What it is.....
Where from.....
Used for.....

Cassava

By : Publications and Public Relations Sub-Committee

History

What it is

Cassava is a tuber crop – a food crop, which is one of the important economic crops in tropical countries, and ranking among the five top major starch-foods apart from wheat starch, corn starch, rice starch and potato starch.

Where from

Cassava is not an origin crop of Thailand. Its primary origin is from the Central and South America. Cassava was brought into Asia in the 17th Century by the Portugese and the Spainish, It was firstly cultivated in Indonesia, India, Sri-Langka and the Philippines.

For Thailand, these is no apparent evidence as to when cassava was first known in this country. It is, however, believed that **tapioca flour** (starch) was brought into Thailand from Indonesia through Singaporian traders–It was known as **Singapore flour**, which is used in making food, tapioca pearl and dessert called' Lodchong Singapore' etc.

Nearly the same period, ①**cassava variety** was first introduced into Thailand also from Indonesia through the South of Thailand. It was planted between the rows of rubber-tree (not in the normal growing plots) just for food-human consumption. However, when the rubber-tree had grown up and their leaves covered the whole area, planting of cassava was then impossible and vanished from the Southern part of Thailand.

From the South, plantation of cassava was then expanded to the Eastern coastline of Thailand, where the soil is sandy and suitable for growing of cassava. Recognition of the success-plantation of cassava has quickly become popular, covering the whole Eastern Region i.e. Cholburi-Rayong-Chantaburi-Trad-Chacheongsal-Prajeenburi and Srakaew provinces.

① The **cassava variety** brought into Thailand in the early stage was the variety for food-humen consumption. It was known as 'sweet variety' or **five-minute variety** having a taste of little bit sweet and no bitter taste-normally used for food. Later when the plantation of cassava was expanded to the Eastern coastline Region, another type of cassava variety has been planted. It is the variety with a little bit of bittier taste, but contains high starch content suitable for making tapioca flour and for animal feed. Since the expansion and development of cassava growing has widely spread all over the country, there have been many imports of several types of cassava variety using for breeding, improving and developing i.e.

- 1960 imported from Indonesia Malaysia and Moritius
- 1965 imported from The Virgin Islands
- 1970 imported from CIAT/Center of International Agriculture Tropical Countries in South America.
- 1975 imported cassava variety in the form of hybrid seeds from CIAT for the first time.
- 1979 imported cassava variety in the form of tissue culture in glass tube.

Nowadays with the co-operation of Department of Agronomy-Faculty Agriculture-Kasetsart university, Department of Agriculture-Ministry of Agriculture and Cooperates and the Thai Tapioca Development Institute Foundation (TTDI). Thailand has continually advanced in researching of the improvement and development of various varieties to give high yield and high starch content so that farmers have better chance in choosing appropriate variety for each locality, The achieved varieties are : Rayong 1, Rayong 5, Rayong 60, Rayong 90, Sriracha 1, KU-50, Rayong 72 and Huay-Bong 60.

In 1965-1966 with the outstanding features of being easily grown, drought resistant, less water dependent and growable the whole-year round, cassava growing has been widely introduced to :

- The North-Eastern Region (where the weather condition is normally drought and not much raining) starting from Korat and Chaiyaphum provinces and then expanded to other provinces all over the region. Main area covers Chaiyaphum, Korat, Burirum, Roi-ed, Kalasin, Khonkaen, Udorn and Loei.
- At the same time, plantation of cassava has been expanded to some parts of the West and the Lower-North Regions such as Suphanburi-Kanjanaburi-Ratchaburi and Uthaithani-Nakornsawan Kamphaengpetch- Pitsanulok provinces.

Plantation of cassava in Thailand has continuously been promoted and expanded. The country has the highest record of 9.460 million rais growing area in 1988/1989 crop year, with the output of cassava roots of 24.6 million tons, which make Thailand to have the highest export volume of 9.798 million-tons of tapioca products in 1989 (consisting of 0.645 million tons of tapioca flour+starch and 9.153 million-tons of tapioca chips + pellets)

At present, Thailand has almost 7 million rais of cassava growing area nationwide, of which 85% is in the East and the North Eastern Regions. The estimated cassava roots production of approximately 20.4 million-tons will be harvested.

