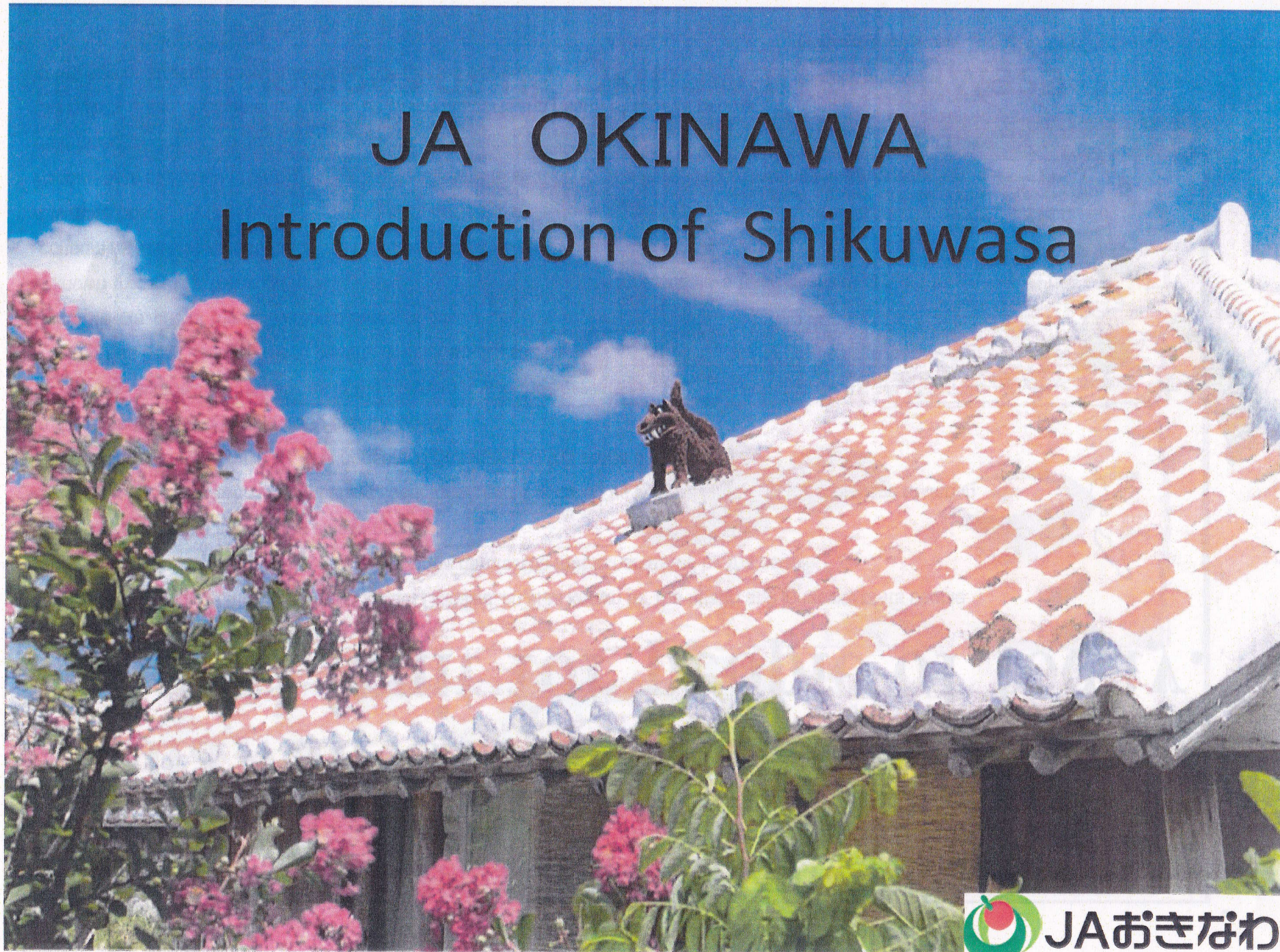


# JA OKINAWA

## Introduction of Shikuwasa





## Introduction of Okinawan Shikuwasa



# Okinawan Green Shequasar is an ideal fruit for people of today.

Shequasar is mainly cultivated in the northern Okinawa, an area known for the health and longevity of its people.

With the abundance of blessing from the sun and the nature, the fruit is harvested by the people.

among many of them are healthy elderly people.

Shequasar is an Okinawan word meaning "soul food," and it is called as "Hirami lemon" in the main land of Japan.

