Bottle Fermented Sparkling Wine; Process and Equipments (ed.5.0) @2009.07.10

version English

picture: Gert Transier / SMB

Text:
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0202-050219-060204-070508.0611-090710

KITA SANGYO

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Recent market trend in Japan: Imported sparkling wines

■主要国からのスパークリングワイン輸入量の推移

単位:c/s(1c/s=9ℓ)、%

順位	生産国	2000年	2001年	2002年	2003年	2004年	2005年	2006年	2007年	2008年	前年比
1.	France	504,390	586,792	611,924	680,245	802,387	802,444	1,018,474	1,099,809	1,142,348	103.9
2.	Spain	233,719	226,862	229,314	211,786	305,438	347,428	424,740	458,866	576,518	125.6
3.	Italia	303,665	398,665	441,435	429,748	487,028	390,993	483,168	458,520	493,827	107.7
4.	USA	60,821	69,561	84,485	89,745	101,203	88,670	79,128	88,247	113,376	128.5
5.	Australia	16,936	24,681	27,088	34,716	43,086	63,504	101,243	94,732	111,817	118.0
6.	Germany	56,927	67,854	73,076	80,485	72,123	46,313	70,963	58,143	57,109	98.2
7.	Argentine								5,174	21,008	406.0
8.	South Africa								10,522	17,460	165.9
9.	Chili								9,253	13,874	149.9
10.	Mexico								4,200	4,890	116.4
	Others	—	—	—	—	—	—	—	—	7,957	—
	TOTAL	1,188,572	1,383,580	1,479,881	1,542,610	1,827,449	1,756,864	2,199,313	2,299,721	2,560,209	111.3

Source WANDS 2009/04 Ministry of Finance, code 220410000

"Still" Growing

■2.56mil. cases (30.72mil bottles) in total are imported to Japan in 2008. 45% came from France, 23% from Spain, 19% from Italy.

■Imported sparkling wine increased by 11.3% in 2008, though most of other alcoholic bev. market is shrinking in Japan.

■Note; Spain and US are remarkably expanding in 2008.

■3 players dealing over 200thou. cases; Möet et Chandon (MHD), Freixenet (Suntory) and Café de Paris (Pernod Ricard - Mercian).

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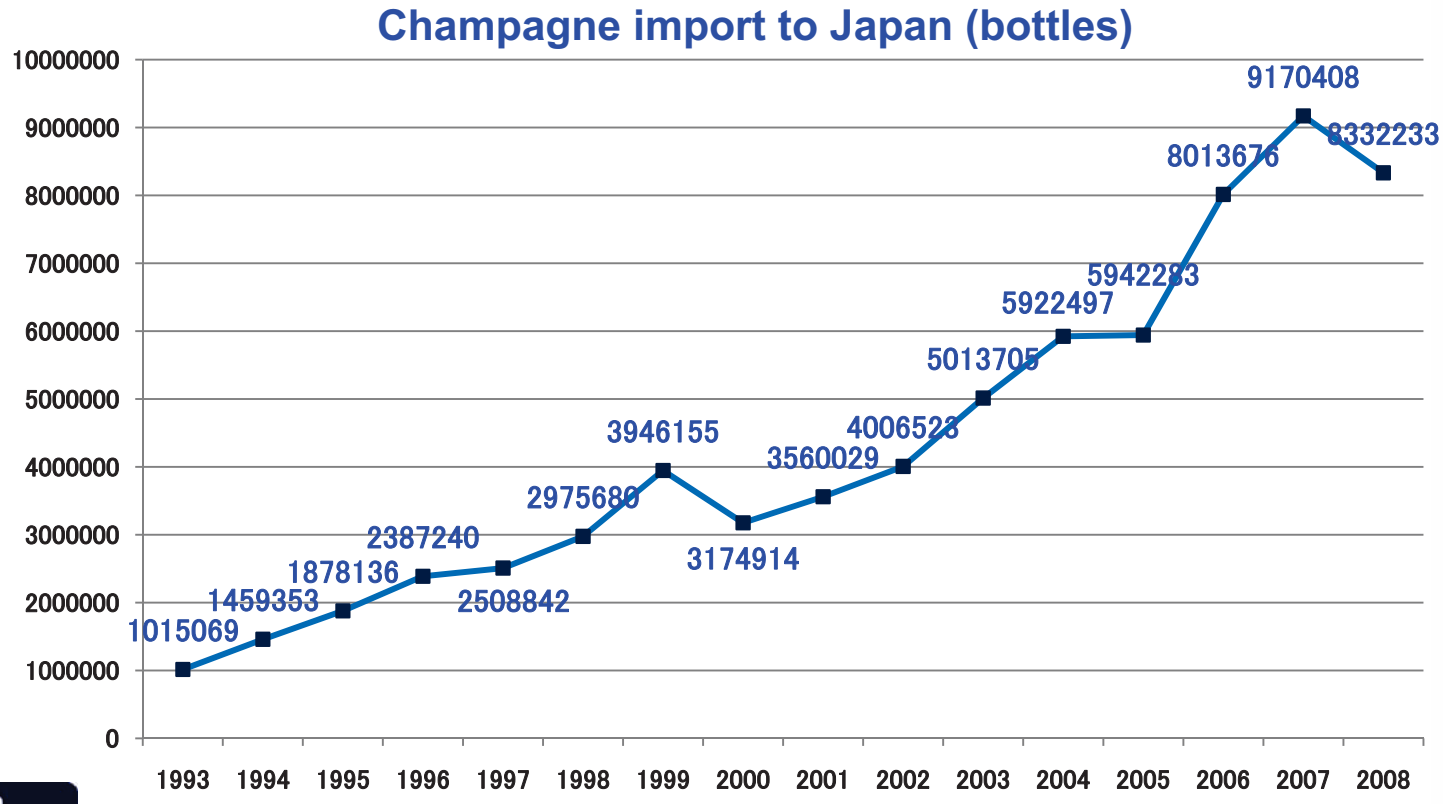
Recent market trend in Japan: Champagne

- From the beginning of 21st century, Champagne imports had kept increasing for 7 years until 2007.
- However, 9.17mil. bottles in 2007 -> 8.33mil. bottles in 2008.
- Champagne is approx. 60% of sparkling from France, and approx. 30% of total imported sparklings (in bottle quantity)



(Source : Comité interprofessionnel du vin de Champagne)

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bottle fermented sparkling wine
ed.5.0

Recent market trend in Japan: from Spain

2nd biggest exporter to Japan

- Spain exceeded Italy from 2007. Now, first France, second Spain.
- 0.58mil cases (6.92mil bottles) ware imported in 2008, whereas almost of them is Cava
- According to the statistics of DO Cava organization (see chart), export to Japan is 6.32mil bottles, 31.8% increasing in 2008.

