# This is real Japanese tea

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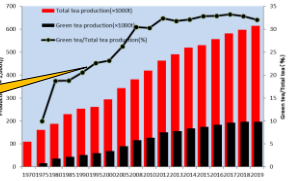
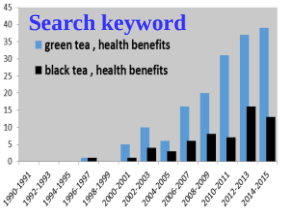
## Change in World Tea Production

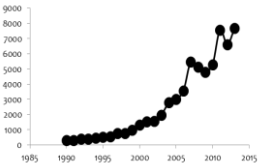
Green tea production is on the rise, as tea has beneficial health effects



Changes in the production of amount of tea

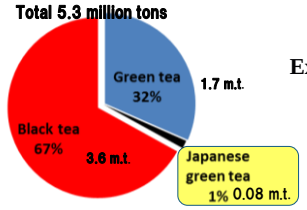



Number of research papers containing green tea, black tea, catechins, theaflavins and health benefits from 1990

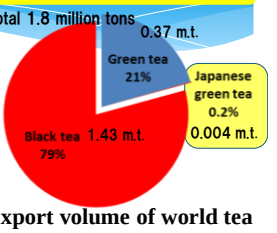


Shift in no. of research papers on **catechin** (Google Scholar)

## Japanese Green Tea is Hard to Acquire Overseas

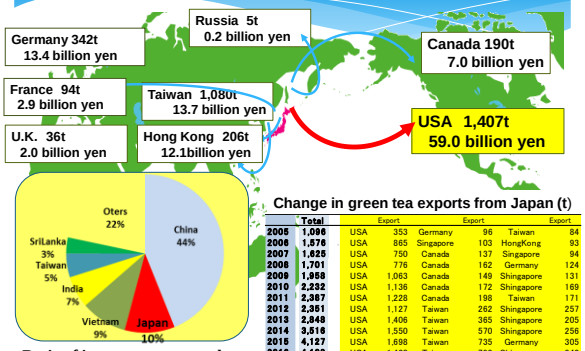



Production volume of world tea




Export volume of world tea

## Green Tea Exports from Japan (2017)




Ratio of import green tea volume from each country of the USA

Change in green tea exports from Japan (t)

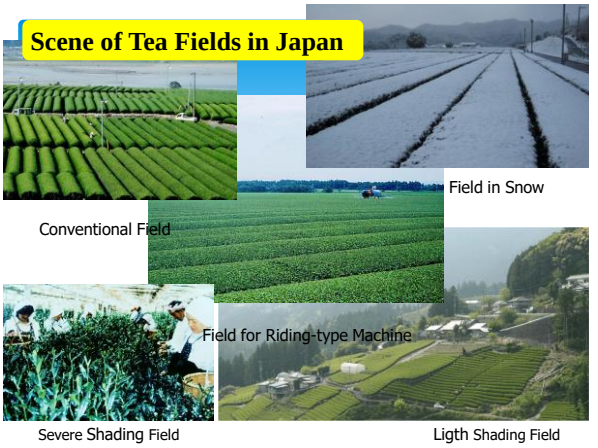
| | Total | Export | | Export | | Export |
|---|---|---|---|---|---|---|
| 2005 | 1,096 | USA 353 | Germany 96 | Taiwan 84 | | |
| 2006 | 1,576 | USA 865 | Singapore 103 | HongKong 93 | | |
| 2007 | 1,625 | USA 750 | Canada 137 | Singapore 94 | | |
| 2008 | 1,701 | USA 776 | Canada 162 | Germany 124 | | |
| 2009 | 1,958 | USA 1,063 | Canada 149 | Shingapore 131 | | |
| 2010 | 2,232 | USA 1,136 | Canada 172 | Shingapore 169 | | |
| 2011 | 2,387 | USA 1,228 | Canada 198 | Taiwan 171 | | |
| 2012 | 2,361 | USA 1,127 | Taiwan 262 | Shingapore 257 | | |
| 2013 | 2,848 | USA 1,406 | Taiwan 365 | Shingapore 205 | | |
| 2014 | 3,516 | USA 1,550 | Taiwan 570 | Shingapore 256 | | |
| 2015 | 4,127 | USA 1,698 | Taiwan 735 | Germany 305 | | |
| 2016 | 4,108 | USA 1,420 | Taiwan 793 | Shingapore 342 | | |
| 2017 | 4,842 | USA 1,407 | Taiwan 1,080 | Shingapore 343 | | |