The people of Okinawa have for long consumed Shequasar in the stage of both

in green and sour and in yellow and slightly sweet.

In old days, and still in a few places in the northern region today,

the fruit has been used to soften banana fiber cloths (Bashofu).

Ogimi Village, one of the cultivation centers of the fruit,

is known throughout the world for its people's longevity. It is said that the people's traditional eating habit for

consuming vegetables and fruits has contributed their longevity.

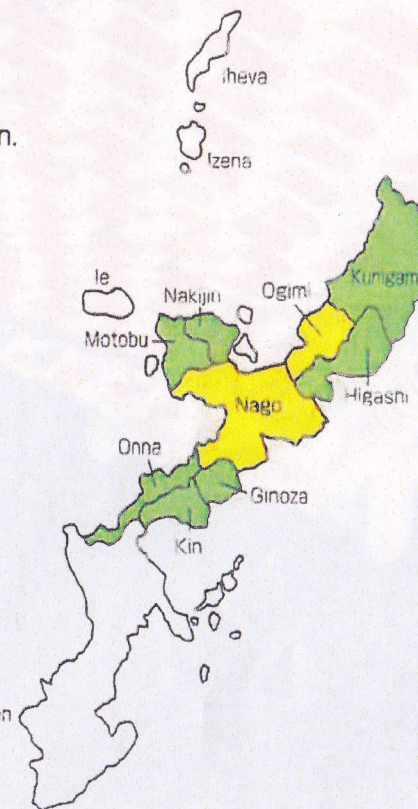
It is quite possible that Shequasar played an important part of it.

Researchers pay close attention to both nobiletin and tangeretin (citrus flavonoids) contained in Shequasar for

their blood-glucose inhibition property and hypotensive factor.

Okinawa's green Shequasar is acid citrus which supports the health of today's people

in the age of stressful daily life and lifestyle-related diseases.



■ Ogimi Village and Nago City (the areas in yellow) have been designated as centers of Shequasar cultivation by the prefectural government.



# Introduction of Okinawan Shikuwasa



## 沖縄シークワーサー 特集



**若手育つ本部町拠点産地めさす**

**祖父の地で志継ぐ**

**大粒例年より甘み強く**

本部町産地めさす。若手育成に力を入れている。祖父の地で志を継ぐ。大粒例年より甘み強く。収穫がピークを迎え、作業に追われる。小橋川弘さん一家。写真館から清さん、兄の弘さんと妻の敦子さん。大宜味村大宜味。撮影・伊藤純子

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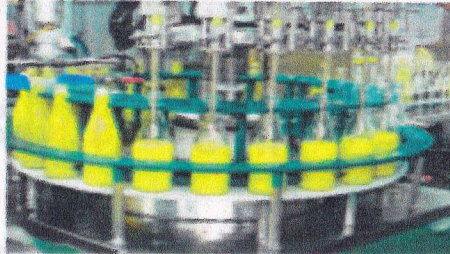
### 各搾汁工場フル稼働 1日採計約50ト



加工期 9月下旬～12月下旬まで

各搾汁工場フル稼働 1日採計約50ト

収穫がピークを迎え、作業に追われる。小橋川弘さん一家。写真館から清さん、兄の弘さんと妻の敦子さん。大宜味村大宜味。撮影・伊藤純子



## 元気の源「風邪知らず」

**■驚きの生命力**

県内生産の約半数を占める大宜味村。父の代から半世紀以上、沖縄シークワーサーを育てる小橋川弘さん（67）一家。山間部に広がる約30坪の畑に、収穫を待つ実がたわわに実る。隣の畑には弘さんの実弟・清さん（65）も同じように育てている。加工作用の収穫が農閑期となる10月から年末までは、朝7時から日暮まで作業に追われる。

**■収穫ピークの大宜味村**

**小橋川弘さん（67）一家**

今年の生産量は前年より2割増し。沖縄シークワーサーの本産地は大宜味村。約30坪の畑に、収穫を待つ実がたわわに実る。隣の畑には弘さんの実弟・清さん（65）も同じように育てている。加工作用の収穫が農閑期となる10月から年末までは、朝7時から日暮まで作業に追われる。

**■ノビリン病**

「風邪知らず」の生命力。弘さんは60年以上も栽培している。加工作用の収穫が農閑期となる10月から年末までは、朝7時から日暮まで作業に追われる。

沖縄シークワーサーの収穫がピークを迎え、作業に追われる小橋川弘さん一家。写真館から清さん、兄の弘さんと妻の敦子さん。大宜味村大宜味。撮影・伊藤純子



# Introduction of Okinawan Shikuwasa



## 1. Beginning of the Shikuwasa juice

Shikuwasa is the oldest known citrus among the citrus of Okinawa. In mainland Okinawa, Shikuwasa mainly grows naturally in Yanbaru northern area (it also grows in part of Amami islands and Taiwan). In the days of old, it was eaten as fruits or used for washing and stain removal of banana-fiber cloth.

