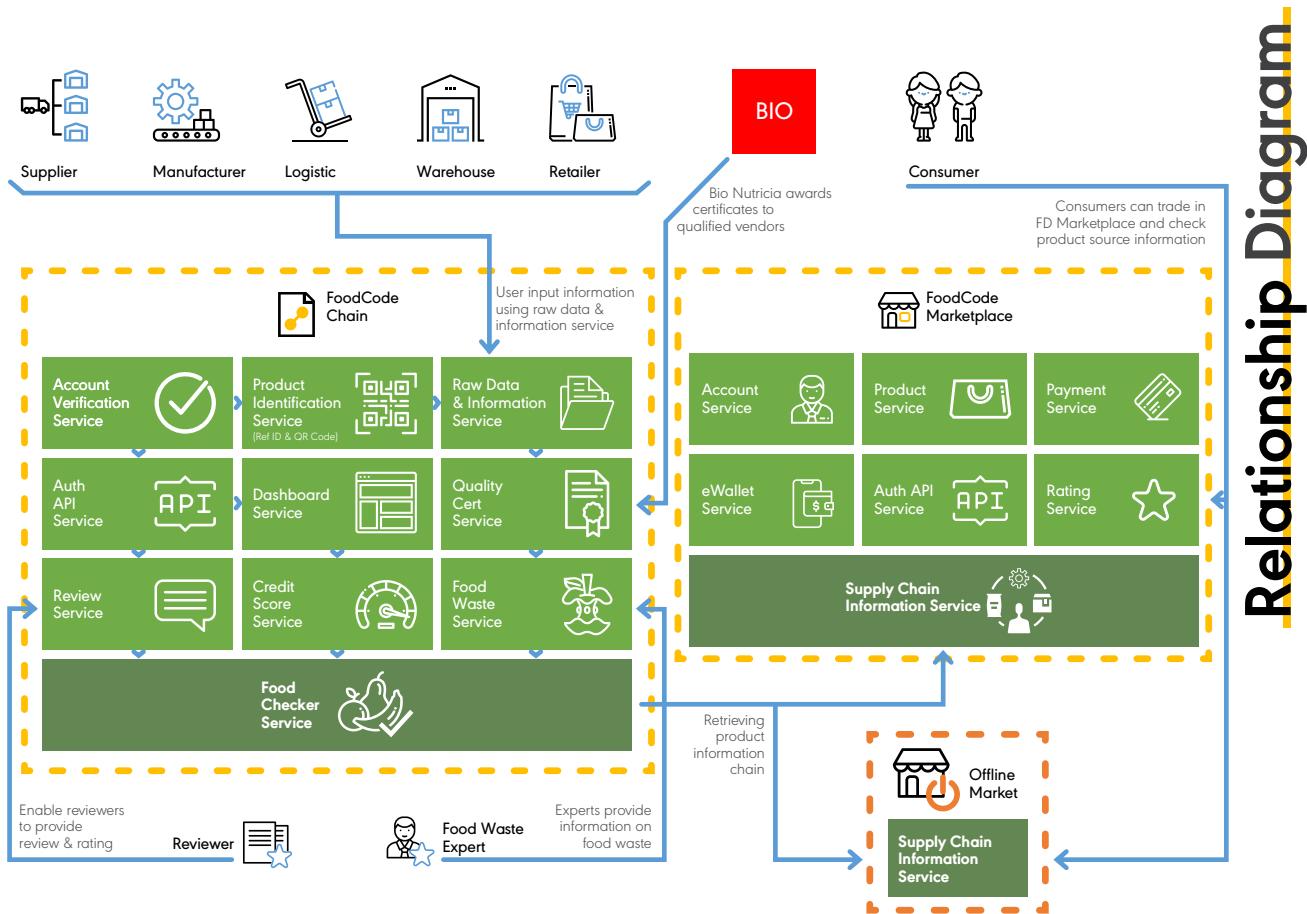
The Foodcode blockchain functions with the key actors:



Types of Users



Every key player in the blockchain is interconnected. It creates a business community that established a robust supply chain. The community created by the platform will lead to benefits and success to every key player. The marketing, product research and development, logistics and waste management makes the food sector business owners efficient and cost-effective. The interconnectedness can create a considerable influence on the market that can compete with huge food market players.

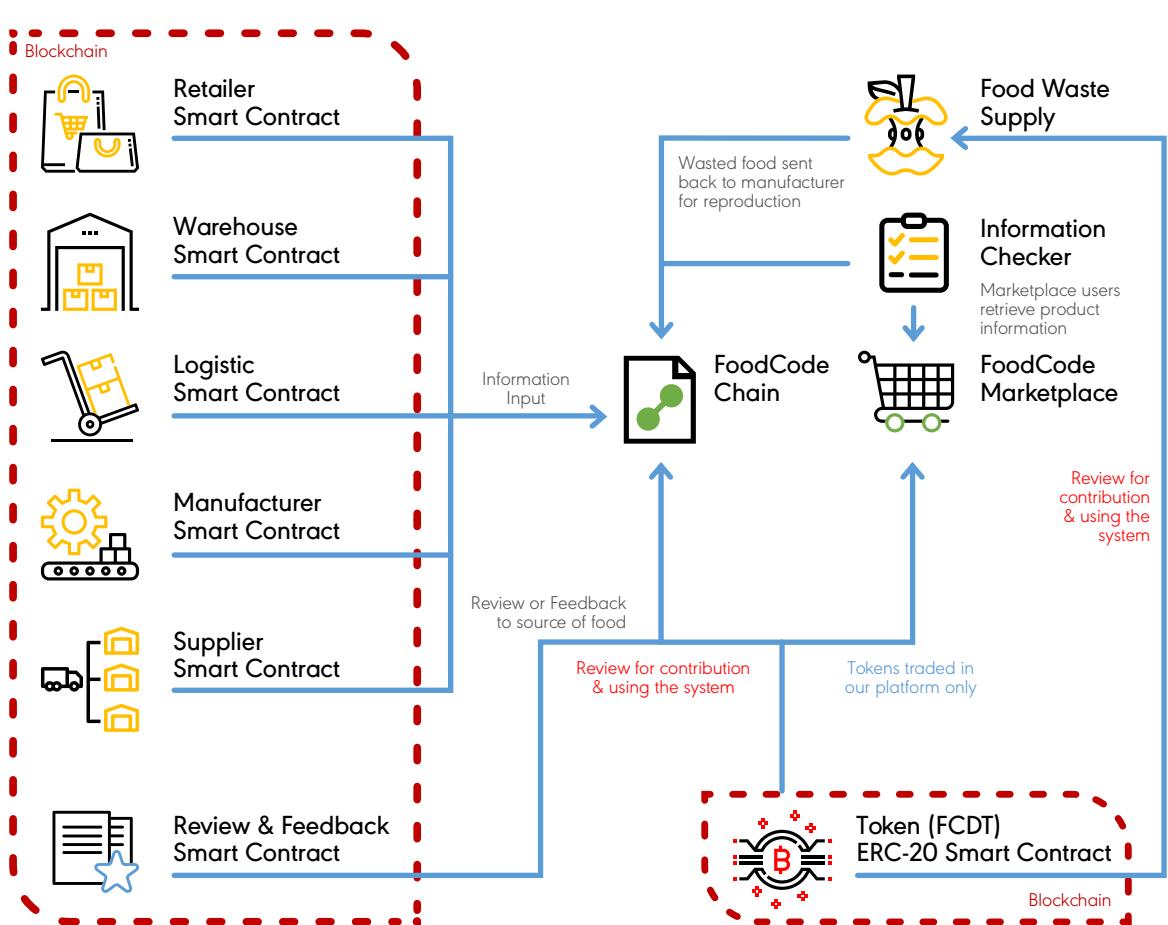


The Foodcode blockchain ecosystem is the best solution to food business and manufacturers. The diagram above shows the relationship of the key actors in the foodcode ecosystem. Once the Bio nutricia awards the certificate to vendors with a smart contract, once the system is activated, the user will start to input raw data and information of services. The system activated the review service where products reviewers can give feedback and ratings. The best thing about the Foodcode is it has available expert that provides information of food waste.

When consumers join and trade within the Foodcode ecosystem, they can take review in the information of the products from the vendors. A consumer can utilize the different trading services and tools of the Foodcode. The consumers can give their product review and ratings.

General Tokenomics

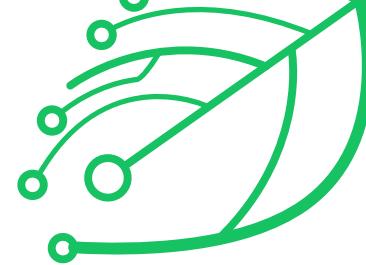
Foodcode Ecosystem Diagram



The foodcode chain is a reliable traceability system that is capable of accurate recording, sharing, and tracing of data within the whole food supply chain. It involves the processes of production, processing, warehousing, logistics, and retail.

The review and feedback can contribute to boosting product marketing. Tokens are used for trading in the Foodcode platform.

The best feature of this platform is waste management. The wasted food can be sent to the manufacturers for reproduction. It can be developed into new products that consumers can utilize.