EXPORTACIONES CAVA 2008

PAIS	BOT. 75 CL.	% Bot.s/2007
ALEMANIA	51.419.077	25,39
REINO UNIDO	30.548.309	-6,60
ESTADOS UNIDOS	14.477.896	0,21
BELGICA Y LUX.	9.913.284	58,91
JAPON	6.319.684	31,81
SUIZA	3.112.236	-10,87
HOLANDA	2.492.152	-1,46
FRANCIA	2.414.400	-6,59
FINLANDIA	2.342.768	20,09
SUECIA	1.812.652	-23,04
CANADA	1.599.385	-24,67
DINAMARCA	1.397.111	-12,25
AUSTRIA	1.255.447	29,03
NORUEGA	1.082.075	1,80
PORTUGAL	768.553	1,41
ITALIA	689.247	-30,74
AUSTRALIA	502.588	-11,59
ISRAEL	483.299	153,78
URUGUAY	454.964	-31,25
VENEZUELA	428.153	7,63
ESPAÑA (ZONAS FRANCAS)	384.209	27,82

(Consejo Regulador del CAVA)

Background of increasing of sparkling in 2001-2007

Ladies? Economy growth? IT bubbles? Many premium hotels opened? "By the glass" marketing? Global warming?

Background of increasing of sparkling in 2008-2009

Premium market might be collapsed, but certain sparkling lovers ware born, and the market established?

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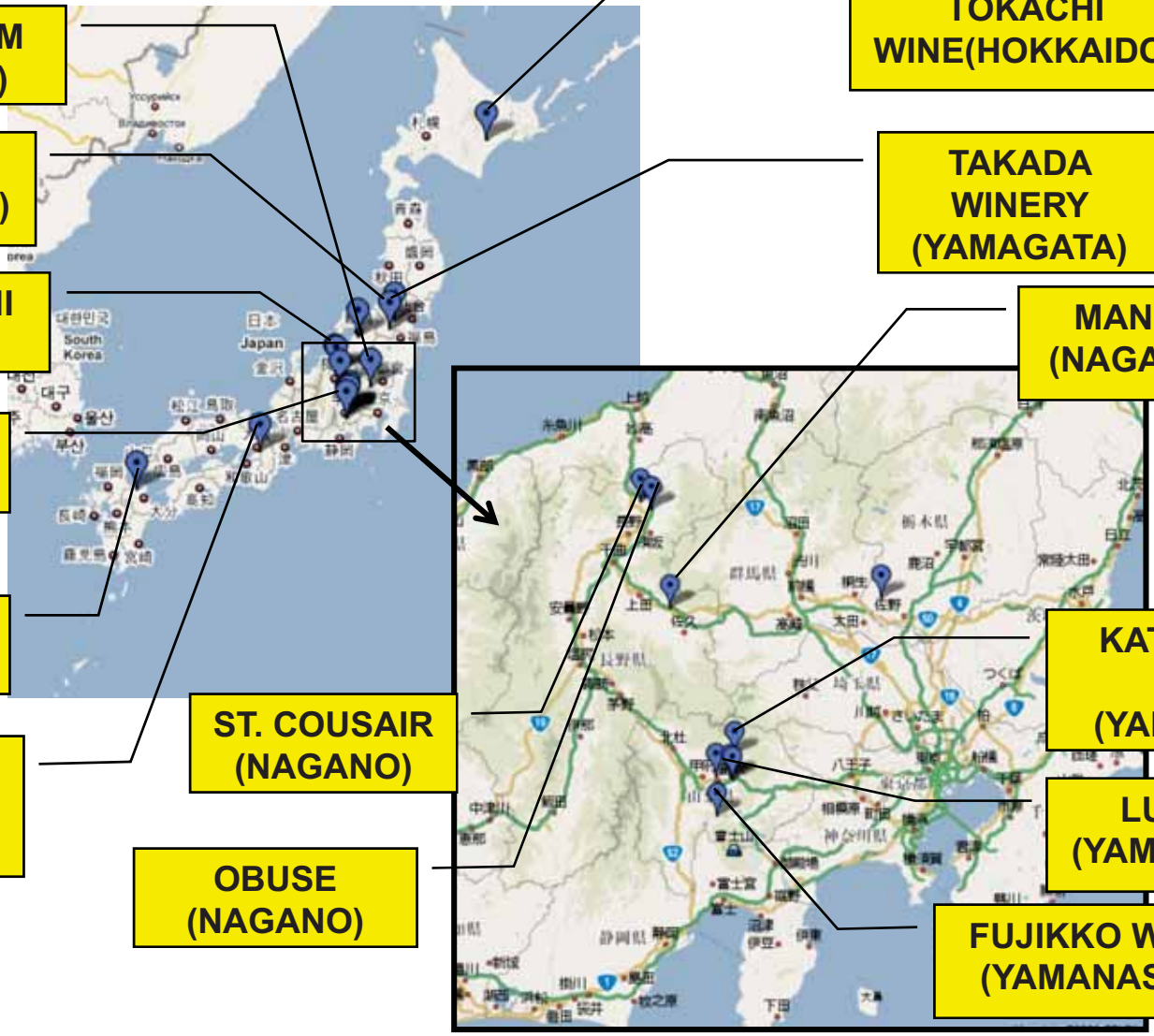
Bottle fermented sparkling wine in Japan @2009



IKEDACHO TOKACHI WINE(HOKKAIDO)

COCO FIRM (TOCHIGI)

TAKAHATA (YAMAGATA)

TAKADA WINERY (YAMAGATA)

CAVE D'OCCHI (NIIGATA)

MANNS (NAGANO)

KIZAN YOSHU (YAMANASHI)

AJIMU WINE (OITA)

KATSUNUMA JOZO (YAMANASHI)

ST. COUSAIR (NAGANO)

KATASHIMO WINE FOOD (OSAKA)

LUMIER (YAMANASHI)

OBUSE (NAGANO)

FUJIKKO WINE (YAMANASHI)