From early 1970s, sales of Shikuwasa juice has started slowly. But sale started in full scale in year 1975 when Okinawa prefecture requested to produce Shikuwasa juice for Okinawa Ocean Expo.

But after removal of orange juice import ceiling in 1992, the quota of imported juice increased drastically and the amount of consumption also had sharp increase. However, consumption of domestic juices decreased greatly and sales of Shikuwasa juice also hit the wall.



# Introduction of Okinawan Shikuwasa



## 2. Countermeasure

Sales faced an uphill battle. Despite the unstable production of Shikuwasa, the sale of the product in the market was maintained. Beginning in the year 1991, a nutritional study began and samples of Shikuwasa fruit were sent to Dr. Hideaki Ota of Nakamura Daigaku University, Faculty of Nutritional Science in Fukuoka and Dr. Yutaka Sashida of Tokyo University of Pharmacy and Life Science, Faculty of Pharmacy.



# Introduction of Okinawan Shikuwasa



## 3. Shikuwasa became a trend

Result of continuous research reveals **high levels of nobiletin contained in the skin. Nobiletin has strong anti-cancer properties, and acts as an antioxidant and anti-inflammatory by blocking the enzymes that produce inflammation.** Many studies regarding the effect of nobiletin have been reported to academia and included in their journals.

Chart 1: Content of nobiletin (mg) per 100g of citrus (fruit)

Citrus	Shikuwasa	Grapefruit	Valencia Orange	Tangerine
Nobiletin	30.3 mg	1.0 mg	5.0 mg	1.5 mg

※The data is taken from both the skin and flesh, therefore numerical value is smaller

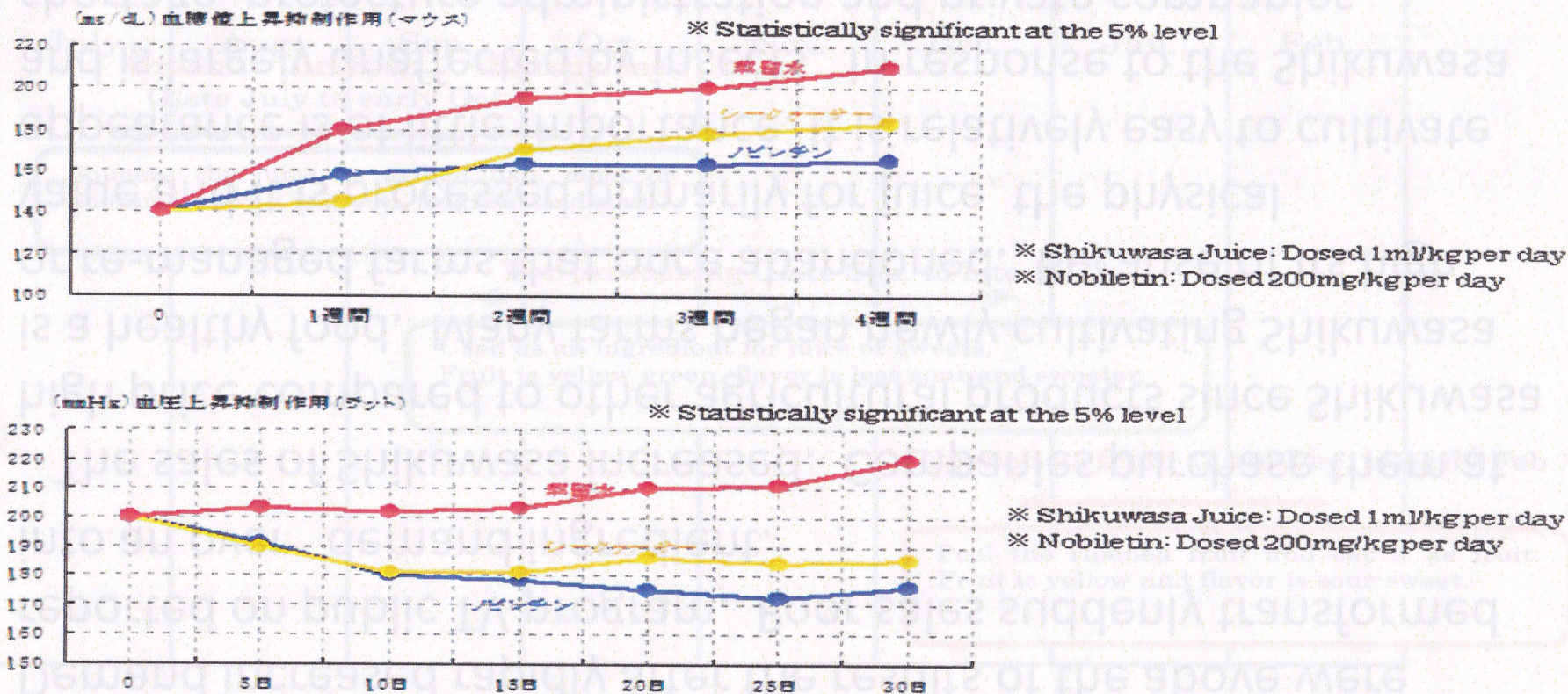
※Source : Biosci.Biotechnol.Biochem.70(1)178-192(2006)