The following will happen in the data tracking and recording in the blockchain with the smart contract;

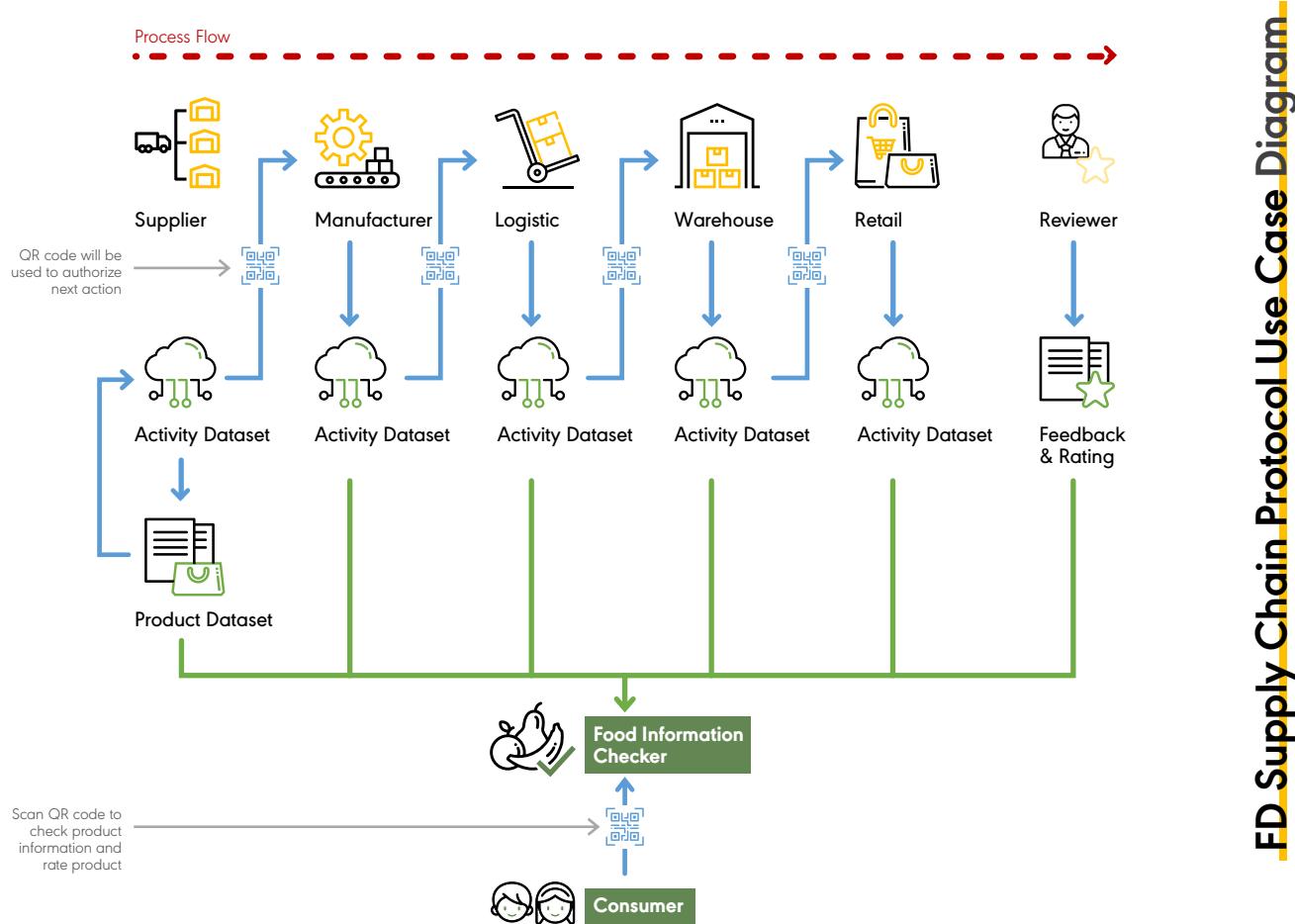
a. Product core data set

 Product Information	<ul style="list-style-type: none">• Reference ID• Serial number• Name• Product Type
--	--

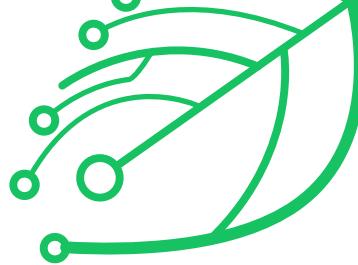
b. Activities data set (in every stage)

 Supplier (Raw material, food extract, manufacturer)	<ul style="list-style-type: none">• Date/time of each process• GPS location• Vendor• Origin and specification of raw materials• Ingredients used in processing• Quality certifications• Production & expiry date• Damage & dispose• Quantity
 Logistics	<ul style="list-style-type: none">• Date/time of each process• GPS location• Vendor• Traveling route and distance of products in each process• Mode of transport• Supporting document for goods clearance• Damage & return
 Warehouse	<ul style="list-style-type: none">• Date/time of each process• GPS location• Vendor• Temperature• Storage condition• Inventory
 Reviews & Feedback	<ul style="list-style-type: none">• Date/time of each process• Feedback• Rating

How The Foodcode Chain Works



1. Generally, the following essential events will happen when the chain functions;
 - a. Every single process information dataset will store on-chain base in different contracts. The smart contract allocation is subject to which activity is occurring.
 - b. Information dataset from supplier, manufacturer, logistic vendor, warehouse vendor, and the reviewer will store on-chain.
 - c. A unique reference ID and QR code will generate off-chain for data integration between on-chain and off-chain.
 - d. The QR code will be the key of connection between two parties. The receiver will be required to scan the QR code for authorization from the sender to do further actions.
 - e. For third-party system or IOT devices, they can request our Authentication API to be integrated.
2. Raw material vendor
 - a. The raw material vendor is required to create a profile for each product. A unique reference ID will be created and tied to the pattern.
 - b. Information needed to add to the product dataset such as:
 - c. Raw material source location
 - d. Product information and photos
 - e. Description of production flow
 - f. Quality certificates or other product-related documents from authorities



- g. A unique QR code will be generated. The QR code will be provided to manufacturers to authorize them access to the product information.
3. For Manufacturers
- a. The manufacturer produces food products with raw materials provided by the raw material suppliers.
 - b. The manufacturer will scan the QR code of the raw material for authorization to access raw material information.
 - c. Once the authorization is granted by raw material suppliers, the raw material will be registered as one of the ingredients of the food product. The process can be done with our app or using IoT devices.
 - d. Next, the manufacturer needs to register as a manufacturing vendor of the product.
 - e. Information dataset required, such as:
 - i. Manufacturing process flow
 - ii. Production and expiry date
 - iii. Quality certificates or other product-related documents from authorities
 - f. Once the information given is complete, there will be a generation of a unique QR code. It contains all the information of the manufacturer and the product ingredients. This QR code will be provided to the logistics vendor.
4. Logistics vendor
- a. The logistic vendor will scan the QR code given by the manufacturer to create a profile for the logistics activities of the product.
 - b. Once the authorization is granted by the manufacturer, the logistic vendor needs to register as a logistics vendor of the product.
 - c. Information dataset will be needed, such as:
 - i. Mode of transport
 - ii. Inventory
 - iii. Documents for custom clearance
 - iv. Departure and arrival date and time of transportation
 - v. Other supporting documents or certificates involved for transporting the product.
 - d. A unique QR code will be generated using our mobile app to provide access to product information to warehousing vendor.
5. Warehousing vendor
- a. Scan the QR code given by the logistic vendor to add storage activities information.
 - b. Once it's authorized, warehouse vendor needs to register as a vendor of this product.
 - c. Information dataset needed such as
 - i. Product in and outdate of the warehouse
 - ii. Inventory
 - iii. Storage condition such as temperature, humidity, etc.
 - d. They need to update warehouse condition and temperature regularly. The process can be done using the app or using IoT devices (data can be integrated with our app via our Authorization API).
6. Retailer
- a. Scan the QR code given by warehousing vendor to acknowledge product delivery.

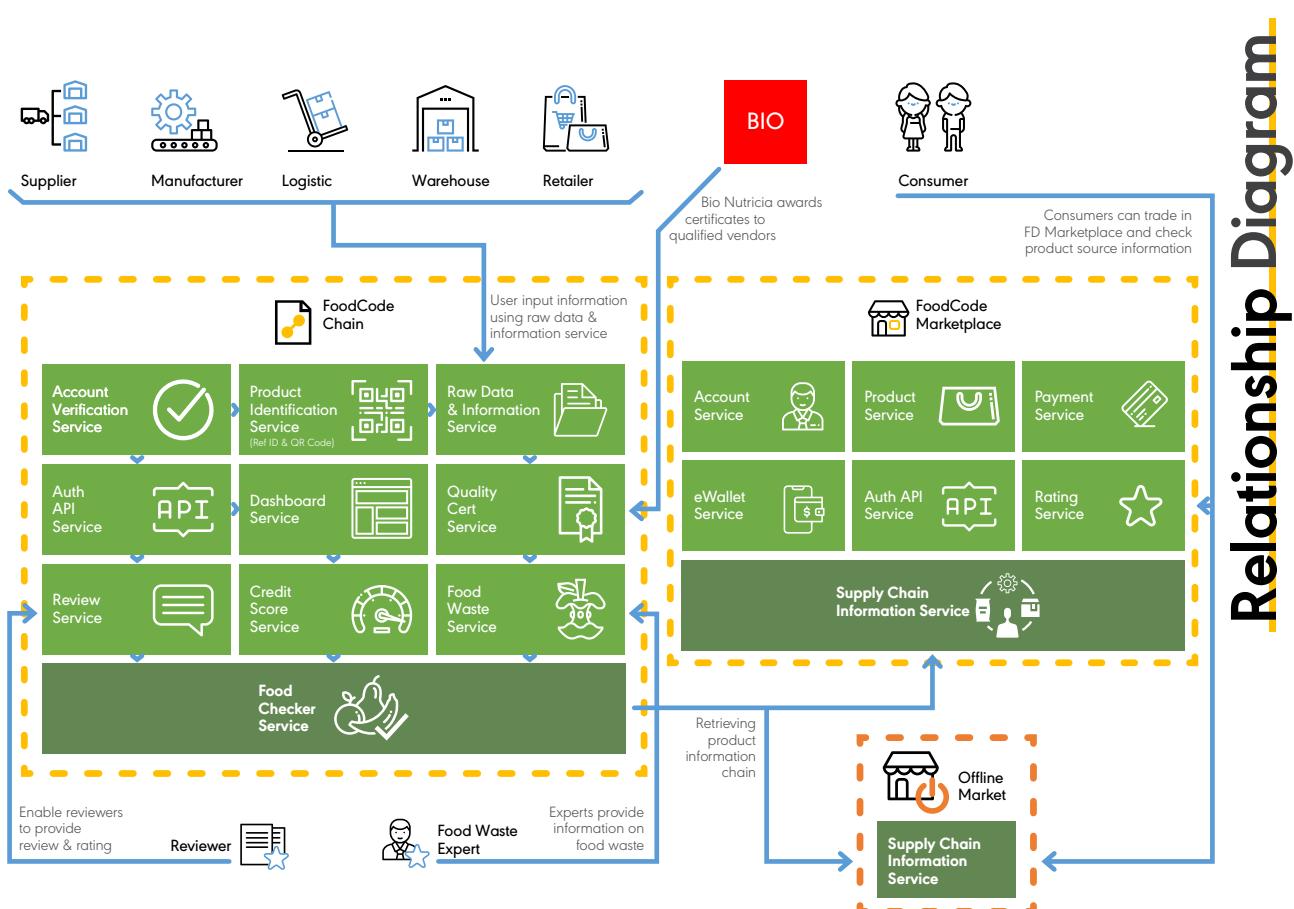


- b. Once it's authorized, the retailer needs to register as a vendor of this product.
- c. Information dataset needed such as:
 - i. Retail location
 - ii. Retail condition of the product such as temperature, humidity, display method, packaging, etc.
- d. The retailer needs to generate a QR code which contains the complete information of the whole supply chain for the product. It will be displayed on the product for consumer reference.