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All bottle fermented sparkling wine in Japan @2009
inc. méthode ancestrale and cloudy (w/t sediment)

picture: Kita Sangyo Co., Ltd. 090223

Title(Company)	Pref.	Vol.	Alc.	Method	
St. Cousair Sparkling Brut (St. Cousair)	Nagano	750	12.5	MT	★
Cave d'Occhi Sparkling Rose Brut (Cave d'Occhi)	Niigata	750	12	MT	
Obuse Sparkling E (Obuse)	Nagano	750	12	MT	
Kizan Sparkling Traditional Brut (Kizan Yoshu)	Yamanashi	750	12.5	MT	
Aruga Branca Brilliante (katsunuma Jozo)	Yamanashi	750	10.5	MT	★
Sparkling (Fujikko Winery)	Yamanashi	375	8	cloudy	★
Lumier Petian (Lumier)	Yamanashi	750	12	cloudy	★
Domaine Takeda Brut Chardoney (Takeda)	Yamagata	750	11	MT	
Petian de Mars (Hombo Shuzo Yamanashi)	Yamanashi	720	10	cloudy	
Nobo Brut (Coco Firm Winery)	Tochigi	750	13.3	MT	
méthode traditionnelle brut (Manns)	Yamanashi	750	11	MT	★
Japanese Sparkling Delaware (Katashimo)	Osaka	750/375	10.6/10	MT	★
Sparkling Muskat Baily-A (Takahata)	Yamagata	750	11	MT	
Ajimu Sparkling (Ajimu Wine / Sanwa Shurui)	Oita	750	11	MT	★
Tokachi Sparkling Brume Magnum (Ikedacho)	Hokkaido	1500	13	MT	★

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(reference) Sparkling Sake is also booming

picture: Kita Sangyo Co., Ltd. 090223

Methodology of making sparkling wine

●**traditional method** -> Main theme of this text

Long aging at a condition *sur lie* – over dead yeast (autolysis)

●**bottle fermented wine except traditional method**

1. transfer method
2. *méthode ancestrale* (cloudy and clear)
3. others; *méthode dioise*, etc.

Aging over died yeast (autolysis), but not so long time

●**in-tank second fermentation**

1. Charmat method:
2. mixing still wine and fermenting must: Some of Lambrusco
3. others; Tank fermentation plus additional carbonation, etc

No chance of aging over died yeast (autolysis),

●**adding CO2; diffusing, sparging, injection,,,**

1. carbonator machine
2. diffusing gently thru stone in chilled tank
3. In-line carbonation between tank and tank, etc.

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General review of Champagne AOC process

Harvesting
(Hand picking is a rule. Sorted in vineyard.)

↓

Pressing -> A
(Squeezing ratio 64%, SO_2 50mg/liter is allowed maximum)

↓

chaptalisation* if required, alcoholic fermentation -> *B
(temp. controlled stainless steel tank, or oak vat at some house)

↓

MLF -> B
(some champagne house don't do MLF)

↓

Fining and filtration
Blending *(assemblage)* -> B

↓

Adding sugar & yeast *(tirage)* -> B
(adjuvant also added to better riddling)

↓

Bottling -> C
(*bidule* + 29mm crown or cork + *agraff*)

↓

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General review of Champagne AOC process

↓

Stored at（9-）12 dgree C, bottle fermentation and aging -> D
(15 months (min.) for NV, 3 years (min.) for Vintage is a rule.)

↓

Riddling *(remuage)* -> E
(Nowadays, almost all is done by *Gyropalette*, 3-7 days.)

↓

Neck freezing -> F

↓

Disgorgement *(dégorgement)*, removing sediments -> G

↓

Dosing *liqueur d'expédition (dosage)* -> G
（Even if no liquor dosage, need to fill up by wine)

↓

Corking, wiring , shaking.
Capsuling, labeling -> H

↓

Some months aging before shipping at some maison -> H

↓

Shipping, marketing -> I

ABCDEFGHI Pressing is different from usual wine making

Coquard

■**Traditionally, 4-ton-size *Coquard* press is used. It's a vertical basket press, but very wide dia. and low height.**

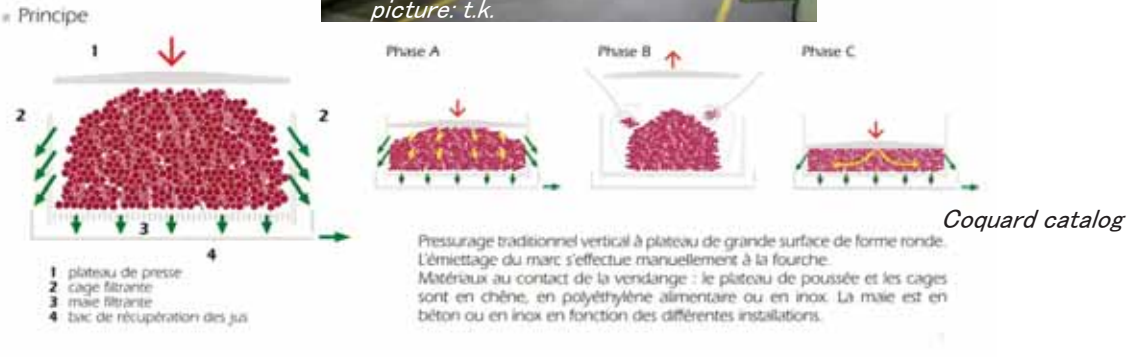
■***Coquard* is a name of pressing machine manufacturer, located in Epernay. Their new product is innovative "slanted" press.**

picture: t.k.

Coquard catalog

picture: t.k.

picture: t.w.



Coquard catalog

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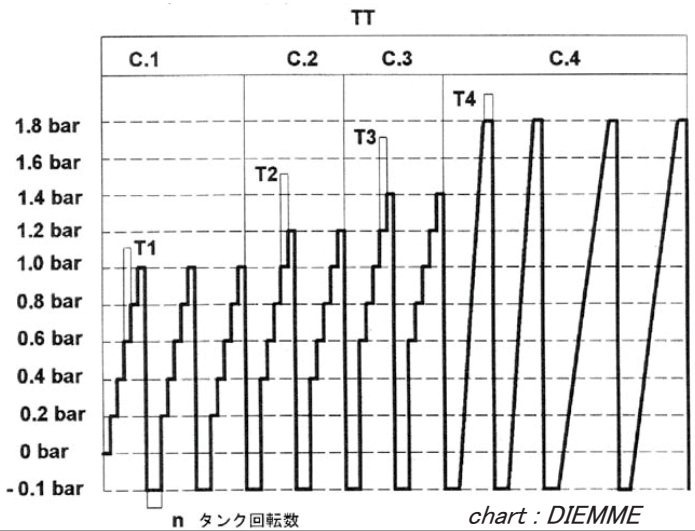
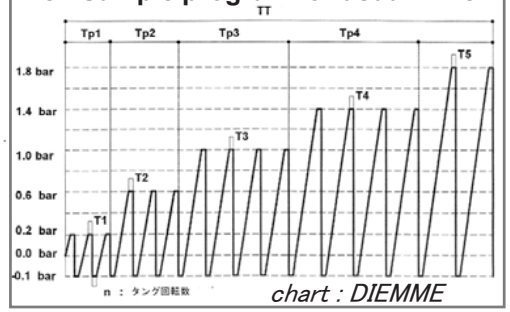
ABCDEFGHI Pressing is different from usual wine making