# Introduction of Okinawan Shikuwasa



## Chart 3: Blood sugar and blood pressure effect of Nobiletin



※Source: Nakamura Gakuen University, Kyushu Okinawa Agricultural Research Center of National Agriculture and Food Research Organization



# Introduction of Okinawan Shikuwasa



Demand increased rapidly after the results of the above were reported on public TV program. Poor sales suddenly transformed into an over demand ingredient.

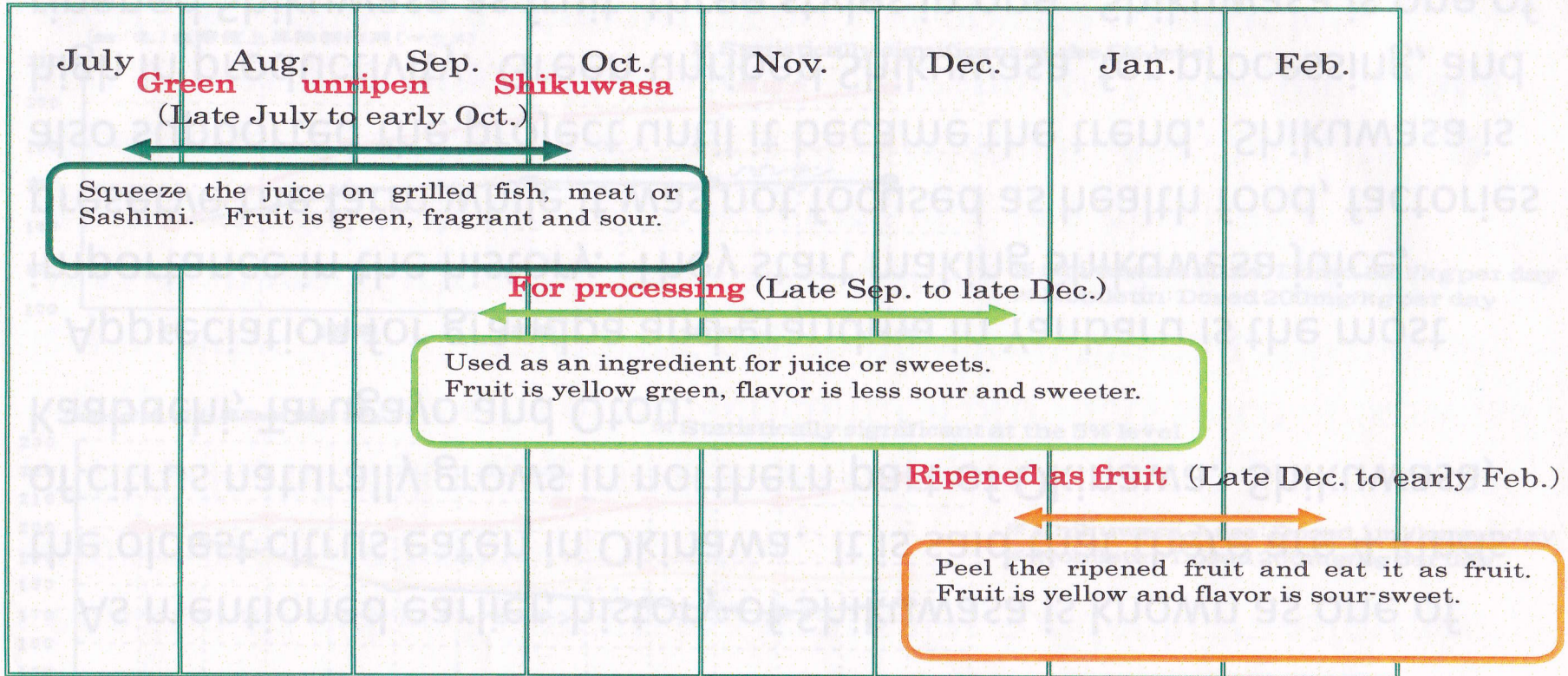
The sales of Shikuwasa increased. Companies purchase them at high price compared to other agricultural products since Shikuwasa is a healthy food. Many farms began newly cultivating Shikuwasa or re-managed farms that once abandoned. Because of its high value and it is processed primarily for juice, the physical appearance is of little importance. It is relatively easy to cultivate and is largely unaffected by insects. In response to the Shikuwasa shortage, prefecture administration and private companies promoted increased production by providing tree saplings and maintenance costs subsidies.