7. Consumer

- a. The consumer can quickly scan the QR code using food checker to check the whole supply chain information
- b. Food checker information to retrieve included:
 - i. Product information
 - ii. Ingredient information & process flow, supporting documents and certificates
 - iii. Production date
 - iv. Expiry date
 - v. Summary of supply chain activities
 - vi. Credit Score

Features of Foodcode Chain





a. Account Verification

Users need to register to access and use the system. The users will need to go through KYC / authentication process to verify their identity and reliability of the information generated.

Users will be asked to submit documents, such as:

- i. Business registration
- ii. Manufacturing facilities registration and certificate (e.g., GMP, HACCP, MESTI & JAKIM HALAL Certification)
- iii. Quality certification
- iv. Driving license
- v. Service contract

b. Product Identification

Once a raw material, ingredient or product has been produced, a secure item ID and dynamic QR code will be generated. The ID and QR code contains vital traceability information of the product such as origin, location, production date/time, etc. Hence, all product data is stored on the blockchain through smart contracts.

c. Data & Information

- Raw material supplier
Inclusion of information of raw material such as origins, location source, temperature, photos of source, etc. A QR code will be generated containing all the information, including the Warehousing vendor. The information can be used to monitor inventories, expiration of products, and storage conditions.
- Logistics vendor
The foodcode chain system is capable of tracking transportation journey of products, distance, date, and time of travel. By scanning the QR code, the user can get the update of the product status.
- Consumer
A registered consumer can easily scan QR code on the product to view the complete information of the product from the raw materials to the marketplace

d. Authentication API

Bio nutricia will build an open API so that users can integrate with their systems in manufacturing, warehousing, logistics, or retail. It will help users easily input data in their systems. The data collected using the IOT device (i.e., temperature, humidity) can be integrated into the foodcode system through the open API.

e. Food Trail Overview Dashboard

The dashboard is user-friendly that shows information of all vendors involved in the supply chain. The user can quickly get updates on the status and condition of the product. Further, it can provide information on the estimated time of arrival of the product in each stage of the supply chain. It has an interactive map that the user can easily refer and comprehend. Also, it has a feature that it can give alert status if there will be delays in the



supply chain or any expiration issues of the raw materials and products

f. Consumer Review

The best thing about the Foodcode Blockchain Ecosystem is that consumers can give their reviews and feedbacks after purchasing a product. A consumer can verify the authenticity of a product. Suppliers and manufacturers will provide all product information that the consumer can use for verification process or a lab test.

Besides the consumers, the independent R&D institutions of food and agriculture can also review the product information. With their background in the related fields, they can provide more robust and convincing reviews with research evidence as support to the suppliers and manufacturers.

As a reward to consumers and independent R&D institutions that contribute reviews and feedback, tokens will be given to them to encourage continuing effort to ensure the accuracy and integrity of the product.

Furthermore, the reviews on the product can affect the credit score. However, the suppliers and manufacturers can mend the product information and make improvements leading to improve the credit score.

g. Quality Certification

Bio nutricia provides a certification program on the FoodCode Blockchain system. The suppliers and manufacturer can submit products and related documents to Bio nutricia, in which, a process of lab test will be done to verify quality of product and accuracy of the information. The verified product will have a Bio nutricia certification mark which will boost the user's confidence in the product and sales.

h. Credit Score

Each product will have a credit score based on the accuracy of the product information and certifications. The credit score indicates transparency and degree of traceability of the product. Thus, it gives confidence to users to use the product.

The credit score will be given to a product after an evaluation. The criteria of the review are as follows:

- Completeness of information for each stage of the supply chain. Any lacking information will result in the deduction of credit score based on the algorithm of the system.
- Availability of supporting documents and certificates that prove the information given is genuine
- Lead time from supplier to retailer. The shorter lead time of product distribution, the higher credit score will be provided.
- Length of the shelf period. The longer the shelf period, the higher score will be given
- Degree of product damage.
- Rating and reviews. If the products receive positive comments and reviews from the consumer, the credit score will increase.

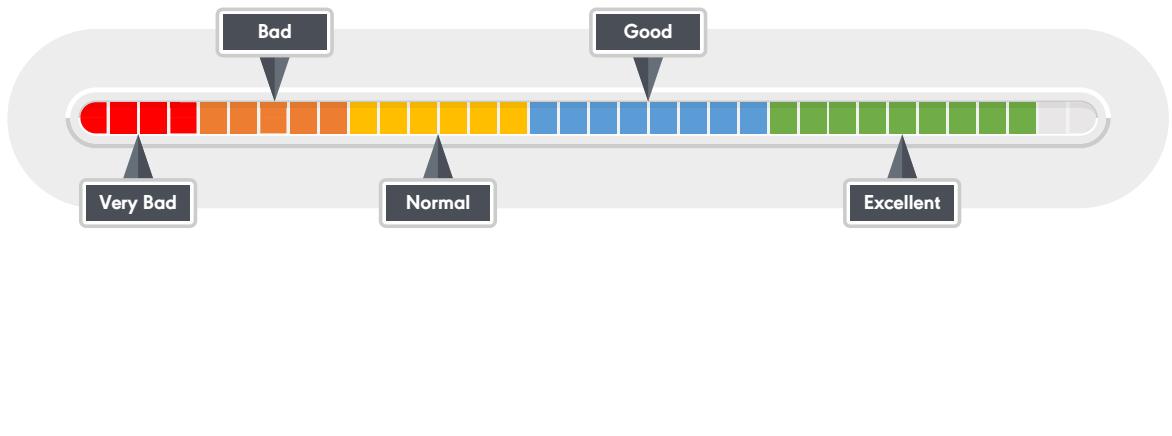


- Quality certification awarded by Bio nutricia

The credit scoring system has five categories:

- i. Green (Excellent)
- ii. Blue (Good)
- iii. Yellow (Normal)
- iv. Orange (Bad)
- v. Red (Very bad)

CREDIT SCORE



Credit Score Result Chart

i. Food Waste Management

The retailer can conveniently report any food waste using the app. A food waste expert will come to collect the waste at a reasonable price. The trash being collected will be used to produce new products.

j. Food Checker

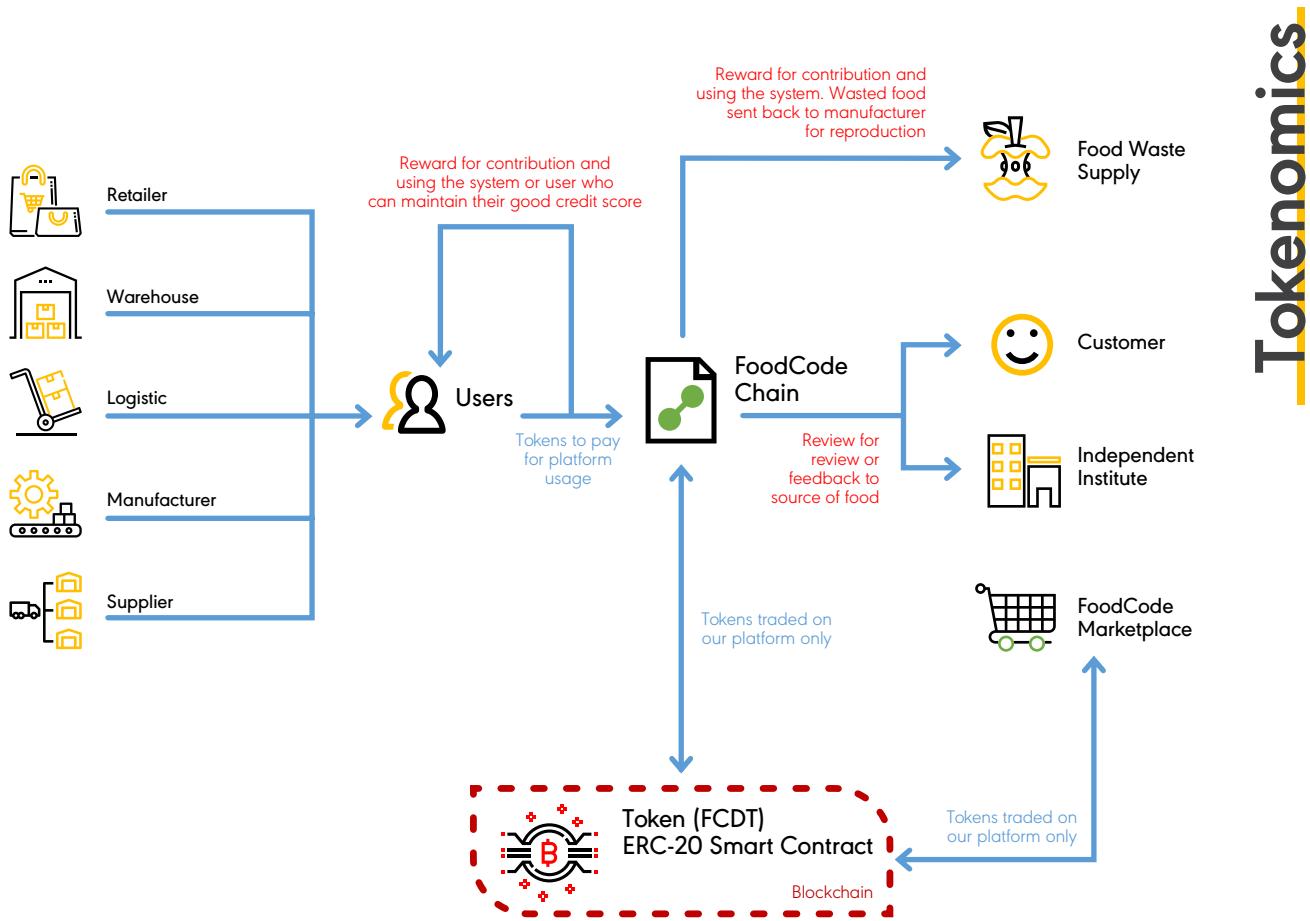
The marketplace is fully integrated into the supply chain system through the open AI to build rapport on the product. It means that all products in this marketplace can be tracked and traced. With this, it will be much easier for users to find and purchase quality-guaranteed products.