Sample program for Champagne, approved by CIVC (Le Comité interprofessionnel du vin de Champagne)



Ref. Sample program for usual wine



2550 liter / 4tons = 64%

■**Champagne AOC regulation; From 4 tons of grape, 2050 liter *cuvée* (first juice, originaly came from 10 of 205 liter *piece* - champagne barrel) plus 500 liter *taille* (second juice), total 2550 liter can be extracted and used for wine. Must be squeezed from whole bunches.**

■**Actually more juice is squeezed, but used for different purposes.**

■**Some Champagne maisons are making premium champagne only by *cuvée* , whereas some maisons prefer mixture of *cuvée* and *taille*, which contains more tannin.**

■**Previous rule for *taille* was not 500 liter but 615 litre, which was 410 liter *Première* (first) *taille*, and 205 liter *deuxième* (second) *taille*. The rule has been changed some times in the past.**

Membrane press

■**Nowadays, approx half are replaced by membrane press, which is easy to work with, and low oxidization risk.**

DIEMME

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ABCDEFGHI The Ingredients


picture: t.k.


source: www.grand-marque-champagne.com

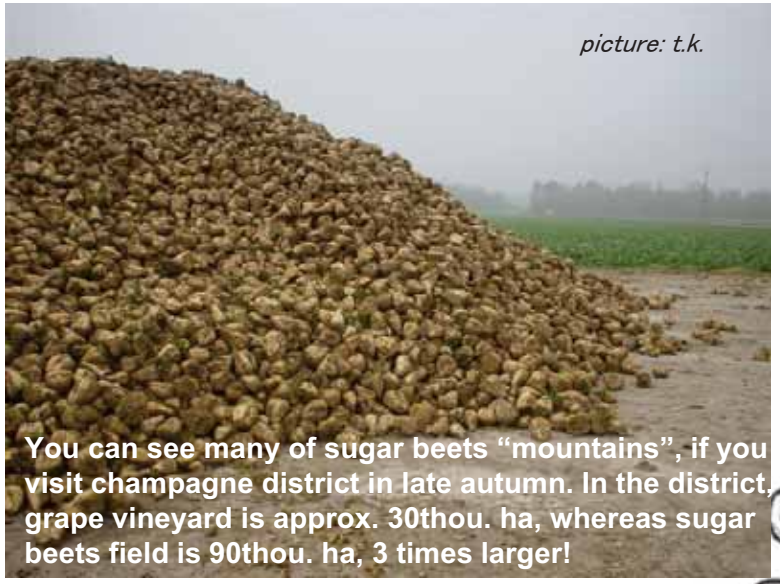
3 ingredients

1. **Chardonnay**: a white grape, acid, aroma, freshness, long aging
2. **Pinot Noir**: power, fruits, structure
3. **Pinot Meunier**: rustic, smooth

- Officially, some other grapes are permitted.
- In Japan, **Koshu? Muscat Bailey A? ,,,**

The 4th ingredient

- Not indicated on the labels, but the 4th and very important ingredient is **"sugar"**.
- Sugar is used 3 times in the process, i.e. *chaptalisation*, *tirage* and *liqueur d'expédition*.
- Sucrose from sugar beet (sometimes, cane sugar or concentrated liquor of grape sugar) is used.


picture: t.k.

You can see many of sugar beets "mountains", if you visit champagne district in late autumn. In the district, grape vineyard is approx. 30thou. ha, whereas sugar beets field is 90thou. ha, 3 times larger!

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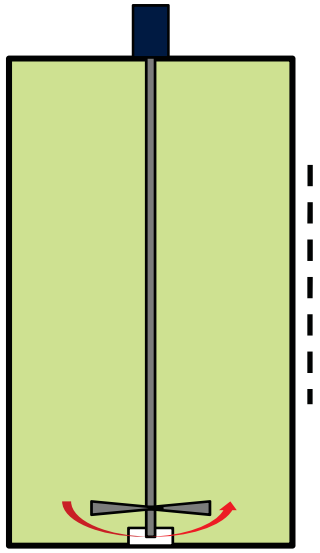
Tirage, Sugar, Yeast, Adjuvant

Tirage

■Applying minus degree of temp. at *assemblage* tank, remove tartaric crystals. (Tartaric acid has bad effect to bubbling of the final products)

■Blended wine is transferred to the *tirage* tank. Add *liqueur de tirage* (wine + sugar), *levain* (propagated yeast) and adjuvant. **Homogeneous mixture and temp control are absolutely important.**

■Typically, nutrients for yeast also added. In some case, citric acid may added.



Maxime P.

Theory

■Total sugar contents decide the final CO2 gas volume. **Sugar 4g/liter makes 1bar @ 20 degree C.** Hence, typical target, 6bar (= approx. 6.0 CO_2GV or approx. 11.9 CO_2g/ liter) can be achieved by 24g/ liter. Generally 20 – 26 grams are added. In some years aging period, 0.5 - 1CO_2GV will be lost.

■On the other hand, **sugar 16.8g/ liter makes 1% alcohol** (v/v). Hence, sugar 24g/ liter makes 1.5%. If the base wine is 11%, final products comes to be 12.5%.

Correct *tirage* tank, correct order of mixing

■Design of *tirage* tank is very important. To keep the correct order of mixing is also important.

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Tirage, Sugar, Yeast, Adjuvant

Adjuvant

■Adjuvant is made from specially selected bentonite (or bentonite + alginate, or bentonite + tannin) for champagne.

■It works for 1) flocculating or agglomerating the dead yeast, i.e. sediments, 2) preventing sediments from sticking to the glass wall of the bottle, 3) creating heavier sediments, the more easily it will slide towards the bottleneck.