# Introduction of Okinawan Shikuwasa



## Intended Usage of Shikuwasa



\*Source: Nakamura Gakuen University, Kyushu Okinawa Agricultural Research Center of National Agriculture and Food Research Organization



# Introduction of Okinawan Shikuwasa



## 4. Effort for the future

As mentioned earlier, history of Shikuwasa is known as one of the oldest citrus eaten in Okinawa. It is said that there are 4 kinds of citrus naturally grows in northern part of Okinawa. Shikuwasa, Kaabuchi, Tarugayo and Otou.

Appreciation for grandpa and grandma in Yanbaru is the most importance in the history. They start making Shikuwasa juice, preserve the farm while it was not focused as health food, factories also supported the project until it became the trend. Shikuwasa is high in productivity. Green unripened Shikuwasa, for processing, and ripened Shikuwasa as fruit, three styles in one. Shikuwasa is one of the most valued fruit in Okinawa.



# Introduction of Okinawan Shikuwasa



! Blessings of Okinawa's nature are delicious and healthy.!

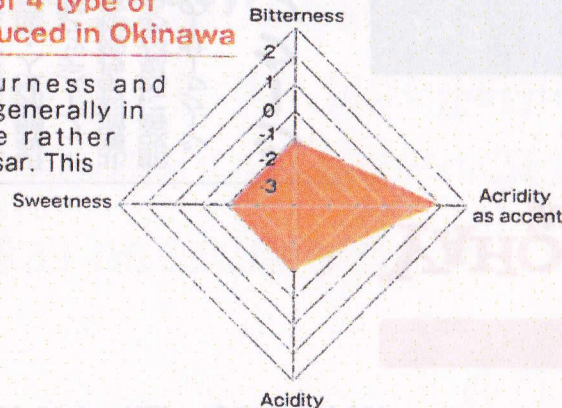
## JA Okinawa's No.1 Recommendation: Shequasar!

### ! Delicious! Results of Sensory Evaluation

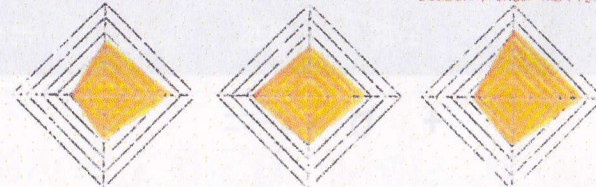
In order to compare the tastes and aroma of Shequasar with those of four other types of citrus fruites—Kabosu, Sudachi, lemon and Yuzu—we conducted sensory analysis and digitized characteristics. Shequasar has rather inhibited acidity, bitterness and sweetness, with a slight accent of astringent quality. Lemon demonstrated rather strong in acidity and bitterness, while Kabosu, Yuzu and Sudachi types showed similar characteristics as Shequasar except that bitterness is stronger in the former three types than the later. Our survey showed Shequasar citrus has suppressed bitterness, resulting in milder taste than the other types.

#### Average score of 4 type of Shequasar produced in Okinawa

Bitterness, sourness and sweetness found generally in citrus fruits are rather inhibited in Shequasar. This milder taste is accentuated with acidity, resulting in a clear outline of the overall taste.

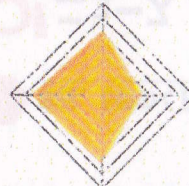


Kabosu (Oita Pref.) Yuzu (Tokushima Pref.) Sudachi (Tokushima Pref.)