Foodcode Marketplace

A Marketplace app will be available by Bio nutricia for users to buy and sell products (raw materials or finished products). The food manufacturers can register as a seller in the marketplace to sell products to consumers. The consumers can use the token to trade in the market place. The marketplace has a food checker that allows consumers to know the complete information of the product throughout the supply chain. Hence, the E-wallet is provided for payment purposes, and consumers can spend using the FCDT token.

Foodcode Tokenomics

The FoodCode Tokenomics describes how the token will be utilized within the marketplace. Below is the process diagram of how the token can be exchanged for services or rewards within the system. The FCDT token are required at any point of time for any transactions within the chain. It combines and executes smart contracts between different parties like Retailer, Warehouse Management, Logistic Services, Manufacturer Accounts and Supplier Informations with its users. Traceability and tracking of services will be accessible by trading their tokens within the system.



1. All the user will be charged to use Foodcode Chain to send/retrieve information.
2. All the user who contribute information to Foodcode Chain will be rewarded. The reward will only be given in a given period.
3. Any user of Foodcode Chain will be given reward if they can maintain a well credit score.
4. Customer or independent institute who review or feedback to source of food will be rewarded.
5. All the transaction in Foodcode Chain will be dealing with token.
6. To Food Waste Supplier, reward will be given for contribution of the ecosystem. Wasted food sent back to manufacturer for reproduction.
7. In Foodcode Marketplace, platform user can use our token to trade.

Roadmap

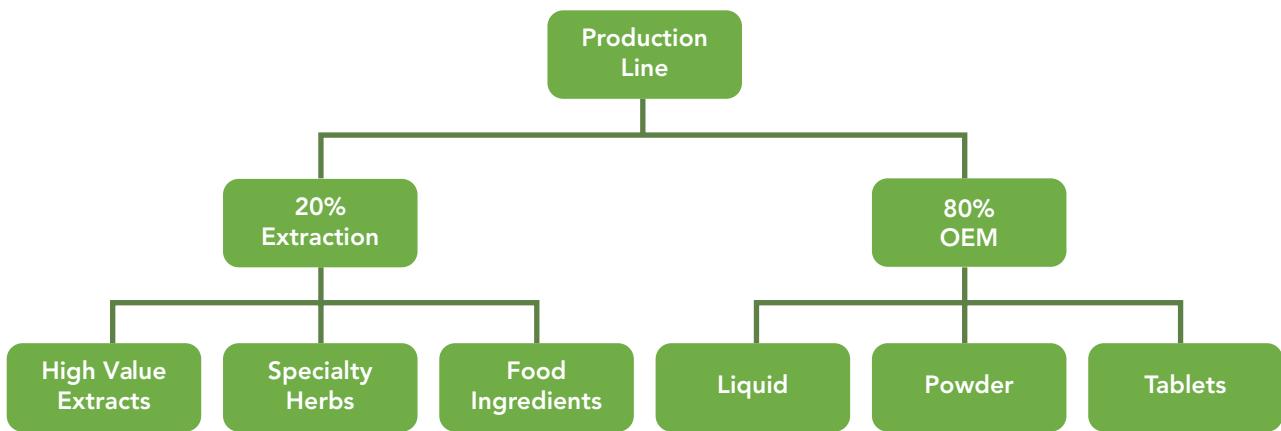


2006:	Incorporation of Bio-Nutricia as a Specialty Food (Nutraceutical), Beverage & Traditional Plants (Herbs) trading company in Malaysia
2019 Q3:	Conceptualization of FoodCode
2019 Q4:	FoodCode Whitepaper and Fundraising, ICO Launch, Investor Dashboard, SmartContract, Pre- & Public Sales
2020 Q1:	Development of the FoodCode Platform in Blockchain, Token Issue and Listing on Exchanges <ul style="list-style-type: none">Preparing system architecture design & planning for FoodCode PlatformPlanning for workflow of FoodCode PlatformPlanning for scalable server infrastructure & its setupPreparing FoodCode Platform UI/UX designDevelopment of FoodCode Platform prototype
2020 Q2:	Deployment and Beta Testing of FoodCode based, 2 Customer Trial on basic functions <ul style="list-style-type: none">Development of FoodCode Platform & system infrastructure (Blockchain & Big Data)
2020 Q3:	Sign-up < 50 Vendors & < 10 Manufacturers to participate in the FoodCode food ingredient tracking and monitoring <ul style="list-style-type: none">Monitoring dashboard statusDevelopment of product & flow activities & information handling moduleDevelopment of QR Code/Barcode scanning moduleDevelopment of digital certificate handling moduleLaunching of Phase 1 of FoodCode Platform
2020 Q4:	Malaysia & Southern China expansion and launch of payment for FoodCode service offering
2021 Q1/Q2:	Onboarding of > 500 Vendors and > 50 Manufacturers <ul style="list-style-type: none">Development of item review & rating moduleDevelopment of account credit score report & analysis moduleDevelopment of food checker moduleLaunch of Phase 2 of FoodCode Platform
2021 Q3/Q4:	Further Business Expansion in Malaysia (Penang, Kedah), Thailand & Indonesia <ul style="list-style-type: none">Development of food waste handling moduleLaunch of Phase 3 of FoodCode PlatformDevelopment of authorized open API handling module (third-party system)Launch of Phase 4 of FoodCode Platform
2022 Q1/Q2:	Paid Business Partner onboarding of > 100 Vendor and > 50 Manufacturers
2023 Q3/Q4:	Additional coverage in Malaysia (Johor, Sarawak), Korea & US
2024-2025:	Global expansion including Europe, Japan and Vietnam with up to > 1000 Vendors (Paid) and 100 Manufacturers (Paid)



Product Status

The viable product of Bio nutricia consists of 20% extracts and 80% OEM. The plant extract process of Bio nutricia is unique with advanced Nano-technology. It uses enzyme assisted pre-treatment, ultra-sonic treatment, multiple effect plate evaporation, advance spray dry technology, and food organic solution. Bio nutricia tops in manufacturing liquid, powder and tablet-based products in the market.



Overall, Nio-Nutricia is generating a revenue of RM 10M per annum of all the product lines. The manufacturing process is the blueprint for the next stage development of the marketplace ecosystem for all other manufacturers, suppliers, etc. described in this whitepaper.

In 2019, Bio nutricia reaches the total production capacity of 12,000 MT, reaching the revenue of 2.9M USD. By 2025, Bio nutricia will be entering the total production capacity of 30,000 MT, equivalent to revenue of 30M USD. The forecast growth rate for Bio nutricia from 2019-2025 is at 8-10 times compared to any other business in the same industry. With the Foodcode ecosystem in place, Bio nutricia will not be the only one that will benefit the potential gain, but every manufacturer and supplier that will come together as a community. The network of SMEs can potentially compete with large-scale industry players that monopolize the market.

Go-to-Market Strategy

To ensure the reach of the potential market, Bio nutricia must put the best foot forward. Hence, the pro-active strategy of going to the market is the best approach to secure the top. Getting the top 10 industry customers and suppliers will have a revenue reaching 30M USD to 300M USD.

The top market potentials that Foodcode is reaching out are part of their 111+ existing customers as well as out of the 121+ existing suppliers. They will participate in the trial till the finish product has been achieved and deployed based on the roadmap and the selected customers.

Next to that, comprehensive online marketing with responsive website, trade Show & exhibition



with Matrade, engagement with chiefs to develop product oriented recipe based on Bio nutricia ingredients help to promote the FoodCode platform. By engaging sport athlete for testimony, the platform is able to promote and sell the solution as part of the end-to-end offering. This will entice and open doors for further collaboration with local & MNC food ingredient supplier and manufacturers.

In addition, recruitment of experience marketing & sales team to visit every hotel, restaurant, health supplement, food & beverage manufacturer are key to the success for onboarding and expanding the business on the FoodCode virtual manufacturing platform. Emphasize on customer service and technical support via this channel can support the overall user experiences between the suppliers, manufacturers and its end consumers.

Token Model

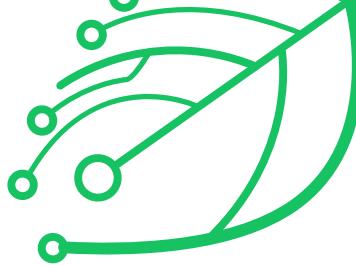
Token Structure

The Foodcode Blockchain Ecosystem is creating a virtual manufacturing platform that supports the supply chain services within the manufacturing industry. Main products are virtual supplier, vendor and warehouse management registration and booking system with, e-commerce, and advertisement engine. With the features of ERP, CRM, Invoicing, Data Storage, and Payment Gateway the market players will be able to offer, sell and buy products within their community.

Tokens are required to enjoy the services offered by Foodcode. These utility tokens or just "tokens" are a form of credited points that can be redeemed or are required to perform certain transactions. The transaction could be a sign up for full membership access, placing an order, register as new supplier, enable payment gateway, execution of smart contracts, etc. Besides, renewal of membership fees, reward programs or even advertisements spaces can be exchanged with FCDT tokens instead of paying directly through a fiat payment gateway.

Discounts are given under the discretion of Foodcode, i.e., rewards in form of reduced tokens for membership fees can be given. Token holders without withdrawals can earn reward tokens in the form of Airdrops into their wallet. Also, cross-border transactions are executed only with FCDT tokens. It means that intermediaries are not required to perform a one to many or many to many transactions.

As tokens are required to participate in this marketplace, the user needs to hold or buy tokens from the listed FCDT crypto exchanges. Through this mechanism, FCDT tokens are maintaining healthy circulation in the market. The FCDT management is holding 30% of the reserved token, which can be released or sold to avoid dilution of the value of FCDT tokens. It also helps to compensate any fraudulent acts caused to Foodcode.



Ecosystem Token (FCDT)

FCDT Tokens or “Tokens” are used to perform transactions within the Foodcode ecosystem. An e-wallet for each user will be created, subject to KYC/AML approval, and each token holder can withdraw tokens in exchange for services. Subscriptions or License fees can be deducted from this account as well.

Every time a transaction is executed, costs will occur like mining and administration fees. If the user is participating in a reward or bonus program, every transaction will be recorded, deposited, or deducted from the token holders’ account. Any other operations involving services in exchange for tokens can be acquired from listed FCDT crypto exchanges.

Token Sales Structure

The goal for Foodcode is to raise funds to support the development and launch of this virtual manufacturing solution into the market by 2020. Foodcode is aiming to build a hard cap of US\$5M with a soft cap at US\$500,000.