■Usual bentonite (for still wine) may work somewhat, but sediments may tend to float and be cloudy, compared to adjuvant.

Yeast

■Large champagne maisons have their own yeast, which decides the style of the maison.

■One of recommended dosing ratio as leaven: 2 x 10^6/ml

■The yeast should have high resistance to alcohol. Some typical yeast belongs to S. Bayanus.

■Monologue: Sake yeast, which has very high alcohol resistance, may work well!?

Big maison has its own yeast and the propagation equipment.

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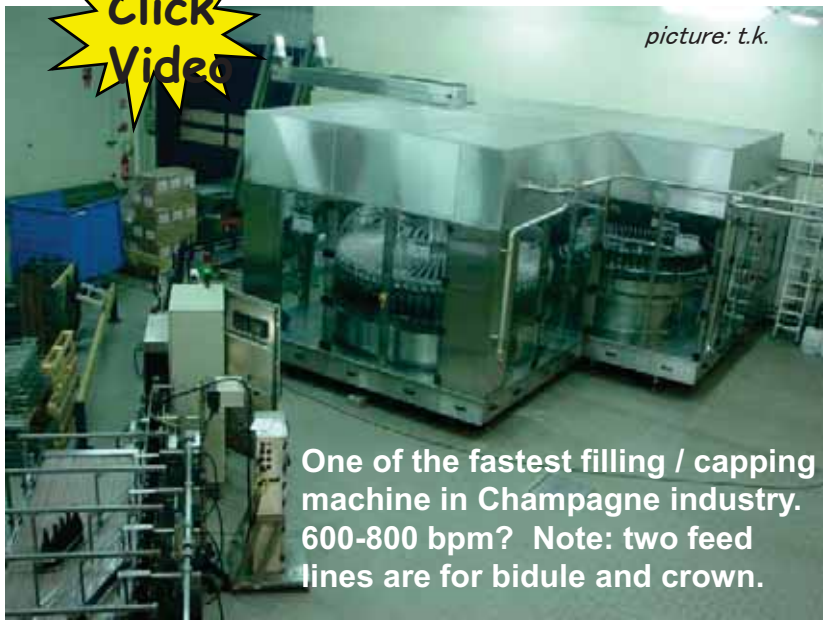
ABCDEFGHI Bottling



Some people say "50ml head space is required to make good bottle fermentation". If so in case of standard champagne bottle, filled volume will be slightly less than 750ml.

■29mm crown should be used for standard champagne bottle. (note: Our familiar crown for beer or beverage is 27mm.)
■Tin, stainless and aluminum crowns are available. Should be selected depends on the aging circumstances and years.
■The small cup-like plastic part is so-called "bidule", which is standard parts in Champagne industry.
■The crown with integrated plastic hung-on liner, works without bidule. It may god for small production.

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Second fermentation, aging

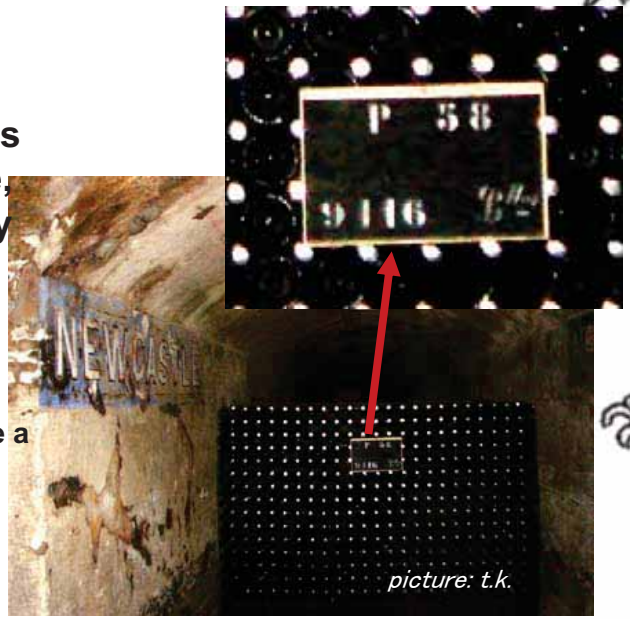
Aging at underground cave

■After the bottling, typically the bottles transferred to the underground cave by palette.

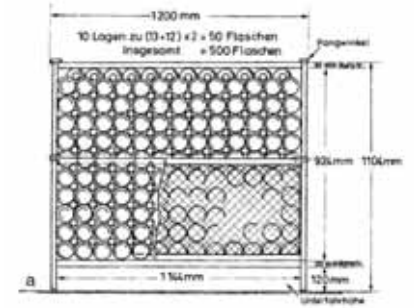
■If imagine intuitively, store the bottles in the palette as it is. However, they take off the bottles from the palette, and pile up huge numbers of bottles, stack horizontally heads to tail, from wall to wall of the tunnels.

■“500 bottles in 1.2m width, 10 stages of piling-up, 2 rows of heads-to-tail” is standard arrangement.

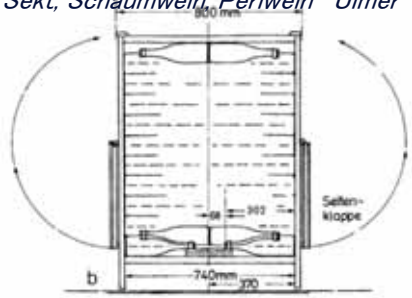
■In Japan,,, underground tunnel is usually not available. In case you use a cellar, regulated and low temperature (around 12 degree C.) like a tunnel is important. Darkness and no wind may be also required. (In other words, lights and wind may have no good effect.)

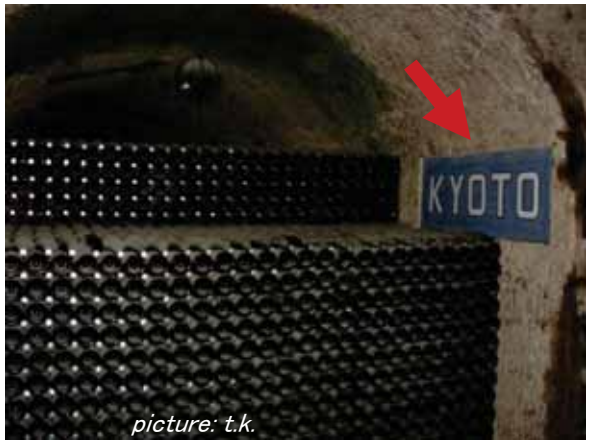


picture: t.k.