## Japanese Green Tea Production


Area and production of tea (2020)

| Prefecture | Area (ha) | Production (1000t) |
|---|---|---|
| Shizuoka | 15,200 | 25,200 |
| Kagoshima | 8,360 | 23,900 |
| Mie | 2,710 | 4,696 |
| Kumamoto | 1,180 | 1,084 |
| Kyoto | 1,556 | 2,208 |
| Fukuoka | 1,510 | 1,664 |
| Miyazaki | 1,330 | 1,999 |
| Saitama | 825 | 884 |
| Saga | 705 | 1,137 |
| Others | 4,293 | 5,349 |
| Total | 37,669 | 68,121 |

## Scene of Tea Fields in Japan



Conventional Field

Field in Snow

Field for Riding-type Machine

Severe Shading Field

Ligth Shading Field

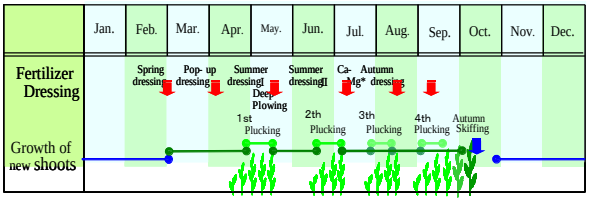
## Cultivation of Japanese Green Tea


Fertilizer application


Deep plow subsoiler


Plucking of new shoots

**Time of fertilizer application in Shizuoka Prefecture**




## Plucking Methods of New Shoots


*Hand plucking*

***Plucking efficiency***

| Methods | The amount of new shoots per day per person |
|---|---|
| Hand plucking | 10 ～ 15 kg |
| Hand-shear plucking | 100 ～ 200 |
| Mechanical plucking | |
| Portable machine for two persons | 700 ～ 1,000 |
| Riding machine | 4,000 ～ 5,000 |
| Self-rail-tracking machine | 2,000 ～ 3,000 |