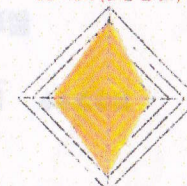
Bitterness, sourness and acridity as accent—characteristics of citrus—are rather strong while sweetness is understated, resulting in an unclear balance of taste.

Shikikan (Okinawa Pref.)



Scored rather high in sweetness and strong in bitterness and sourness as well, giving it a wider range of taste.

Lemon (the U.S.)



Very strong sourness and bitterness, which suppress the other qualities of taste, resulting in a plain taste balance.

\*Those taste sense radar charts show at a glance the result of taste analysis of each type of those citrus fruits. The charts represent that the larger the numerical value, the stronger the taste of each quality.  
\*Those analyses were conducted with cooperation of Taste & Aroma Strategic Research Institute and Tropical Technology Center Ltd.



# Newspaper & Yahoo! News “Shikuwasa Functional component”

2017年（平成29年）3月10日（金） 琉球新報

Yahoo!ショッピング 本日、5のつく日は全商品ポイント5倍以上! [今すぐ参加](#)

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トップ 速報 写真 映像 雑誌 個人 ビジネス 特集 意

主要 国内 国際 経済 エンタメ スポーツ IT・科学 ライフ 地域



コメントを見る

シークワサー 肝機能改善か

3/10(金) 8:30 掲載

## シークワサー、肝機能改善か 産総研など研究「解毒作用を増強」

沖縄の果実シークワサーの果汁が肝機能改善に効果がある可能性が、北海道科学技術総合振興センター（ノーステック財団）、国立研究開発法人・産業技術総合研究所（産総研）などの研究で8日までに分かった。シークワサーは脂肪燃焼や血糖値低下などの効果がこれまでに確認されている。新たな付加価値が加わることになると関係者から期待が高まっている。（琉球新報）

## シークワサー 肝機能改善か

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### 解毒作用を増強

シークワサーの果汁が肝機能改善に効果がある可能性が、人間の細胞には、摂取した食べ物成分など外からの刺激に応じて、さまざまな機能を入れたり切ったりするスイッチの役割を果たす「受容体」がある。試験では人間が持つ18種類の受容体にシークワサーの抽出液をかけたところ、肝臓内でアルコールなどの成分を解毒する能力を持つ受容体が活性化すること

### 産総研など研究

とが確認された。研究者らは「シークワサーに肝臓内の解毒作用を増強する効果がある」と見る。従来からシークワサーの効果として確認されていた脂肪燃焼や血糖値の低下、血圧低下に関する仕組みも、人間の細胞で初めて解明した。機能性の研究事業は県から委託を受けたJAおきなわと食品検査を行うクロックワークの共同事業体が担い、ノーステック財団と産総研に依頼していた。



## Newspaper & Yahoo! News “Shikuwasa Functional component”

日本語	英語
シークワサー、肝機能改善か 産総研など研究「解毒作用を増強」	Shikuwasa may improve liver function, Sansoken says “it can reinforce detoxification”
沖縄の果実シークワサーの果汁が肝機能改善に効果がある可能性が、北海道科学技術総合振興センター(ノーステック財団)、国立研究開発法人・産業技術総合研究所(産総研)などの研究で8日までに分かった。	It was learned on March 8 that there is a possibility that juice from Okinawan fruit Shikuwasa (Citrus Depressa) can help improve liver function. It was found in the research conducted by Northern Advancement Center for Science and Technology (NOASTEC Foundation), and National Institute of Advanced Industrial Science and Technology (Sansoken, AIST).
シークワサーは脂肪燃焼や血糖値低下などの効果がこれまでに確認されている。新たな付加価値が加わることになると関係者から期待が高まっている。	Shikuwasa is already known for its effects of fat burning and lowering blood sugar level. Concerned parties have high expectations for new findings about Shikuwasa.
人間の細胞には、摂取した食べ物の成分など外からの刺激に応じて、さまざまな機能を入れたり切ったりするスイッチの役割を果たす「受容体」がある。	In human cells, there is a substance called “receptor,” which plays a role as a switch to turn on and off various functions responding to external stimulation such as components of food that humans take in.
試験では人間が持つ18種類の受容体にシークワサーの抽出液をかけたところ、肝臓内でアルコールなどの成分を解毒する能力を持つ受容体が活性化することが確認された。研究者らは「シークワサーに肝臓内の解毒作用を増強する効果がある」と見る。	In the experiment, researches poured juice extracted from Shikuwasa over 18 different kinds of receptors that humans have in their bodies. They confirmed a receptor in the liver to detox alcohol was activated by the juice. Researchers say “Shikuwasa has a function to reinforce detoxification in the liver.”
従来からシークワサーの効果として確認されていた脂肪燃焼や血糖値の低下、血圧低下に関する仕組みも、人間の細胞で初めて解明した。	For the first time in human’s cells, they found out that Shikuwasa burns body fat and lowers blood sugar level and blood pressure, which were already known as Shikuwasa’s effects.
機能性の研究事業は県から委託を受けたJAおきなわと食品検査を行うクロックワークの共同事業体が担い、ノーステック財団と産総研に依頼していた。	The research about the function was led by a consortium of JA Okinawa and Clock Work, a food inspection company, which were contracted by Okinawa Prefecture. The consortium asked NOASTEC and Sansoken (AIST) to carry out the research.