“Sekt, Schaumwein, Perlwein” Ulmer





picture: t.k.

■The caves of Pommery. Each tunnels are named after world cities.

■The board at “Newcastle” says 9116 bottles. The tunnel width is 2.4m, and 20 stages. So it should be 10 rows towards the behind.

■They have also “Kyoto” tunnel.

■Note: From the point of view as Japanese, good thing is, no earthquake in Epernay and Reims. (However, they said they experienced fall-down of tunnel in the past, which destroyed everything…)

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ABCDEFGHI Second fermentation, aging

“Effervesce period” and “Aging period”

■Functionally, the total aging term is divided into two phases. “Effervesce – capture of CO2 - period” and “aging period “.

■Sometime after the effervesce period, the yeast goes to death, which is called **autolysis**. I think autolysis starts within 2 – 3 months, however, actual aging effect starts much later. **After 8 – 10 months, the dead yeast starts to enrich the wine** with amino acids, proteins and volatile substances. It provides complexity and finesse.

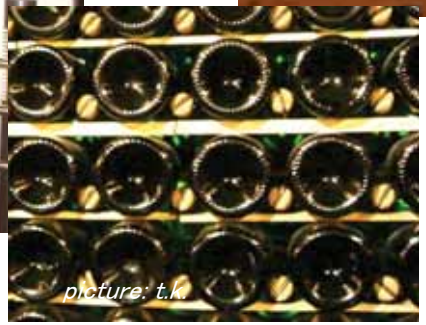
■It is surprising that the good champagne keep on changing after 3 years, 5 years or more.

picture: t.w many thanks to Maxime!

New champagne maison, newly made concrete cave. 190thou. bottles at this tunnel!

Robot piler, by Champagel.


picture: t.k.


picture: t.k.

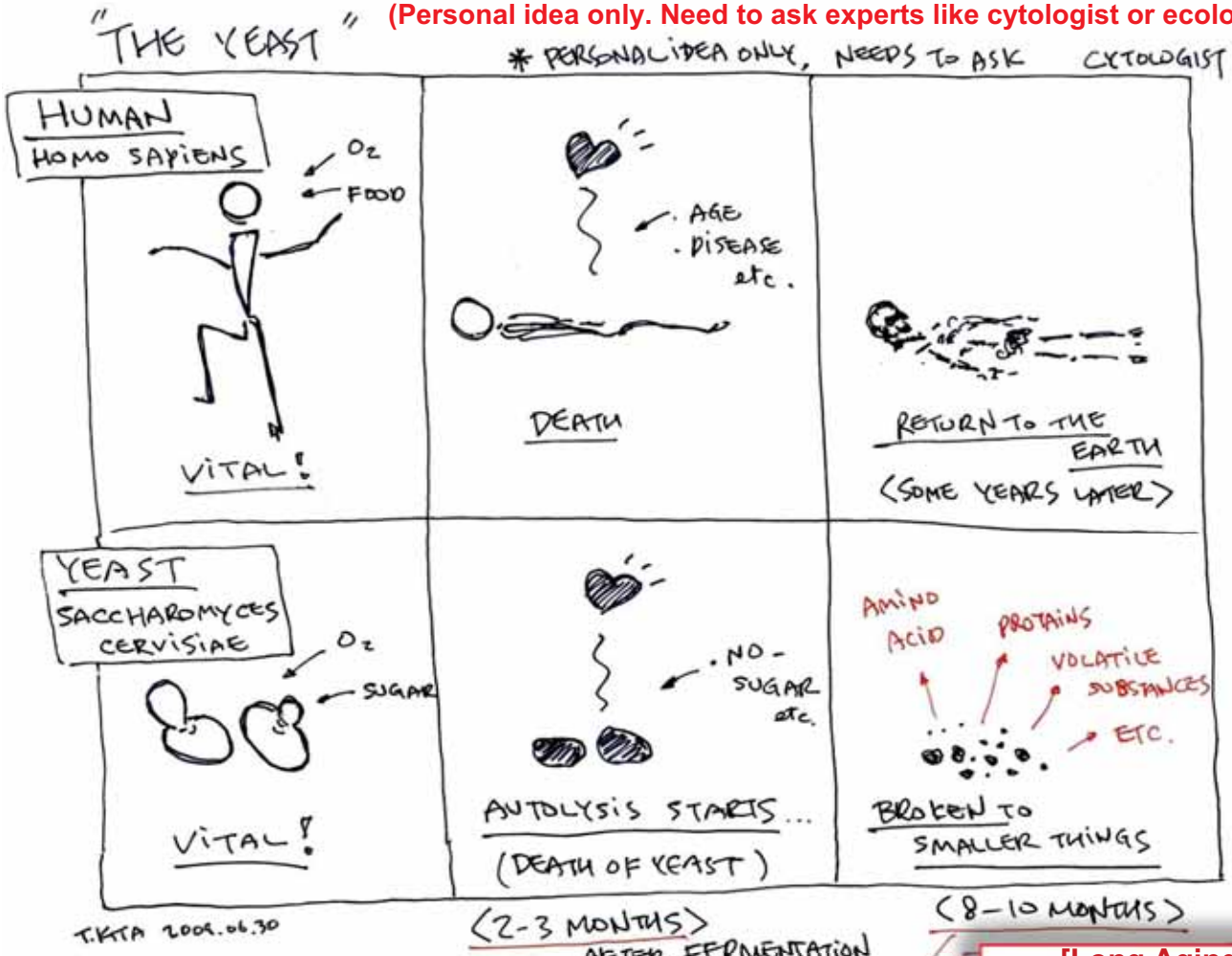
Aging with cork and agraff.

■It is unusual, but some kind of champagne is closed by cork. A little O2 permeability is the reason.

ABCDEFGHI the Yeast

Aging period **I think,,, things are going like the below.**

(Personal idea only. Need to ask experts like cytologist or ecologist.)