*Hand-shear plucking*


*Portable machine for two persons*


*Riding-type plucking machine*


*Plucking with riding machine*

## Making Process of Japanese Green Tea


Cooperative tea factory


Primary drying tea roller

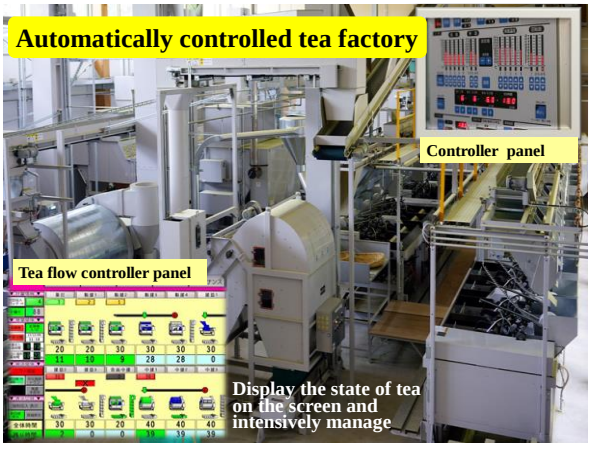

Secondary drying tea roller


Tea steaming machine


Tea roller


Finally drying tea roller

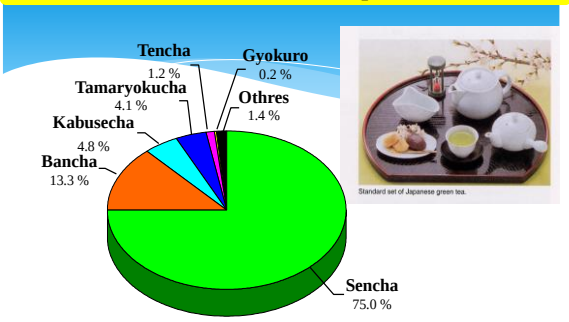
## Automatically controlled tea factory




## The main types of Japanese Tea

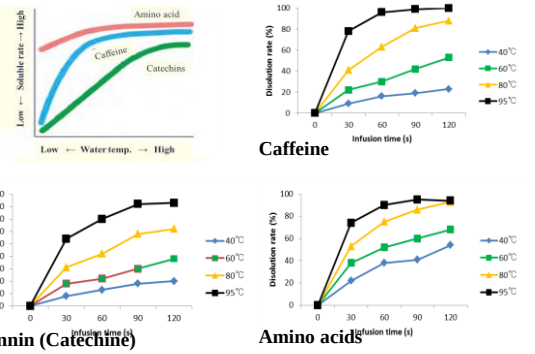
- Steamed green teas
  - Sencha
    - Regular Sencha
    - Heavily Steamed Sencha
  - Gyokuro
  - Kabusecha
  - Tamaryokucha (steamed)
  - Tencha → Matcha
  - Bancha
  - Reprocessed teas → Hojicha, Genmaicha etc.

## Production of Various Kinds of Japanese Green Tea




**Production of various kinds of tea in Japan**

## The soluble rate of chemical component on different water temp.

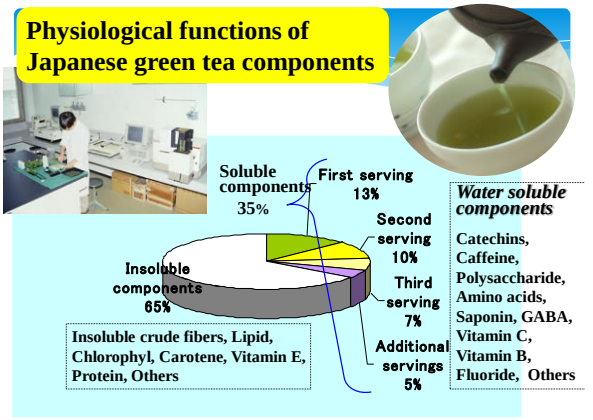



Caffeine

Tannin (Catechine)

Amino acids

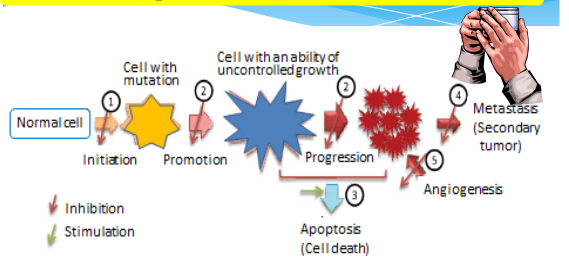
## Physiological functions of Japanese green tea components




## Research on the Functionality of Green Tea was Initiated in Japan

| Green Tea Components | Contents | Functions |
|---|---|---|
| Catechins | 10～18% | **Anti-oxidative, radioprotective, Anti-mutagenic, Anti-tumor, Enzyme inhibitory, Anti-hypercholesterolemic, Anti-hyperglycemic, Fat reducing, Anti-hypertensive, Anti-ulcer, Anti-bacterial etc.** |
| Caffeine | 3～4% | Removal of fatigue, Sleepy feeling, Diuretic etc. |
| Vitamin C | 150～250mg% | **Removal of stress, Cold prevention** |
| Vitamin B | 1.4mg% | Excitometabolic action of carbohydrates and amino acids |
| Vitamin E | 25～70mg% | Anti oxidative, Aging prevention |
| γ amino butyric acid | 0.1～0.2% | Anti hypertensive |
| Flavonoids | 0.6～0.7% | Halitosis prevention |
| Theanine | 0.6～2% | **Anti hypertensive** |

## Cancer development and actions of tea catechins




**Cancer progresses through several stages as it develops including initiation, promotion, progression, and metastasis.**
**Green tea catechins have been shown to exert anti-cancer effects at each of these stages.**