Role	Purpose	Features
Symbol	FCDT	FCDT Utility Token
Protocol / Decimals:	ERC-20	
Token Feature	Utility Token	
Total token maximum supply	2,500,000,000 FCDT	(100%)
Total token supply for sale	200,000,000 FCDT	(8%)
Soft cap	500,000 USD	
Hard cap	5,000,000 USD	
Par value for token sale	1 FCDT = 0.02 USD	
Accepted Equivalents:	ETH, BTC, USD	
Minimum investment amount	1,000 USD	
Token contract address	Will be available & published only at Foodcode website	



Token Sales

Fundraising will start on 15th Aug 2019 till 31st March 2020 till stock last. All tiers have its specific discounts and will be announced accordingly on the Foodcode website.

	Starting Bonus	Tokens
Private Sale	40%	350,000,000
Pre-Sale	35%	337,500,000
Token Sale	30%	640,000,000
Additional Bonuses	+5% referral bonus	

The ICO will end when the maximum number of FCDT is issued, or the contribution period has ended. If less than the minimum soft cap of tokens are issued, token sale contributions would be refunded. Unsold bonus will be burned. Purchasers who commit to purchase a large amount of FCDT Tokens during the sales period ("Presale or Private Sale"), will be eligible for the optional bonus. All such bonuses will be discussed individually with each potential buyer, including vesting conditions.

Provisional incentives for early adopters are as follows:

- Waive 1st year listing fees for Foodcode Ecosystem
- Reward for paying subscriptions in advance (annual payment)
- The reward for early merchant sign-on and inventory push to Foodcode
- Compensation for installation of buyer widget in the Foodcode e-Wallet
- Monthly user awards for highest activity level in content contribution to Foodcode App (inventory, service requests to the system) and Foodcode Ecosystem (verified reviews)
- User refers to new merchants or marketplace operators
- User contributes ratings and reviews
- A user adds blog article(s)
- Buyer becoming a seller or operator
- The user provides the market with support documentation
- The user adds bug reports

The above incentives will be offered over 6 to 12 months. The exact commencement date will be determined by the Foodcode Treasury Board, reviewing the level of platform and token adoption and monitoring the FCDT activity. The intention is to create a functional token and encourage people to use the Foodcode App Ecosystem.

From time to time, the Foodcode Treasury Board will issue guidance on the amendments of the



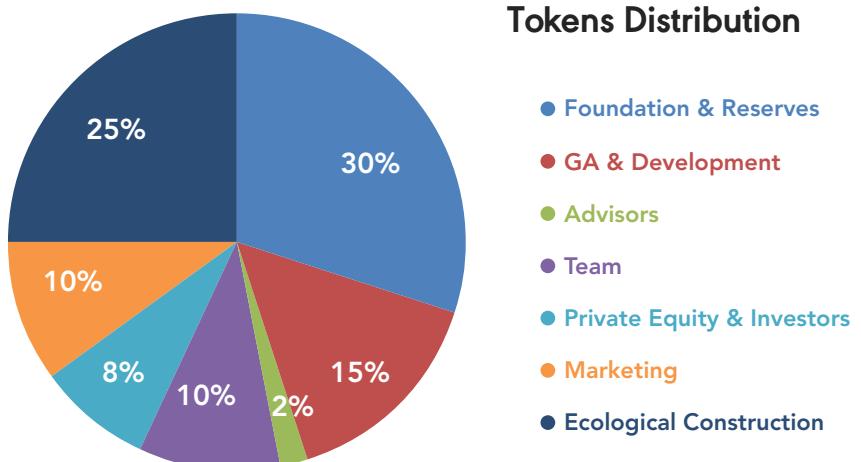
incentives mainly when found to have unintended impacts (e.g., users creating fake accounts or 'bots' to game the system, or an over-supply of tokens vs. real activity and fees accrued on the Foodcode App Platform).

Token Distribution

Tokens distribution	%	Tokens
Foundation & Reserves	30%	750,000,000
GA & Development	15%	375,000,000
Advisors	2%	50,000,000
Team	10%	250,000,000
Private Equity & Investors	8%	200,000,000
Marketing	10%	250,000,000
Ecological Construction	25%	625,000,000
Total	100%	2,500,000,000

The 8% of all FCDT token supply will be made available in a token sale, for both presale and main sale while tokens will be reserved to incentivize early adopters to utilize our services. Incentives will help build the community and encourage testing, feedback, and general content contribution to the ecosystem. Also, judicious use of airdrops will encourage event attendees to get started on Foodcode. 15% is reserved for further technology development and enhance the Foodcode platform.

Moreover, 30% is reserved for future distributions, sales, and marketing activities and strategic acquisitions. Also, it will be used to address issues surrounding the fluctuations in the circulation of Foodcode tokens that can affect the ability of Foodcode token to serve as a useful medium of exchange for consumers and other users who will engage in transactions on the Foodcode platform.



To that end, Foodcode uses FCDT reserves to purchase or sell Foodcode tokens on the open market or may burn (i.e., permanently remove from circulation) a small percentage of Foodcode tokens each year. The FCDT reserves will not be distributed to employees and are the sole property of Foodcode.



The 20% of FCDT tokens will be distributed to strategic investors, management, and key team members with a vesting structure that will ensure the team's interests are aligned with those of the investors. Thus, the team's efforts will be channeled towards the creation of a profitable and sustainable business.

Fees paid to Foodcode will replenish the Treasury, effectively contributing to all but the Token Sale budgets to cover ongoing running costs. The Foodcode Treasury Board will rebalance the allocations annually to match the forecast budgets for the year, as these will shift over time.

The community and user growth pool and any unspent tokens including the reserves will also serve as a liquidity pool to manage undesired volatility under guidance from the Foodcode Treasurer and Treasury Board, who gave the directive to drive marketplace adoption and maximize the utility of the FCDT token for all the participants. Therefore, the reserves are planned to provide the treasury Board more room and flexibility to manage the funds and to stabilize the FCDT Token Value.

Vesting Period

The vesting schedule for relevant participating groups is as follows:

Foodcode Management Team	Three years with a 1-year cliff;
Investors & Advisors:	12 months with a six months cliff
Large volume purchaser:	Vesting will be imposed and discussed on a case-by-case basis

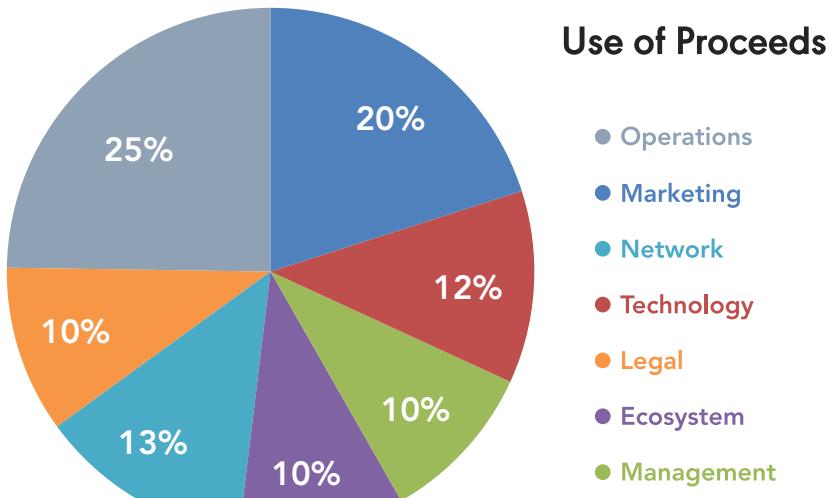
Utilization of ICO Funds

It is challenging to forecast the total amount that will be raised in any crowd sales. The Foodcode has created several funding scenarios that outline how resources will be allocated.

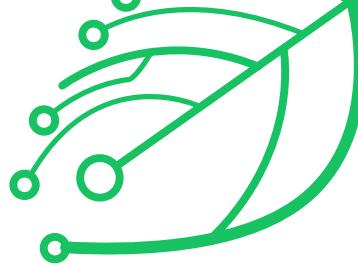
<u>Use of Proceed</u>	<u>%</u>
Marketing	20%
Technology	12%
Management	10%
Ecosystem	10%
Network	13%
Legal	10%
Operations	25%



The amount of capital raised during the token sale is an indicator of the level of impact for the Foodcode Ecosystem, the FCDT cryptocurrency, and its industries. Funds raised in the Foodcode ICO will be used to develop the Foodcode Ecosystem. It includes designing the Foodcode App, e-Wallet and payment, token distribution algorithm, decentralized exchange and executing the marketing strategies.



The Foodcode Team



KP NG

Chief Executive Officer

- Management Executive at Bionutricia for 13 years
- B.Sc (hons) Food Science & Nutrition (PhD in Management by Research)
- UCSI - Diploma in Applied Science, Food Science and Technology

Ng Kuak Ping is the Founder and CEO of Bionutricia. He has spent the last 16 years contributing to the Food Science industry with his skills, and has achieved the patent for Process for Preparing Nutritional Powder Extract. Enthusiastic about secondary metabolite kinetics & always determined to accumulate merit in life, KP NG is a Food Scientist who always strives to make healthier supplements for living.

<https://www.linkedin.com/in/kuak-ping-46a377193>



KW Pong

Chief Operating Officer

- Co-Founder & Chief Operating Officer at Bionutricia for 11 years

Pong Kok Wei is a detail-oriented Mechanical Engineer with extensive knowledge of engineering principles, theories, specifications, and standards. With over 12+ years of experience, he has proven a track record of finishing complex projects ahead of schedule. He is known for having substantial experience in analyzing problems and offering solutions that help to alleviate problems.

<https://www.linkedin.com/in/pong-kw-3b216274/>



Bryan Ng

Chief Technology Officer (CTO)

- Founder and CEO of SEED Digital for 3 years
- Chief Technology Officer for 15 years
- Tunku Abdul Rahman University College - Bachelor's degree, Computer Science/Information Technology

Graduating with a degree in computer science, Bryan has worked across many projects in the digital space for the last 15 years, providing digital strategies and technical solutions to well-known brands such as IKEA (Regional), Nike (Regional), Citibank, Nestle, AirAsia and Celcom. Bryan's contribution to the projects have helped them win various awards, including Malaysia's largest and most prestigious advertising awards called the Golden Kancil awards. His core strengths include the overall assessment of IT and digital budgets, adapting various methodologies to help employees, clients and investors achieve its organizational goals.