(2-3 MONTHS) AFTER FERMENTATION

[Yeasty flavor]

(8-10 MONTHS)

[Long Aging with Sediments] makes champagne characteristics

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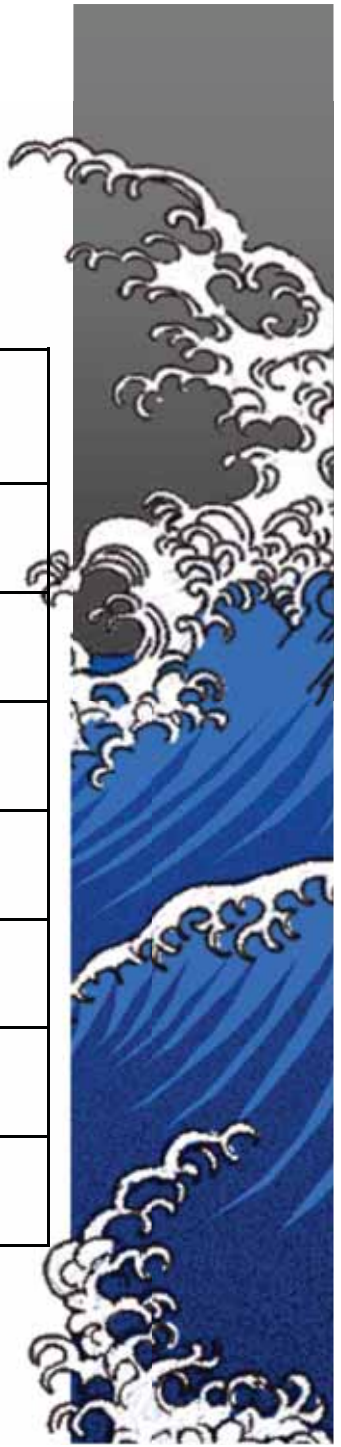
bottle fermented sparkling wine
ed.5.0

Ref.) Comparison with other alcoholic beverages

[Yeasty flavor] is, sometime OK, sometime NG

category	products	cloudy?	Yeasty flavor is OK or NG ?	note
wine	usual still wine	clear	X NG	reduced, sulphureous
	sur lie (5-7 months aging)	clear	✓ OK	
Sake	usual Sake	clear	X NG	*TSUWARI-KA*
	"Nigori" Sake	cloudy	✓ OK	
	Sparkling Sake with yeast	cloudy	✓ OK	
beer	usual (American lager) beer	clear	X NG	yeasty, diacetyl
	Hefe (i.e. yeast) weizen beer	cloudy	✓ OK	



ABCDEFGHI the Yeast

Quantity of yeast

■As shown on the pictures, the quantity of sediments are very different.

■According to my personal observation, A=D<C<B. Champagne is, not so much.

■Too much yeast is not god. Requires more adjuvant, makes difficult to disgorging.

Ref) Picture at a lab. In Champagne

■Capsuled yeast is not prohibited by champagne AOC. No need of riddling.

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ABCDEFGHI the Aging

Big bottle, small bottle?

■*Jéroboam* (3 liter) bottles are on the aging on the picture, but it is exceptional case because hard to riddle.

■Usually, magnum (1.5 liter) and larger, and quarter (187.5ml) are made from standard bottle. So-called “transfer machine” is used for this purpose. (The regulation of Champagne AOC prohibit to make half bottle by transfer machine.)


picture: t.k.


picture: t.w.

Transfer machine

■As a continuous line, SMB, (a German company) is the standard in the industry. Small equipments available from other companies.

SMB Goliath, up to 15 litre

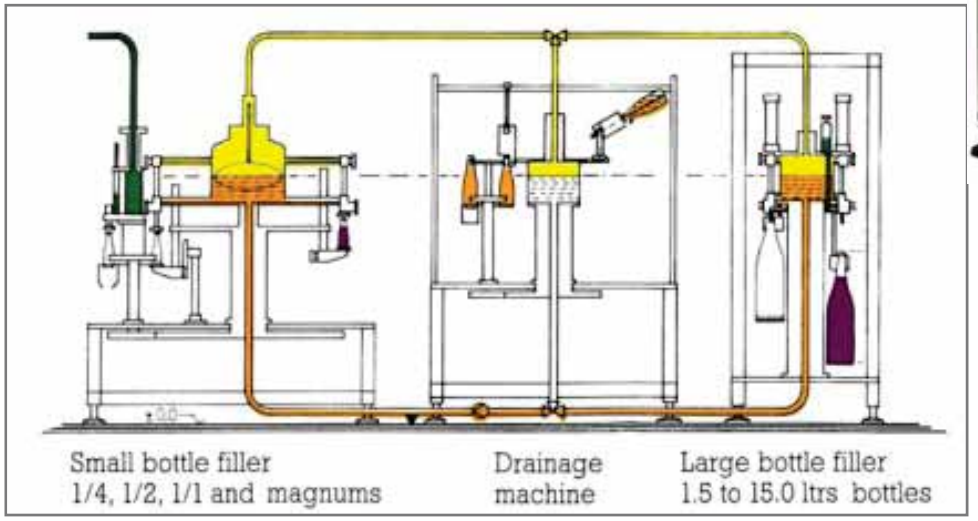

chart: SMB

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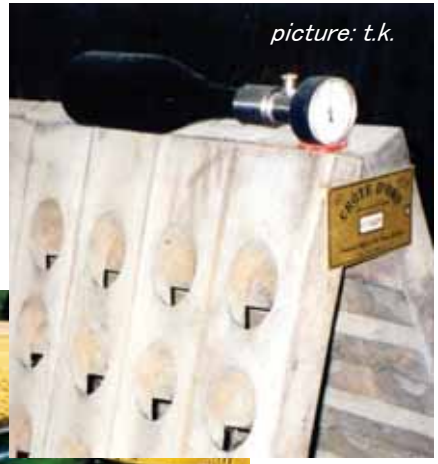
ABCDEFGHI the Aging, checking the pressure



Pressure

- To control population of yeast and to get good bubbles, effervesce period (monitored by pressure gauge) should be kept longer.
- 3 weeks is suggested. (Some says longer, like 2 months.)
- Temperature is important factor.