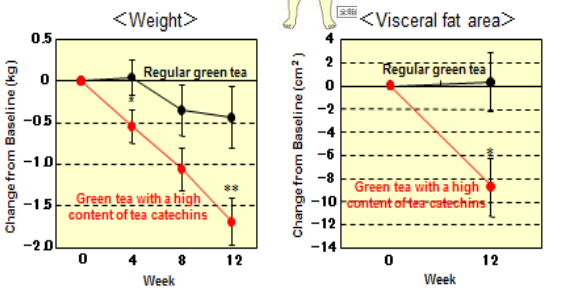
## Epidemiological studies on correlation between green tea intake and the risk of human cancer

| Study type | Cohort | | Case-control | |
|---|---|---|---|---|
| | Risk reduction | No risk reduction | Risk reduction | No risk reduction |
| Colon | 3 | 6 | 4 | 3 |
| Lung | 0 | 4 | 2 | 3 |
| Stomach | 2 | 6 | 8 | 8 |
| Osophagus | 0 | 2 | 4 | 5 |
| Breast | 3 | 5 | 3 | 0 |
| Prostate | 2 | 0 | 2 | 0 |
| Ovaries | 1 | 0 | 2 | 0 |
| Pancreas | 0 | 2 | 2 | 1 |
| Kidney and bladder | 0 | 1 | 1 | 4 |
| liver | 1 | 0 | 0 | 0 |
| Endometrium | 0 | 0 | 2 | 1 |
| Thyroid | 1 | 1 | 0 | 0 |
| Blood | 1 | 0 | 0 | 0 |

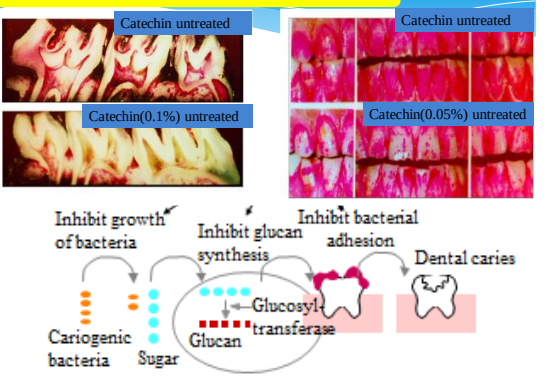
**Cohort study:**
a group of similar individuals who differ with respect to certain factors under study to determine how these factors affect the rates of a certain outcome.

**Case-control study:**
two existing groups differing in outcome are identified and compared on the basis of some supposed causal attribute.

## Effects of catechins on weight and visceral fat area



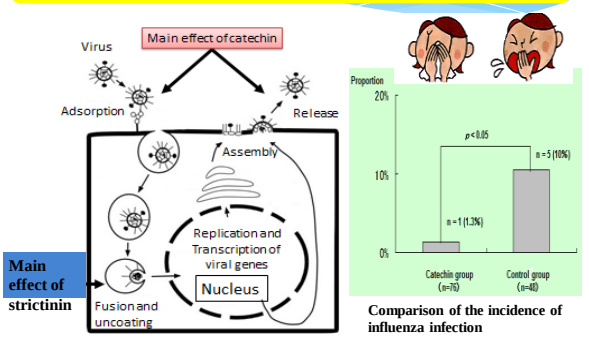

## Effects of catechin on dental diseases





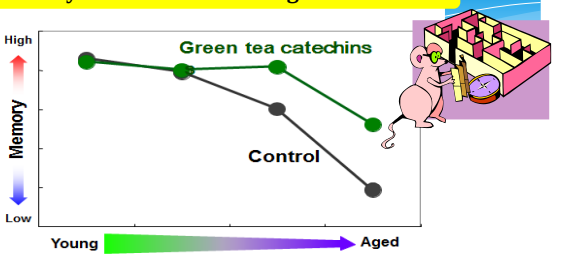


## Effects of catechin and strictinin on infection and replication of the influenza virus



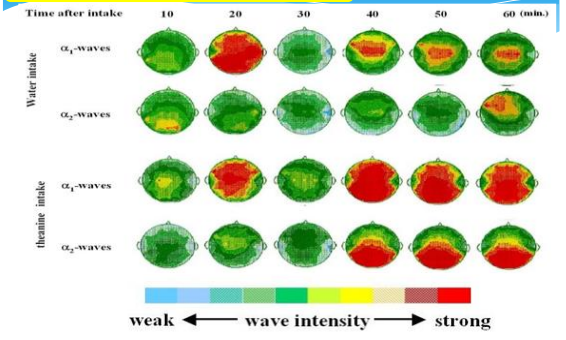

**Comparison of the incidence of influenza infection**

## Memory retention in mice ingested catechin



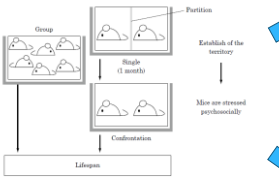

Senescence-accelerated mouse (SAMP10) shows memory decline with aging. As mice prefer a dark place, mice move into the dark box when placed in the light box. However, when mouse was given a weak electric shock through the floor of the dark box, mouse learned not to enter the dark room. Memory retention was tested one month later using same test. Memory decline was much suppressed in mice ingested green tea catechins than in control mice that ingested water.