<https://www.linkedin.com/in/bryan-ngkokweng/>



YY Yong, PhD

Chief Product Officer

- Operation Manager at Bionutricia for 1 year
- Monash University Malaysia - Doctor of Philosophy PhD, Science
- Monash University Malaysia - BSc (Hons) in Medical Bioscience

Graduating with a PhD in science, Yi Yi joined Bio nutricia in the food & manufacturing industry for more than one year, managing the operation of extraction of local plants to accommodate the demands of local and overseas market of natural food additive and food ingredient. Her core strengths include the overall assessment of extraction processes and exploring various methodologies to help the company to achieve higher quality of extracted products, productivity and efficiency in extraction processes.

<https://www.linkedin.com/in/yi-yi-yong-12846294/>



Bee Cham

Chief Marketing Officer

- Business Development Manager at Bionutricia for 1 year
- Dublin Institute of Technology - European Master Degree, Food Science, Food Technology and Nutrition
- Universiti Kebangsaan Malaysia - PgD. in Dietetics,BSc(Hons) in Nutrition

Responsible to identify new local and global opportunities in the industry, Cham Bee Geok is an experienced product specialist with a demonstrated history of working across the food industry, from retail health store, hospital to manufacturing and non-profit organization. She is skilled in Nutrition, Nutrition Education & Clinical Research and always passionate in making one's life healthier through food.

<https://www.linkedin.com/in/beecham/>



Partnership

Existing Clientele



Hai-O

Hai-O was the first traditional healthcare company listed on Bursa Malaysia Securities Berhad since 1996. Hai-O has over the years been resilient to ride through the many business challenges to emerge stronger now with an equity base of more than RM300 million and market capitalisation of approximately RM1 billion. Its success had been honoured by various prestigious awards including the Forbes Awards (2007-2010). The principal business of the Group involves wholesale and retail, multi-level marketing, pharmaceutical manufacturing and Chinese medicinal clinics. For over four decades, Hai-O had honed its expertise in building extensive and efficient distribution network and thereby has successfully gained market leadership in Malaysia. Business present in nationwide with 57 retail chain stores and franchises, 37 Multi-Level-Marketing ("MLM") branches, stockists and sales points, and 2 GMP manufacturing plants across Malaysia.



LeRoy International

LeRoy

LeRoy International is previous known as Visconti Corporation (M) Sdn Bhd who has been in the Network Marketing business since 1996. Despite numerous rocky waves in the Network Marketing industry and unstable economy situation during the past years, Visconti Corporation (M) Sdn Bhd stood strong and firm. In the dawn of the year 2004, Visconti Corporation (M) Sdn Bhd is known as LeRoy International. Having proven years of continuous track record with Atis Corporation Bhd, a public listed company with Kuala Lumpur Stock Exchange, the Chairman of Atis Corporation Berhad, transferred his great management philosophy to develop LeRoy International Sdn Bhd, in creating abundance for everyone, to help mankind with a conscience by offering products in harmony with nature and good health. A major milestone was reached when sales reached RM60 million in 12 months.



Total Image

Founded and established in 1984, Total Image was originated in the U.S.A. and has emerged to the Southeast Asia Market as one of first fewest slimming and beauty companies, pioneering in natural, high performance slimming, beauty and health products. The Company started with only one product which contributed to over 80% of the investment turnover in 1985. Due to great success, the team was encouraged to further bring in other high quality slimming, beauty and health supplements and over the years has introduced many successful products.



Natural Health Farm

Natural Health Farm (NHF) is a chain of 100 retail outlets located mostly in shopping malls and hypermarkets nationwide and abroad, with its principal activities in retailing nutritional supplements, organic foods, healthcare-related products and nutritional consultation. NHF were founded by Dr. Jessie Chung, ND, MD in 1999. Besides in Malaysia, NHFs operate outlets in the USA, China, Macau, Singapore, Australia, Brunei, Philippines, and Thailand. A wide-range of products is offered, including vitamins, herbs, minerals, supplements, natural skincare products, slimming products, and organic foods. NHF obtained the Franchise License from KPDKKK in December 2011 and began its franchise business.

Appendix

Patent Registration

Patent and Trademark

Title: Process for Preparing Nutritional Powder Extract
Application No.: PI 2018700439

Referring to the above-mentioned matter. In accordance with your instructions, we have duly filed the application with the Malaysia Intellectual Property Organization (MyIPO) on Feb 05, 2018. Please find the below summary filing particular useful:

Application No. : PI 2018700439
Filing date : 05th Feb 2018



The literal element of the mark consists of Bio nutricia Extract. The applicant is not claiming color as a feature of the target. The mark consists of two leaves in rotating circular form, a singular water droplet, and the words FCDTNUTRICIA EXTRACT, with stylized alphabet. The application was assigned serial number '88358127'. Bio nutricia Extract (stylized and/or with design, MRK1036112435-012431892_._FCDTnutricia_extract_b_w.jpg).



Trademark	:	Bionutricia Extract
Application No.	:	88358127
Class	:	5 & 30
Applicant	:	Bio-Nutricia Manufacturing Sdn Bhd
Country	:	U.S

The application will undergo examination and we expect to hear from the registry office by March 2020.

Use of Symbol TM / ®

You can use the symbol **TM** on top right of your logo. Kindly note that use of the symbol is **optional**. Do **not** use the symbol **®**, only a registered trademark is entitled to use such symbol.

Rest assured we would monitor your application accordingly.

Thank you for entrusting this matter to us.

Yours truly,

Lymesol
April Lim (016 658 2021)
Trade Mark Agent

Encl. Filing Documents

Field of the Invention

Embodiments of the present invention relate to the area of nutritional powders and supplements. More particularly, this invention pertains to an improved energy powder that provides energy to the body by refueling the body's fuel tank.



Process for Preparing Nutritional Powder Extract

The method for preparing a nutritional powder extract is providing cooling, antioxidant boosters with energy recovery. It includes sorting and cleaning of plant material to remove adhering substances and pre-extraction treatment of the plant material to get a pre-extracted ground plant material. Particularly, homogenizing and subdividing the pre-extracted ground plant material by passing through a homogenizer.

Moreover, extracting the plant material extract from a homogenized mixture using water extraction and solvent extraction protocol, then encapsulating the plant material extract in an aqueous medium. A core substance and a film-forming molecular element coexist together and spray drying of encapsulated plant material extract into a powder form.

Bio nutricia Certification



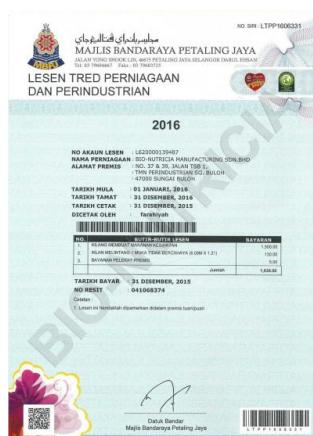
HACCP Certificate



GMP Certificate



Halal Certificate



MBPJ Certificate



FDA Registration



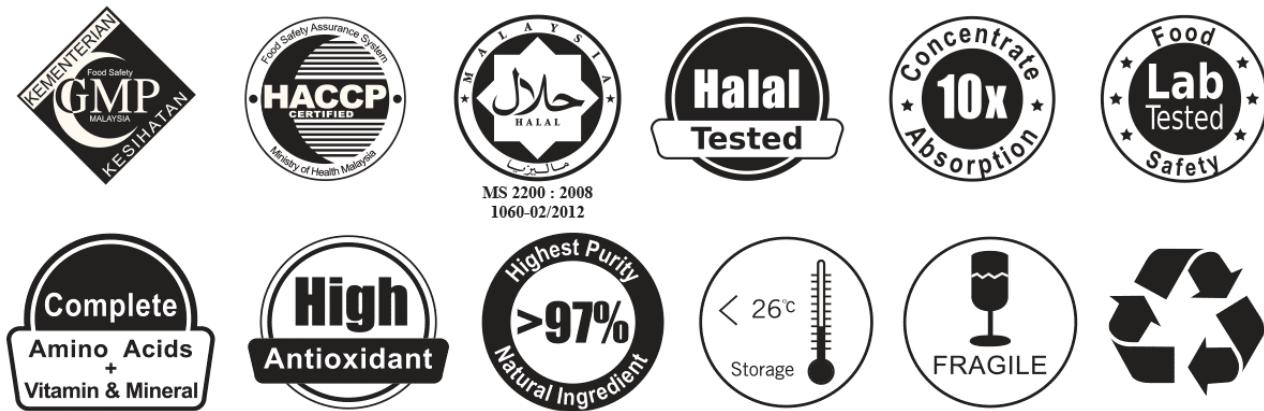
**Bio-Nutricia
Manufacturing
Sdn Bhd KKM
HACCP & GMP**



MeSTI Certification



Quality Certification



Case stories of Blockchain in the Food & Supply Chain Industry

Agric - Agricultural Chain for Technology Research and Development

AGRIC, translated into the agricultural chain. It is regulated, rigorous and robust, from technology research and development, commercial trade, market operations, currency issuance, and wallets, to international exchanges, full circulation, and future planning.

AGRIC has thousands of hectares of farms in Malaysia. The vast land was used as land for agricultural production that supplied the produce throughout the ASEAN region. AGRIC uses solutions to achieve digitalization of agriculture and help solve all the above problems.

AGRIC created the Smart Mobile App to opendemand for fruits and vegetable delivery business. The app provides complete information on crop production, crop protection and all relevant agriculture allied services on the user smartphone. In addition to information and tracking portal, AGRIC will also provide an online marketplace that brings farmers, suppliers, machinery and tools manufacturers enabling them to communicate and connect with end consumers.

Thus, it enables them to supply and deliver food to local stores, customers, and earn money without any middleman taking a lion share of their earning. Also, farmers and suppliers would be able to create their advertisements free of cost.

Consumers can investigate the ads directly through their mobile application When they place order, they get the fresh items to their doorstep. Lastly, all transactions can be done through the payment gateway integrated into AGRIC.



Ecos – Decentralized Software Inspection and Quality Control in the Food Industry

ECOS is a project for the development of decentralized software for inspection and quality control in the food industry. It covers the whole sphere of food products and drinks, including alcoholic ones.

The system is designed to control illegal distribution and appearance in the market of counterfeit goods and fake and life-threatening products based on a public blockchain with a distributed database resistant to theft, substitution, alteration, and breach of information.

The main task of the ECOS project is to combat the global problem of sale of poor-quality, dangerous, counterfeit and illegal products, their sale and distribution in the world industry of food products and drinks, especially alcoholic ones since they are very liable to adulteration today.

The essential advantage of the system is that the ECOS software created is based on a public (transparent and reliable) blockchain that helps to protect billions of consumers all over the world (like us) from dangerous, fake and counterfeit products and drinks (including alcoholic ones). The application being built will enable a usual consumer to check whether a particular product complies with the sanitary norms and safety standards using its smartphone or tablet PC.