Used for

Cassava is a tuber crop with high starch content ..... **Cassava roots** are used for :

1. Direct human consumption
2. Production of Tapioca Flour*..... – for food
   (Native Starch) – for industrial use
3. Production of Tapioca Meal
   Tapioca Chips
   Tapioca Hard-Pellets..... – for animal-feed ingredient
4. Raw material..... – for specific industries such as Alcohol-industry

- **Local industries** that use Tapioca Flour (starch) in their production processes :
  Food-Tapioca Pearl-Monosodium Glutamate (MSG)-Sweetener industries.
  Paper-Textile-Glue industries and Modified Starch industries
- ②**Yearly local consumption** is approximately 900,000-1,000,000 tons.

② ความต้องการใช้แป้งมัน-อุตสาหกรรมภายในประเทศ
Local industrial consumption of Tapioca Flour (Native Starch)

Monosodium Glutamate (MSG)	250,000	Tons
Sweetener	250,000	Tons
Food Industries	200,000	Tons
Paper	120,000	Tons
Modified Starch	70,000	Tons
Sago	60,000	Tons
Textile	10,000	Tons
Others (Glue, Medicine, etc.)	20,000	Tons
Total	980,000	Tons

ประมาณการต่อปี Yearly estimated consumption

INDUSTRIAL APPLICATIONS OF TAPIOCA PRODUCTS

ANIMAL FEED
Tapioca is one of the ingredients for animal compounding.

ALCOHOL
Tapioca is also used to produce liquor, industrial and medical alcohal.

FOOD
Tapioca starch is widely used in food production, such as instant noodle, tapioca pearl and seasoning sauce.

TAPIOCA CHIPS/PELLETS

MONOSODIUM GLUTAMATE (MSG)
Tapioca is a prime raw material in making MSG.

TEXTILE
Tapioca is used in yarn sizing and material printing.

GLUE
Tapioca is an important material in making quality glues.

PAPER
Tapioca is used in paper pressing, flattening and polishing.

MEDICINE
Tapioca is used to mix with active pharmaceutical materials to make capsules and tablets.

PLYWOOD
Good-quality glue for plywood binding is made from tapioca.

TAPIOCA STARCH

SWEETENER
Tapioca is used to make glucose, fructose, lactose, substitute for sucrose in making beverages, jams and canned fruits.

BIO DEGRADABLE PRODUCTS
Tapioca Starch can be mixed with biodegradable polymer to produce a packaging material.

PRODUCTS MADE FROM CASSAVA ROOTS

Animal Feed Production

In the initial stage, the making of animal feed ingredient from cassava roots is just a simple home-made process by using the "fiber materials from the Tapioca Flour (starch)-production process as feed for pig-duck-chicken or drying in the open-air. The product derived is called **Tapioca Waste**

All the "waste and drained water from the Tapioca Flour (starch)-production process was normally dumped into a well near the factory. After one year the sediment from this well would be cleaned by water and be put on filtration. The outcome is called '**Waste of Tapioca**', which can be used for pig-duck-chicken feed.

Tapioca Waste Meal..... Grinding the dried tapioca waste into meal by machine. The outcome is called Tapioca waste meal, which can be used as animal feed ingredient.

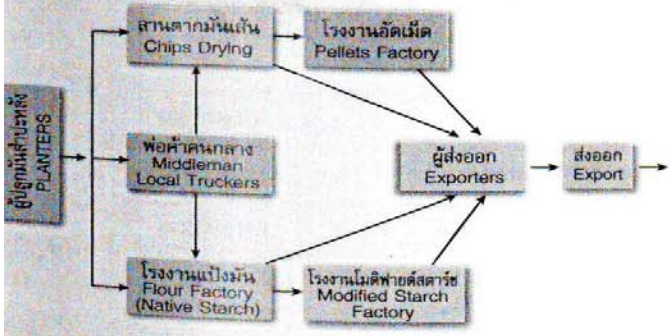
Tapioca Meal..... Cutting raw cassava tubers into small pieces either by hand or mechnical cutter-drying the small pieces in the open air-grinding the dried pieces in the 'Hammer Mill'. The outcome is called Tapioca meal, which can be used as animal feed ingredient.

Tapioca Chips..... Cutting raw cassava tubers into small pieces either by hand or chipping machine-drying the small pieces in the open air. The outcome is called Tapioca Chips, which can be used as animal feed ingredient or as raw-material for Alcohol and Citric Acid industries.