## Effect of theanine on relaxation



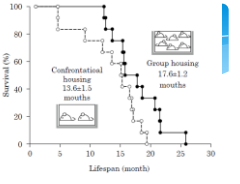

**Electroencephalographic measurement of alpha waves shows higher frequencies among human subjects taking theanine as compared to those taking water.**

## Effect of theanine on psychosocial stress

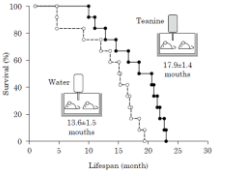



**Group and confrontational housing**

After the two mice were housed separately, for one month, in a cage with a partition, they were housed confrontationally by removing the partition. Generally, group housing mice have long lifespan more than the stressed mice.




Shortened lifespan in stressed mice




Prolonged lifespan of mice by theanine intake

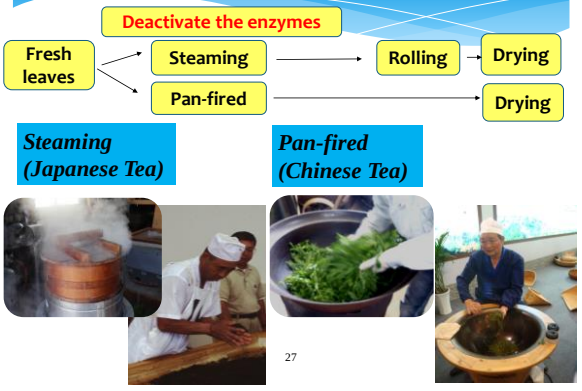

## The only steaming process in the world

The oxidizing enzymes contained in the fresh leaves are stopped by the steam-heat.
By steaming the leaves it becomes the aroma and taste exceptional to Japanese tea.


Steaming is an important process in making of Japanese green tea

Steaming by hand

## Processes of Making Green Tea

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## Differences between Japanese tea and Chinese tea

Appearance



Color

•Components are easily eluted
•Green

Japanese (Steamed)

•Components are not easily eluted
•Reddish brown

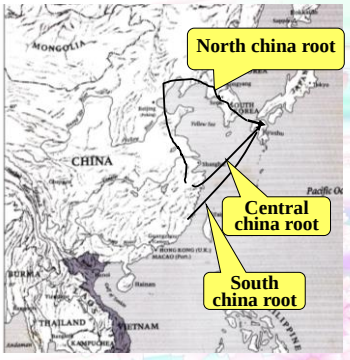
Chinese (Pan fired)

## Excellent character of Japanese green tea

1. Have a long history
2. Culturally rich
3. Superior cultivar
4. Beautiful tea field
5. High technology
6. Steaming method
7. Tea look a needle
8. Color is green
9. Umami is strong
10. Greenish aroma
11. Vitamin C content is high etc.

The taste differs depending on how it is made

## 1. The introduction of Tea into Japan




**North-china root**
North china⇒ Korea⇒ Japan
Oldest root (about A.D.600)

**Central china root**
Introduction of the cake tea, powder tea (About A.D.1100)

**South china root**
Introduce of pour tea
(About A.D.1600)

## 2.Sprits of “Chanoyu / Sado”

In chanoyu, through exchanges of hospitality and appreciation, the host and guests can share a quite, heartwarming, peaceful time and reach a state of spiritual enlightenment so called Wa-Kei-Sei-Jyaku.

**Wa-Kei-Sei-Jyaku (和敬清寂)**

“Wa” : open each other’s heart.
“Kei” : respect each other.
“Sei” : purify your surrounding and your spirit.
“Jyaku”: maintain a spirit of quietness

## 3.Breeding and spreading cultivar suitable for Japanese green tea

Superior cultivar




Seedling tea field

Cutting propagation and clonal tea field

## 4. Beautiful tea fields blended into life

## 5. High-yield and quality tea field by high technology

1)Thickness of the branch of leaf layer is made uniform.
2)The size of a leaf is made uniform.
3)The aging of stem (branch) is made uniform.