# Introduction of Okinawan Shikuwasa



## Enhance Your Health!

### Secret of Healthy Acid Citrus

#### Vitamin Group

This tropical sun-kissed Shequasar citrus contains lots of vitamins. Have the fruit during and after a meal high in fat to balance out your diet.

#### Health and Functional Ingredients

Shequasar contains nobiletin and tangeretin (citrus flavonoids) as functional ingredients. Nobiletin functions as an inhibitor of blood-glucose absorption and have some hypotensive property, which is good news for the people of today who concern about lifestyle-related diseases. New research results have been presented as this ingredient increasingly gather attention. Consume the citrus fruit along with exercises and pursue healthier life.

■ Nobiletin content (mg) per 100g in typical citrus fruits

raw materials	Shequasar	Grapefruit	Valencia Orange	Mandarin Orange
Nobiletin	30.3mg	1.0mg	5.0mg	1.5mg

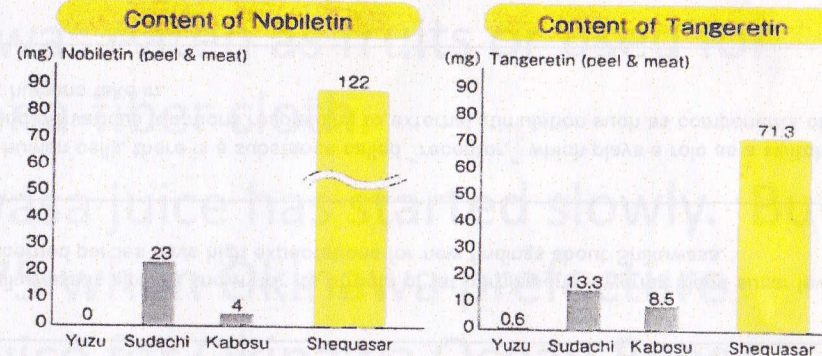
\*The numerical date shown in the table are sample data representing juice squeezed the whole fruit including both the peel and the meat. \*Reference: Bioci.Biotechnol.Biochem.70(1)178-192(2006)

	Vitamin A		Vitamin E	Vitamin B1 (mg)	Vitamin B2 (mg)	Vitamin C (mg)
	beta-carotene equivalent (ug)	retinol (ug)	alpha-tocopherol (mg)			
Shequasar	89	7	0.5	0.08	0.03	11
Kabosu	10	1	0.1	0.02	0.02	42
Sudachi	Tr	0	0.3	0.03	0.02	40
Lemon	6	1	0.1	0.04	0.02	50
Yuzu	240	20	3.4	0.07	0.1	150

\*Standard Tables of Food Composition in Japan, Fifth Revised and Enlarged Edition

\*Tr stands for the trace where the amount of ingredients do not exceed the describable minimum amount although contained.

■ Nobiletin and tangeretin content (mg) per 100g in typical citrus fruits



\*Reference: Youichi Nogata, National Agriculture and Food Research Organization Report vol.5, 2005

## Harvest Period and Usage of Shequasar

### August

#### [Harvest in Green]

Use as a garnish by simply squeezing over grilled meat or fish, or over sashimi. Mix with vinegared miso to enhance the aroma of your dish.

### September



### October

#### [For Processing]

Fruit extract is processed as juice or as ingredients for confectionaries or condiments.

### November



### December

#### [Consumed Fresh]

Eat a fully ripen fruit to directly savor the superior taste.