Tapioca Pellets (Native)..... Putting the dried tapioca chips into a pelletizing machine. The outcome is called Tapioca Pellets, which can be used as animal feed ingredient.

Tapioca Hard-Pellets..... Putting the dried tapioca chips into machine for pelletizing with steam in order to get a hard-pellets, which can be used as animal feed ingredient.

ตารางแสดงระบบการค้าผลิตภัณฑ์มันสำปะหลัง
CHART SHOWING THE MOVEMENT OF THAI TAPIOCA MARKET



Tapioca Flour (starch) Production

In the early days, the making of **Tapioca Flour** (Native Starch) was carried out on a home-made scale basing on the old simple process with the knowhow inherited from the South African and the Malaysian or the so-called 'sediment process'

(Grinding the peeled cassava tubers by hand-setting contents in a sedimentation tank- separating the "fiber materials by siphoning and filtration-"cleaning the settled wet starch by water two times-then drying the settled wet starch in the open air. The product derived is called tapioca flour.)

This Tapioca Flour (starch) is not clean enough. It is mostly used for making tapioca pearl and textile sizing, generally known as textile sizing starch or laundry starch.

Tapioca Pearl

Agglomerating Tapioca Flour (starch) into white, round and pearl-like granules-separating the desired size by screening-roasting the selected granules-then drying in the open air-screening to have clean and standard-size. The product derived is called tapioca pearl, used for both food and dessert as well.

Certain stages of the process in the production of Tapioca Flour (starch) were subsequently developed to obtain the starch output of improved quality whereby some mechanical equipments were applied. The production process has gradually been improved and developed technically.

Tapioca Flour- Grade A
Grade B

Tapioca Flour (starch) with good quality and standard was produced by modern equipments in large-scale tapioca-mills, and the products derived are :

Tapioca Flour - Grade A (with starch content of 85.0% Min)
- Grade B (with starch content of 83.5% Min)

Tapioca Flour- Super Grade
Super Hi-Grade

The production process of Tapioca Flour has further been improved and developed technically to another stage, with full-scale of modern mechanical equipments to obtain the starch output of a higher quality and the products derived are :-

Tapioca Flour - Super Grade
Super Hi-Grade

Modified Starch

Modified Starch is the starch processed through physical modification or chemical modification resulting in its physical change or the change in its chemical structure, so that its quality characteristics and properties are made suitable for applications in each particular type of industry as far as the need and objectives of the user can be met.

Export

Although cassava has been cultivated in Thailand since long time ago, but the export of Tapioca Products has just been realized only after the Second World War - around the year 1944. Most of the countries worldwide were suffered from shortage of all kinds of consumer goods and raw materials for various industries, including raw material for animal-feed. It was then fortunate for Thailand to export **Tapioca Flour** (starch) and **Tapioca Waste** to the neighboring countries i.e. Singapore, Malaysia and Hongkong for industrial uses and as animal-feed ingredients. The export mostly was done through the Singaporian and the Hongkong brokers, who some years later also introduced Thai Tapioca Flour (starch) to other countries, such as Japan and the United States

1. Export of **Tapioca Flour** (Native Starch)
   - for food
   - for industrial use

   (food-monosodium glutamate-sweetener-medicine paper-textile-glue-plywood and modified-starch)

   Main importers : Taiwan-Indonesia-Malaysia-Japan-Hongkong-China

2. Export of **Modified Starch**
   - for industrial use

   (food-medicine-paper-textile construction material-glue-mosquito repellent)

   Main importers : Japan-China-Indonesia-Netherlands-South Korea-the United States

It was told that around the year of 1955 Thailand exported **Tapioca Waste** to Europe for animal feed ingredient The result was fairly good-the users were satisfied with the quality and the cost was cheap. Later in 1957 Dr. Rudolf Schaller-a German, who owned a chemical laboratory and cargo-inspection office in Thailand, had introduced to use a Hammer-Mill in **Tapioca Waste-Meal** and **Tapioca Meal** production, then packed in bags and exported to West Germany. Later, the production and export of Tapioca Products have continuously been improved and developed into other form of better products i.e. Tapioca Chips, Tapioca Pellets (native) and finally Tapioca Hard-Pellets.