The control by trimming and pruning

## 6. The only steaming process in the world

The oxidizing enzymes contained in the fresh leaves are stopped by the steam-heat. By steaming the leaves it becomes the aroma and taste exceptional to Japanese tea.

Steaming machine

Steaming is an important process in making of Japanese green tea

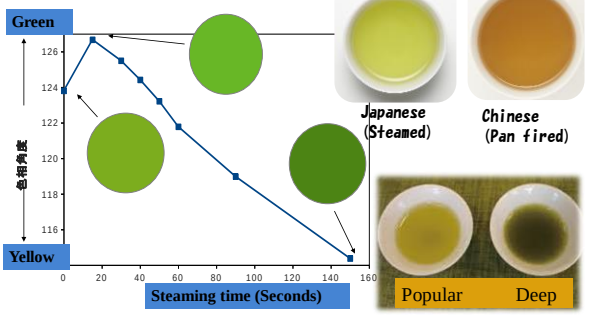
Steaming by hand

## 7. Japanese green tea is a sharp tea like a needle

Needle type tea can only be done by steaming

## 8. Japanese green tea infusion is green color

Color changes depending on steaming time




Difference in color between Japanese and Chinese green tea

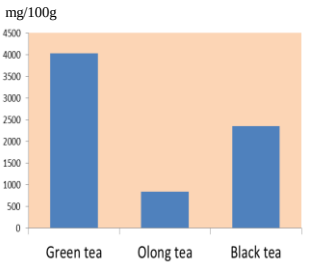


Japanese (Steamed)

Chinese (Pan fired)




## 9. Japanese green tea has a high amino acid and a low catechin content




Amino acid contents of various kinds of tea

Catechins contents of various kinds of tea

| | |
|---|---|
| Chinese type | 13～17% |
| Hybrid | 16～23% |
| Assam type | 25～30% |

## 10. Japanese green tea has a green note

Withering Oxidizationing

Green note

Steamed tea

Pan fired tea

Japanese green tea

Refreshing and greenish aroma

Chinese green tea

A little roasted aroma with floral and sweet note

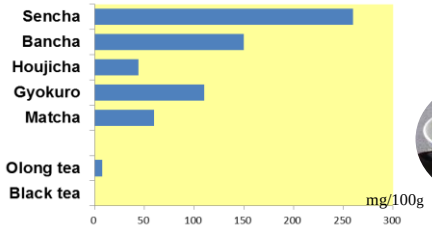
Oolong tea
Black tea

Floral and fruity aroma

## 11. Japanese green tea contains a high amount of vitamin C

The level of vitamin C which has been shown to prevent scurvy and the common cold, is decreased during the fermentation stage.

50mg/100g




Vitamin C content of various tea

6mg/cup

## What is Matcha tea

## Matcha is super food

**Matcha**,
It is possible to consume vitamin A (beta carotene), vitamin E (tocophenol), dietary fiber etc which can not be ingested with tea brewed in teapot.

☆Matcha is delicious
☆When brewed with teapot, about 40% of catechin remains in the tea shell, in Matcha all can be ingested.
☆Green color of matcha is beautiful, It is also used for sweets such as cakes and foods.

## Cultivation of Tencha (Matcha)

Matcha

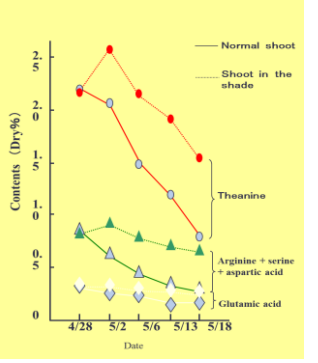
Direct covering by shading



Tench

**Matcha**
**Tencha, which are known as the finest tea in Japan, is made from the leaves grown under the ceiling-shelf covering.**

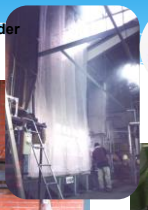
## Umami increases by Covering Culture




## Production Process of Matcha

Processing stages

Tea leaf cooling spreader



Tencha dryer ('Tencha-ro')

Grinding stages

Tea grinder (special stone mill designed for matcha grinding)