### January





# Recipes using Okinawan Shikuwasa

JA Okinawa presents **Very Delicious Shequasar Dishes**



## Chirashi Sushi Made With Shequasar Juice

Slightly yellow vinegared rice in a bowl with a variety of ingredients sprinkled on top. Shequasar Juice mixed for flavor.

**[Ingredients]** (for 4-5 servings)

Rice: 4 cups, "Shequasar Citrus Whole Juice": 2 cups, water: 2 cups, soy sauce: small amount, granulated sugar: 20g, dried Shiitake mushroom: 4 pieces, egg: 3, snow pea: 10, imitation crab stick: 3 sticks, carrot: 1/3, shredded Nori seaweed: small amount, salmon roe: small amount

**[Recipe]**

- 1. Rinse the rice and drain. In a rice kettle, put the rice, pour water and Shequasar Citrus Whole Juice 2 cups each and let it cook for 30 minutes.
- 2. In a bowl, soak the dried Shiitake mushrooms with water to soften. Keep the water in the bowl to use as cooking liquid. Take out the mushrooms and cut them into strips. Cut the carrot into strips as well. Mix sugar and soy sauce with the soaking liquid. Put the mushroom and carrot back into the bowl with the liquid to marinate.
- 3. Cook the rice in the rice cooker and let it cool down.
- 4. Make very thin omelets and slice them very thin. Boil snow pea with some salt and put the pea into cold water. After it cooled down, cut diagonally. Cut the imitation crab sticks diagonally, too.
- 5. In a large dish, spread 4 evenly over the vinegared rice and sprinkle the salmon roe and shredded Nori seaweed to finish. Serve in a regular-size rice bowl or on a small dish.

## Shequasar Jelly

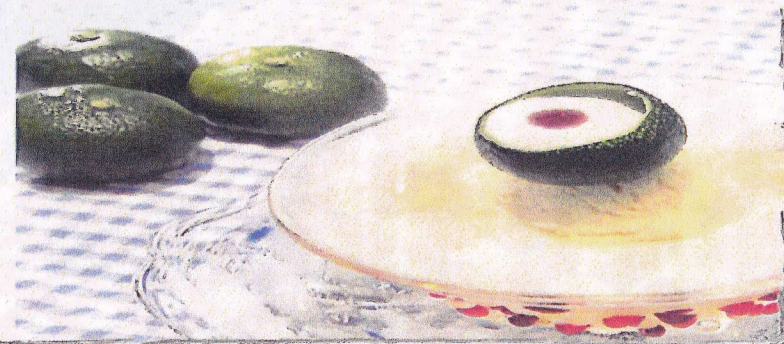
Very refreshing flavor. Use plenty of Shequasar juice to make this fresh tasting goody.

**[Ingredients]**

(A) Water: 400g, granulated sugar: 80g, agar (colorless): 1 pac. (4g), Shequasar Citrus Whole Juice: 200g, (B) 1 liquid made in (A): 6 tbsp, Shequasar Citrus Whole Juice: 3 tbsp, honey: 2 tbsp, (C) Shequasar Citrus Whole Juice: 60g, honey: 60g, soda water (sugarless): 160g, (D) Shequasar fruit, as many as the number of people, (E) Acerola puree: small amount (if desired), whipped cream: small amount (if desired)

**[Recipe]**

- 1. In a pot, put all the ingredient of (A), except Shequasar Citrus Whole Juice, to cook.
- 2. In a large bowl, pour water and ice and place the pot used in 1 over the ice and water to cool the ingredient inside. Pour Shequasar Citrus Whole Juice into the pot to mix. Pour the mixture into a serving dish as much as 1/3. Place the dish inside the fridge.
- 3. Mix all ingredients of (B).
- 4. Make serving cups out of Shequasar fruit by carefully taking the meat out. Do not break the skin.
- 5. Mix the rest of B with C. Place it inside the fridge until it sets.
- 6. Mix all the ingredients D.
- 7. Serve 1 and vanilla ice cream in a glass bowl. Fill a Shequasar cup with whipped cream and acerola puree and place on the fruit cup on the ice cream it. Finally, pour E into the bowl to serve.



## Hirami B Cider Fizzy

During picnic or after a physical activity or bath, have this refreshing Hிரமி B Shequasar Fizzy.

**[Ingredients]**

Hிரமி B: 1/3 of tall glass, carbonated water (sugarless): 1/2 of glass, ice, desired amount

**[Recipe]**

- 1. Put cubes of ice in a tall glass, and pour Hிரமி B about 1/3 of the glass.
- 2. Pour carbonated water into 1.