Walmart – Food Safety on Blockchain

Walmart has been working with IBM on a food safety blockchain solution. They provide a platform that all suppliers of leafy green vegetable for Sam's and Walmart will upload their data to the blockchain by September 2019 .

Most supply chains are bogged down in manual processes that make it difficult and time-consuming to track down. By placing a supply chain on the blockchain, it makes the process more traceable, transparent and fully digital.

Each node on the blockchain represents an entity that handles the food on the way to the store, making it much easier and faster to see if one of the affected farms sold infected supply to a particular location with much greater precision.



Carrefour – Nestle – Other Food Companies

Carrefour, the Europe's largest retailer is adopting blockchain, which will quickly help trace food back to its source within seconds. The network is now generally available after 18 months in testing, during which retailers and suppliers have tracked millions of individual food products.

In November, the multinational retailer Carrefour announced that it would be using the IBM Food Trust blockchain to track free-range chickens in Spain. Meanwhile in Switzerland, Gustav Gerig AG revealed that it would be using the Ethereum blockchain to track tuna. Also, in the same month, the South Korean government announced that it would begin tracking beef in January, while United States salad chain Sweetgreen said it had raised \$200 million in funding to develop a blockchain-based tracking system for its ingredients.

Nestlé traced some of its Gerber baby food products using Food Trust, a blockchain system developed by IBM, in a test of the technology's ability to locate the source of fruits and vegetables that go into the products, the Wall Street Journal reported. The trial involves nine other food companies – Dole Food, Driscoll's, Golden State Foods, Kroger, McCormick, McLane, Tyson Foods, Unilever and Walmart – to determine how useful blockchain is in food traceability on a global scale.

During the test, Nestlé traced the ingredients for sweet potato, apple, and pumpkin puree baby food to determine if the technology could make product recalls faster. The tests involved multiple ingredients and cross-border shipments. Alberta-based companies Hamill Farms, Canada Malting Co. (a GrainCorp company), Red Shed Malting and Last Best Brewing & Distilling have teamed up with TE-FOOD to deliver a new and engaging consumer experience. "Blockchain"—a new beer officially launching on February 1st—uses blockchain technology to trace the beer grain ingredients from field to can.

Blockchain technology is being used increasingly to facilitate traceability in food ingredients, giving consumers greater visibility over where their food comes from, how it's been processed and transportation. The solution allows consumers to follow the way Blockchain was produced. The barley was grown and harvested at Hamill Farms in Penhold, Canada then traveled to Canada Malting Company in Calgary Canada for malting, then to a third-party lab for quality assurance, on to Red Shed Malting in Penhold for roasting and finally to Last Best Brewing & Distilling in Calgary for brewing and packaging. All events in the supply chain are registered on the FoodChain.

FedEx

FedEx is one of the world's biggest logistics management companies and handles billions of dollars' worth of cargo every year. FedEx has now become the first big shipping giant to incorporate Blockchain technology into their supply chain management.

So far, they are using Blockchain to track high-value cargo and are soon planning to extend the functionality to almost all their shipments. In addition to that, they are also helping to develop the Blockchain-based industry standards for supply chain logistics, establishing themselves as



pioneers in this field.

The American courier joined Hyperledger, an open source project designed to improve cross-industry blockchain technologies. Hyperledger is hosted by Linux Foundation that can enable a business to build blockchain-based industry grade applications, platforms and hardware systems. Hyperledger Executive Director Brian Behlendorf stated the growth and diversity is a signal of the increasing recognition of the strategic value of enterprise blockchain and commitment to the adoption and development of open source frameworks.

According to FedEx CEO Fred Smith, FedEx demonstrate the proactive approach in adopting the blockchain technology as it is becoming the next frontier for global supply chains. One of the best results is the partnership were created like pharmaceutical company Good Shepherd Pharmacy in developing new blockchain power infrastructure to help cancer patients get medications.

Microsoft

Microsoft is another tech giant that has embraced Blockchain Technology since its inception. Microsoft had started accepting Bitcoin payments on its website in 2014 when almost no one had even heard of cryptocurrencies. Microsoft has also secured some 40 patents related to the use of Blockchains as payment gateways and for secure storage.

Bill Gates and several of his nonprofit decentralized have looked at Blockchains to try to improve the workings within their organization. Microsoft is also letting businesses and developers deploy their Blockchain using Stratis in Microsoft Azure. Microsoft Azure is a cloud computing service created by Microsoft for building, testing, implementing, and managing applications Microsoft-managed data centers.

Cloud computing is the delivery of computing services—including servers, storage, databases, networking, software, analytics, and intelligence—over the Internet (“the cloud”) to offer faster innovation, flexible resources, and economies of scale. You typically pay only for cloud services you use, helping you lower your operating costs, run your infrastructure more efficiently, and scale as your business needs change.

The following are the key reasons why shift to cloud computing:

- Cost
Cloud computing eliminates the capital expense of buying hardware and software and setting up and running on-site datacenters—the racks of servers, the round-the-clock electricity for power and cooling, and the IT experts for managing the infrastructure. It adds up fast.
- Speed
Most cloud computing services are provided self service and on demand, so even vast amounts of computing resources can be provisioned in minutes, typically with just a few mouse clicks, giving businesses a lot of flexibility and taking the pressure off capacity



planning.

- Global scale

The benefits of cloud computing services include the ability to scale elastically. In cloud speak, that means delivering the right amount of IT resources—for example, more or less computing power, storage, bandwidth—right when they're needed, and from the right geographic location.

- Productivity

On-site datacenters typically require a lot of “racking and stacking”—hardware setup, software patching, and other time-consuming IT management chores. Cloud computing removes the need for many of these tasks, so IT teams can spend time on achieving more important business goals.

- Performance

The biggest cloud computing services run on a worldwide network of secure datacenters, which are regularly upgraded to the latest generation of fast and efficient computing hardware. This offers several benefits over a single corporate datacenter, including reduced network latency for applications and greater economies of scale.

- Reliability

Cloud computing makes data backup, disaster recovery, and business continuity easier and less expensive because data can be mirrored at multiple redundant sites on the cloud provider's network.

- Security

Many cloud providers offer a broad set of policies, technologies, and controls that strengthen your security posture overall, helping protect your data, apps, and infrastructure from potential threats.

References



[All Accessed May 2019]

The Great Chain of Being Sure about Things, The Economist, 2015. Available from <https://econ.st/2VYDj5a>

Seafood in Supply Chain Traceability Using Blockchain Technology, Hyperledger, 2017. Available from <http://bit.ly/2HwyhUB>

Hyperledger Architecture Working Group, IBM, 2016. Available from <http://bit.ly/2JBAFMi>

Nakamoto, S. (2008): Bitcoin - A Peer-to-Peer Electronic Cash System, Nakamoto Institute. Available from <http://bit.ly/2JWXj0Q>

Pierro MD. 2017. "What Is the Blockchain? Computing in Science & Engineering 19 (5): 92-95. doi: 10.1109/MCSE.2017.3421554

From Shore to Plate: Tracking Tuna on the Blockchain, Provenance, 2019. Available from <http://bit.ly/2YMOpY6>

Reijers W, O'Brolcháin F, and Haynes P. 2016. Governance in Blockchain Technologies & Social Contract Theories. Ledger 1: 134-151. Available from <http://bit.ly/2X2phMa>

How blockchain can transform the manufacturing industry, Syncron, 2019. Available from <http://bit.ly/2X10J6h>

Mire, S. (2018): Blockchain For Manufacturing - 10 Possible Use Cases, Disruptor Daily. Available from <http://bit.ly/2wbKpUA>

Nutrineo – Health Food Solution By Uelzena, 2019. Available from <http://bit.ly/2YlbomP>

Michail, N. (2018): Help or hype – Should food manufacturers invest in Blockchain? Food Navigator.com. Available from <http://bit.ly/2X3PZnU>

Labs, W., Hanacek, N. (2019): Extending the applications of Blockchain in the food manufacturing industry, Food Engineering. Available from <http://bit.ly/2YLr4G1>

Arnold, A. (2018): 5 Use Cases Proving Blockchain Can Have A Massive Impact On The Manufacturing Industry, Forbes. Available from <http://bit.ly/2Hzdsb9>

Blockchain's future in food and beverage companies is now, RSM, 2018. Available from <https://rsm.us/2YKi6ZK>

Recall: The Food Industry's Biggest Threat to Profitability. Food Safety Magazine. 2012. Available from <http://bit.ly/2VJyk3e>

Pelberg, D. (2018): Crypto Case Study: Solving Food Waster, Crypto Disrupt. Available from <http://bit.ly/2VVaBSC>

The benefits of blockchain technology, Food Business News, 2018. Available from <http://bit.ly/2VYJvtL>

Cook, J. (2018): 12 blockchain food & agriculture companies in their own words, Medium. Available from <http://bit.ly/2HzwoGV>

Noel, A. (2018): Six Ways Blockchain is Being Used in Food and Agriculture Supply Chains, Medium. Available from <http://bit.ly/2HyyLJX>

Banker, S. (2018): Blockchain Gains Traction in the Food Supply Chain, Forbes. Available from <http://bit.ly/2M3QiOU>

Market size of food ingredients worldwide from 2017 and 2022, Statista, <http://bit.ly/2WaSelB>



Herbal Extracts Market: Global Industry Size, Trends, Forecast 2024, Goldstein Research, 2018. Available from <http://bit.ly/2JCC6tN>

Global Integrated Food Ingredients Market By Function; Integrated Solutions By Company and By Geography, Forecast & Opportunities 2024, TechSciResearch. Available from <http://bit.ly/2WTHETt>

Global Food Flavours Market Size, Share & Food Flavours Market Forecast 2024, TechSci Research, 2018. Available from <http://bit.ly/2JzQMtw>

Global Powder Induction and Dispersion System Market, TechSci Research, 2018. Available from <http://bit.ly/2QlrYpz>

Global Malted Food Drinks Market by Type, by Distribution Channel, by Region, Competition, Forecast & Opportunities, TechSciResearch, 2019, <http://bit.ly/2Hwm2qY>

Bulk Food Ingredients Industry (Market) Growth Analysis by Top Key Players 2018-2015, WebNewsWire, LexisNexis, 2019, <http://bit.ly/2Wek9aV>

Sharma, A. (2019): Plant Extract Market - Industry Research Report 2018-2025, Globally. ResearchGate. Available from: <http://bit.ly/2JW9Y4g>