3. Export of **Tapioca Waste-Chips-Pellets (Native)-Hard-Pellets**
   - for animal-feed ingredient
   - for industrial use

   (Chips as raw material for making alcohol, citric acid, etc)

   Main importers of Chips : China

   of Hard-Pellets : EU, China and Japan

สถิติการส่งออก-สูงที่สุด
The Highest Export Record

	Year	M-Tons
Tapioca Hard Pellets	1989	9,032,918
Tapioca Chips	2003	1,974,024
Tapioca Flour (Native Starch) Modified Starch	2003	1,609,568*

* Native Starch 1,084,054 M-Tons
Modified Starch 525,514 M-Tons
Total 1,609,568 M-Tons

สถิติการส่งออกมันเส้น-มากกว่า 1 ล้านตันต่อปี
The Export Record of Tapioca Chips-Exceeding 1 mil-tons per Year

Year	Export	*China-Main Byuer
2001	1,649,238	1,638,725
2002	1,560,352	1,560,200
2003	1,974,024	1,968,282

ปริมาณ : ตัน Quantity : Tons

*CHINA is the biggest buyer of Thai Tapioca Chips since the Year of 1997.

ปีที่ทำสถิติส่งออก-มันเส้น+มันอัดเม็ด (ธรรมดา)+มันอัดเม็ดแข็ง
Export Record of Tapioca Chips+Pellets (Native)+Hard Pellets

Exceeding 1 million tons in 1970 (1,083,685 tons)
2 million tons in 1974 (2,030,360 tons)
6 million tons in 1978 (6,040,125 tons)
7 million tons in 1982 (7,181,695 tons)
9 million tons in 1989 (9,153,309 tons)

ปีที่ทำสถิติส่งออก-สินค้าแป้งมัน+แป้งแปรรูป
Export Record of Tapioca Flour (Native Starch)+Modified Starch

Exceeding 250,000 tons in 1974 (254,967 tons)
500,000 tons in 1988 (555,746 tons)
750,000 tons in 1992 (750,425 tons)
1,000,000 tons in 1997 (1,140,377 tons)
1,500,000 tons in 2003 (1,609,569 tons)

Export Policies

- In the past, there was no limit or restriction on the export of Tapioca Products. It was a **free trade** with no control on the export volume. But in 1982 Thailand has signed an ①import restriction agreement with the EU, this has led to the policy of **Quota Allocation** for Export of Tapioca Products to EU in 1983 onwards.

In order to control the export to be within the limited quantity agreed upon with the EU, several measures have been applied to serve this purpose i.e.

- free race for vessel loading measure (first come-first serve basis)
- stocking measure
- incentive measure
- tender measure
- past performance measure
- first come-first serve measure

The Minister of the Ministry of Commerce is the person who will fix the export policy year by year, sometimes more than one measures are used at the same time.

- During the year 1992, the European Community Commission has announced the reform of its ②Common Agricultural Policy (CAP) by 29% within 3 years commencing from July 1993 onwards.

Owing to the continuous impact on the EU's Import Restriction Agreement and the CAP Reform, both policies had subsequently sustained declining export quantity and value of Thai Tapioca Products exported to the EU, which had inevitably impact on the cassava roots price of farmers to be much lower. The Thai government has, therefore, issued the following policies in order to cope with the afore-mentioned situation :

- **Market Intervention Policy** - to assist farmers to be able to sell cassava roots at good-reasonable price (normally will be higher than the market price) i.e. Fixing minimum price, Buy-in at the guarantee price or Mortgage at the fixing price.
  (All these measures have unavoidably affected the trader/exporter as a whole, causing the buying price to be higher than the selling price or export price from time to time.)

- **Production Improvement and Development Policy** - to support on improvement and development of Tapioca Production so as to serve the requirements of various industries and to help promote and expand Tapioca Products to other new outlets and markets.

During the past ten years, the quantity of Tapioca Hard-Pellets exported to the EU has significantly dropped (to the lowest of 1,426 mil-tons in 2002). Nevertheless expansion of the export of Tapioca Products to other markets-new outlets is quite satisfactory. This **total export volume** when combines with the **local consumption volume** can be quite **in line with the total cassava roots output** of each year.

② การปฏิรูปนโยบายการเกษตรร่วมของประชาคมยุโรป
The Reform of the EC's Common Agricultural Policy (CAP)

The EC's commission has on May 21, announced the reform of its Common Agricultural Policy (CAP) by 29% within 3 years commencing from July 1993 onwards.

Such a reform would subsequently sustain declining export quantity and value of Thai tapioca products exported to the EC, which would inevitably impact cassava roots' price of the Thai cassava farmers to be much lower and probably lower than cost price.