Herbal Extracts Market Size, Rising Trends and New Technologies Research Forecast to 2024, MarketWatch, 2019. Available from <https://on.mktw.net/2YMf33h>

Herbal Extract Market Research Report – Forecast to 2023, Market Research Future, 2018. Available from <http://bit.ly/2JTo5ae>

Global Herbal Medicine Market, 2018 by Manufacturers, Region, Type and Application, Forecast to 2023, Wise Guys Research Consultancy, Global Info Research, 2018. Available from <http://bit.ly/2JzThMk>

Herbal Medicine Market 2018 – Global Share, Trend, Segmentation and Forecast to 2023, Wise Guy Reports, Thomson Reuters, 2018. Available from <https://reut.rs/2EquZAp>

Herbal Supplement Market by source; by; by Function: Global Industry Perspective, Comprehensive Analysis and Forecast, 2017 – 2022, Zion Market Research, 2017. Available from <http://bit.ly/30pOe6B>

Global Plant Extract Market Report by Types, Forms, End-Uses, and By Regions, 2017-2024, Value Market Research, 2010. Available from <http://bit.ly/2HLiAI7>

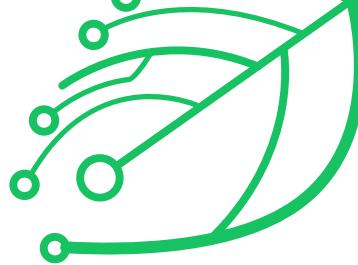
Herbal Supplements Market Size, Share & Trends Analysis Report by Product, By Formulation, By Consumer, And Segment Forecast, 2018-2025, Grand View Research, 2018. Available from <http://bit.ly/2HvNjtR>

Krupali, R. (2018): Global Botanical Extracts Market Research CAGR of 8.7% from 2017 to 2025, PMR Press Release. Available from <http://bit.ly/2HP1r0f>

Botanical Extracts Market by Source, Application, Form, and Region – Global Forecast to 2022, Global Information Inc., Markets and Markets, 2017. Available from <http://bit.ly/2HJEVWD>

Medical Cannabis Market: Global Industry Trends, Share, Size, Growth, Opportunity and Forecast 2019-2024, imarc Group, 2019. Available <http://bit.ly/2JzKLNo>

McCarthy, N. (2018): U.S. Marijuana Market - The Grass Is Getting Greener, statista. Available from <http://bit.ly/2HJvOVP>



Legal cannabis market worldwide from 2016 to 2024, statista, 2018. Available from <http://bit.ly/2YB7MDg>
McCarthy, N. (2018): U.S. Marijuana Market - The Grass Is Getting Greener, statista. Available from <http://bit.ly/2HJvOVP>

Williams, S. (2018): 15 Ways Marijuana Has Made History in 2018, The Motley Fool. Available from <http://bit.ly/2HuWrPj>

Williams, S. (2018): 15 Ways Marijuana Has Made History in 2018, The Motley Fool. Available from <http://bit.ly/2HuWrPj>

Williams, S. (2018): Merry Christmas – Hemp and Hemp-Based CBD Are Now Legal, The Motley Fool. Available from <http://bit.ly/2WYOs2o>

Legalized Cannabis Market, Food & Beverages, Transparency Market Research, 2019. Available from <http://bit.ly/2VWLUVQ>

Cannabis Industry Statistics 2019 – From Market Growth to Regulation, flowhub, 2019. Available from <http://bit.ly/2QixVDL>

Matco Cannabis Investment Fund, Matco Financial, Calgary, 2017. Available from <http://bit.ly/2JzABwa>

Invest in cannabis, arcviewgroup, 2019. Available from <http://bit.ly/2wgIfTu>

Williams, S. (2019): Global Marijuana Sales to Grow 38% to \$16.9 Billion in 2019, The Motley Fool. Available from <http://bit.ly/2M3573X>

Important aspects in the development of new food products, statista, 2019. Available from <http://bit.ly/2Jxk77V>

Report: Tracing the supply chain, accenture, 2019. Available from <https://accntu.re/2EkATmD>

Columbus, L. (2018): How Blockchain Can Improve Manufacturing in 2019, Forbes. Available from <http://bit.ly/2X115K7>

Taylor, M. (2019): Freedom Superfoods Celebrates Success of Raw Organic Cacao Powder as Healthy Sugar-Free Snack Alternative, Marketers Media. Available from <http://bit.ly/2Eqv1lu>

Fruit Powders Market Global Analysis, Size, Share, Key Player, Gross Margin, Trend, Business Statistics and Forecast to 2023, Marketers Media, 2019. Available from <http://bit.ly/2wcJgfx>

Food Acidulants Market: By Application Type Source - Forecast 2017-2022, IndustryARC, Research and Markets, 2017. Available from <http://bit.ly/2MjD14D>

Functional Food Ingredients Market Size, Share And Forecast To 2023, Credence Research, 2016. Available from <http://bit.ly/2VZvITM>

Food Coating Ingredients – Global Market Outlook (2015-2022), Statistics, Market Research Consulting, 2016. Available from <http://bit.ly/2QixDwD>

Canadean (2015): Successful New Product Development Strategies in Food, Drinks and Personal Care Market, Acute Market Reports. Available from <http://bit.ly/2HMynqa>

Global Personal Care Active Ingredients Consumption 2016 Market Research Report, Acute Market Reports, QYResearch, 2016. Available from <http://bit.ly/2VJfeub>

Phytosterols Market Size, Share, Trends | Forecast 2026, Acumen Research and Consulting, 2018. Available from <http://bit.ly/2Wg4ojG>



Food Ingredients Market to Reach USD 63.11 Billion By 2026, Reports and Data, 2019. Available from <http://bit.ly/2M8oGYo>

Food Acidulants Market: By Application Type Source - Forecast 2017-2022, Research and Markets, 2017. Available from <http://bit.ly/2M4AsD4>

Functional Food Ingredients Market Size, Share And Forecast To 2023, Credence Research, 2016. Available from <http://bit.ly/2VZvITM>

Food Coating Ingredients – Global Market Outlook (2015-2022), Statistics, Market Research Consulting, 2015. Available from <http://bit.ly/2HxaKTr>

Phytosterols Market Size, Share, Trends | Forecast 2026, Acumen Research and Consulting, 2018. Available from <http://bit.ly/2Wg4ojG>

Columbus, L. (2018): How Blockchain Can Improve Manufacturing In 2019, Forbes, Enterprise & Cloud. Available from <http://bit.ly/2X115K7>

Miller, R. (2018): Walmart is betting on the blockchain to improve food safety, TechCrunch. Available from <https://tcrn.ch/2whDwkw>

IBM Food Trust: adding trust and transparency to our food, IBM Blockchain, 2019. Available from <https://ibm.co/2WooNTD>

How Walmart brought unprecedented transparency to the food supply chain with Hyperledger Fabric, The Linux Foundation Projects, Hyperledger, 2019. Available from <http://bit.ly/2Wg56gQ>, [accessed May 16. 2019]

Bracher, P. (2018): Blockchain As A Food Safety Tool – Limitations and Opportunities, Asia Pacific Food Industry. Available from <http://bit.ly/2HTwatk>

Splitter, J. (2018): What Can Blockchain Really Do For The Food Industry? Forbes. Available from <http://bit.ly/2VGZxnm>

Tian, F. (2017): A Supply Chain Traceability System for Food Safety based on HACCP, Blockchain & Internet of Things, 2017 International Conference on Service Systems and Service Management, Dalian, pp. 1-6. doi: 10.1109/ICSSSM.2017.7996119

Gooch, M., Dent, B., Sylvia, G., Cusack, C. (2017): Rollout Strategy to Implement Interoperable Traceability in the Seafood Industry. Available from <http://bit.ly/2wgljTs>

Green, E., Gunn, L. (2018): Blockchain technology can revolutionize the food supply chain, says IBM VP, Food Ingredients First. Available from <http://bit.ly/2YCRxFM>

Chandler, S. (2018): From South Korea to IBM Food Trust – How Blockchain Is Used in the Food Industry, Cointelegraph, The future of money. Available from <http://bit.ly/2VJhXnp>

Wollenhaupt, G. (2018): Blockchain test traces Nestlé baby food ingredients, Supply Chain Dive. Available from <http://bit.ly/2VW7wlu>

Kehoe, L., Gindner, K., Dalal, D., Andrzejewski, D., O'Connel, N. (2017): When two chains combine – Supply chain meets blockchain. Available from <http://bit.ly/2JA9WQc>

Globalized blockchain: Auchan implements food traceability technology on international scale, Food Ingredients First, 2018. Available from <http://bit.ly/2HOEdT>



Pelberg, D. (2018): Crypto Case Study: Solving Food Waste, Crypto Disrupt. Available from <http://bit.ly/2VVaBSC>

Sharma, T.K. (2018): Top 10 Companies That Have Already Adopted Blockchain, Blockchain Council. Available from <http://bit.ly/2X31USP>

Sulaiman, N. F. A. R., & Ahmad, A. (2018). Save The Food for A Better Future: A Discussion on Food Wastage in Malaysia. International Journal of Law, Government and Communication, 3(10), 12-21. Available from <http://www.ijlgc.com/PDF/IJLG-2018-10-09-02.pdf>

(2013) Food waste as a valuable resource for the production of chemicals, materials and fuels. Current situation and global perspective - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/figure/Components-present-in-FSCW-and-their-uses-in-common-consumer-applications_fig2_236590469 [accessed 20 Jul, 2019]

Lin, Pfaltzgraff, Herrero-Davila, Mubofu, Abderrahim, Clark, Koutinas, Kopsahelis, Stamatelatou, Dickson, Thankappan, Mohamed, Brocklesby, Luque (2013): Food waste as a valuable resource for the production of chemicals, materials and fuels. Current situation and global perspective, Energy & Environmental Science, Available from <https://pubs.rsc.org/en/content/articlelanding/2013/ee/c2ee23440h#!divCitation>

Sagar, N.A., Pareek, S., Sharma, S., Yahia, E.M., Lobo, M.G. (2018): Fruit and Vegetable Waste: Bioactive Compounds, Their Extraction, and Possible Utilization, Food Science and Food Safety, Volume 17, Issue 3, Wiley Online Library. Available from <https://doi.org/10.1111/1541-4337.12330>

Ahuja, K., Singh, S. (2018): Food Additives Market Size By Product, Global Market Insights. Available from <https://www.gminsights.com/industry-analysis/food-additives-market-size>