การส่งออกผลิตภัณฑ์มันสำปะหลัง ปี 2503-2508

Export of Tapioca Products in 1960–1965

	แป้งมัน Flour		มันเส้น Chips		มันป่น Meal		อื่นๆ Others		รวม Total	
Year	Tons	M. Baht	Tons	M. Baht	Tons	M. Baht	Tons	M. Baht	Tons	M. Baht
1960	179,763	223	54	-	64,564	51	36,377	16	280,758	290
1961	227,606	278	8,405	7	188,415	150	18,950	11	443,476	446
1962	110,582	158	12,669	10	267,658	245	9,879	9	400,788	423
1963	121,520	204	93,422	76	189,784	143	22,717	16	427,443	439
1964	152,432	289	339,418	256	201,328	141	45,681	30	738,859	653
1965	141,918	223	400,529	315	79,005	61	97,993	77	719,442	676

ปริมาณ-ตัน : มูลค่า-ล้านบาท Quantity : Value

ปริมาณการส่งออกผลิตภัณฑ์มันสำปะหลังปี 2509 – 2546

EXPORT OF TAPIOCA PRODUCTS IN 1966 – 2003

ปี Year	แป้ง Flour/Starch	มันเส้น Chips	มันเม็ด Native Pellets	มันเม็ดแข็ง Hard Pellets	รวม Total
1966	173,671	521,328	-	-	694,999
1967	204,153	506,169	97,096	-	807,418
1968	143,568	417,282	314,788	-	875,638
1969	124,772	87,844	773,908	-	986,524
1970	142,914	22,620	1,061,065	-	1,226,599
1971	146,368	8,706	966,278	-	1,121,352
1972	124,453	3,905	1,109,363	-	1,237,721
1973	179,929	23,908	1,508,598	-	1,712,435
1974	254,967	105,713	1,924,647	-	2,285,327
1975	141,676	67,989	2,036,110	-	2,245,775
1976	241,200	63,,721	3,252,439	-	3,557,360
1977	202,466	104,786	3,564,529	-	3,871,781
1978	235,028	312,598	5,727,531	-	6,275,157
1979	123,409	202,844	3,677,204	-	4,003,457
1980	248,483	256,212	4,452,579	-	4,957,274
1981	309,724	413,122	4,978,137	608,212	6,309,195
1982	425,632	487,247	5,214,592	1,479,856	7,607,327
1983	374,194	266,157	2,391,530	1,637,827	4,669,708
1984	464,875	155,775	2,893,327	2,905,316	6,419,293
1985	497,370	127,161	1,102,432	5,386,950	7,113,913
1986	459,048	68,662	251,161	5,508,254	6,287,125
1987	369,056	97,078	18	5,653,244	6,119,396
1988	555,746	368,328	18	7,183,239	8,107,331
1989	645,529	120,391	-	*9,032,918	*9,798,838
1990	656,291	269,150	-	7,285,423	8,210,864
1991	707,051	142,472	-	6,044,973	6,894,496
1992	750,425	320,643	-	7,724,387	8,795,455
1993	653,276	71,566	-	6,635,439	7,360,281
1994	923,561	9,909	-	4,782,643	5,716,113
1995	845,006	169,067	-	3,127,526	4,141,599
1996	893,365	2,700	-	3,604,411	4,500,476
1997	1,140,377	138,586	-	4,016,106	5,295,069
1998	770,096	237,162	-	2,961,486	**3,968,744
1999	1,028,021	222,058	-	4,118,549	5,368,628
2000	1,409,658	95,170	-	3,819,541	5,324,369
2001	1,284,547	1,649,238	-	2,844,741	5,778,526
2002	1,307,635	1,560,352	-	***1,496,586	4,364,573
2003	*1,609.569	*1,974,024	-	2,019,516	5,603,109

ปริมาณ-ตัน : มูลค่า-ล้านบาท Quantity : Value

* - The highest export rccord of each category of Tapioca Products

** - The total export volume of Tapioca Products has gradually dropped from over 9 mil-tons in 1989 to the lowest of 3.968 mil-tons in 1998.

*** - The export volume of Tapioca Hard-Pellets has drastically dropped to the lowest of only 1.496 mil-tons in 2002.

Source : TTTA YEAR BOOK 2003.The Thai Tapioca Trade Association.