3 types of gauge

1. *Fixing on the bottle neck while effervesce period*
2. *Piercing through crown cap*
3. *Piercing through champagne cork*

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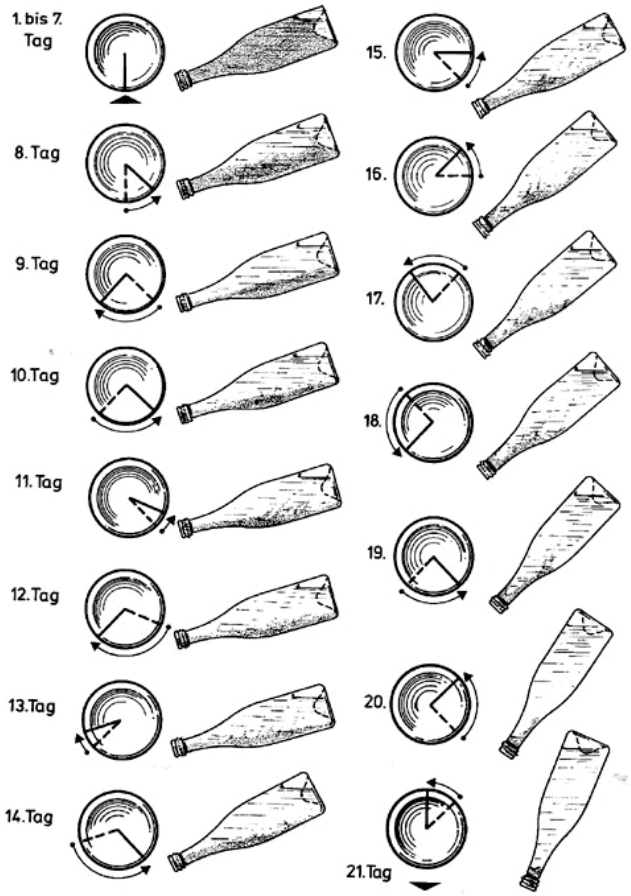
ABCDEFGHI Riddling by *pupitre*



"Sekt, Schaumwein, Perlwein" Ulmer

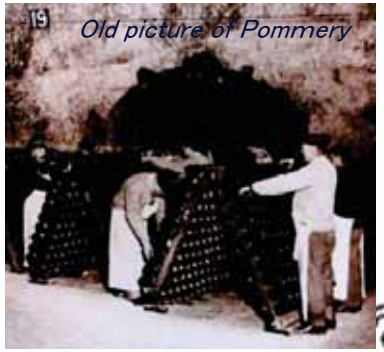
Manual riddling

■***Puptre***, a riddling rack, which has 6x10 holes on one side, total 120 holes, is used for manual riddling.

Turn right and left

■Not twisting one way, but twisting once to the right and once to the left.

■This way makes thicker sediments, and easy to slide them down to the bottle neck.

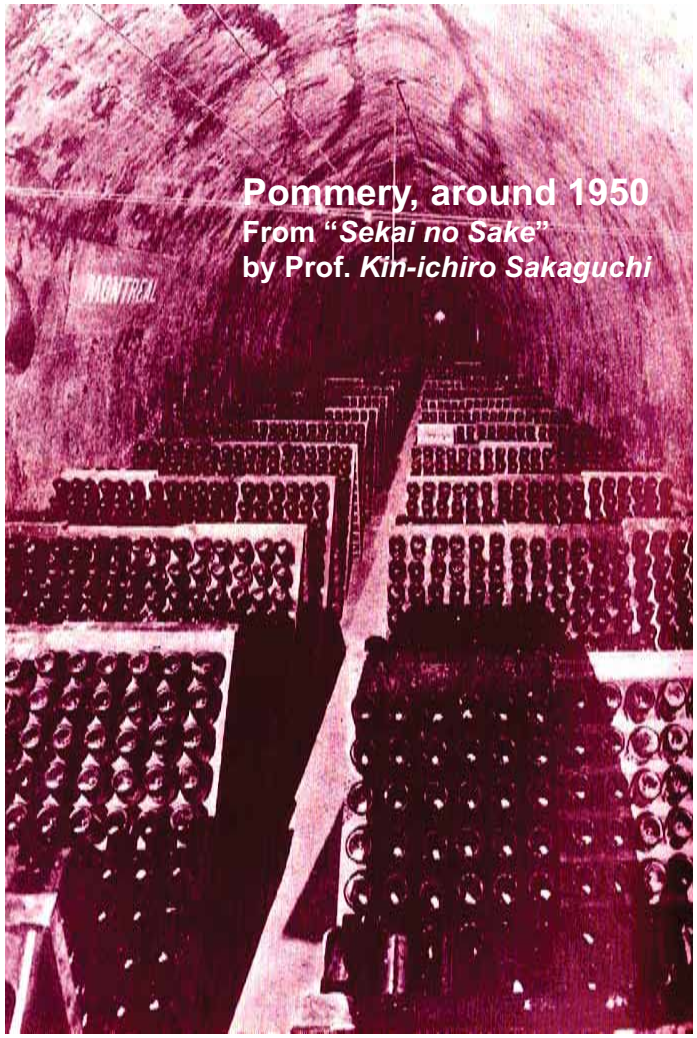


Old picture of Pommery

Kita Sangyo Co., Ltd.

KITA SANGYO

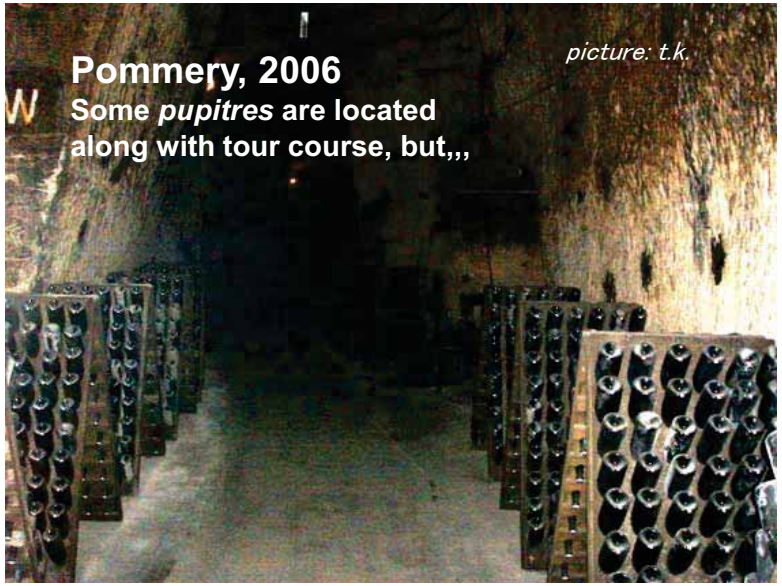
ABCDEFGHI Riddling from *pupitre* to Gyropalette



Pommery, around 1950
From "*Sekai no Sake*"
by Prof. *Kin-ichiro Sakaguchi*

Nowadays,,,

Actually, *pupitre* is already not used for commercial production. Gyropalette is a good alternative, space saving, labor saving and can prolog the actual aging period, which contribute quality,



Pommery, 2006
Some *pupitres* are located along with tour course, but,,,

picture: t.k.

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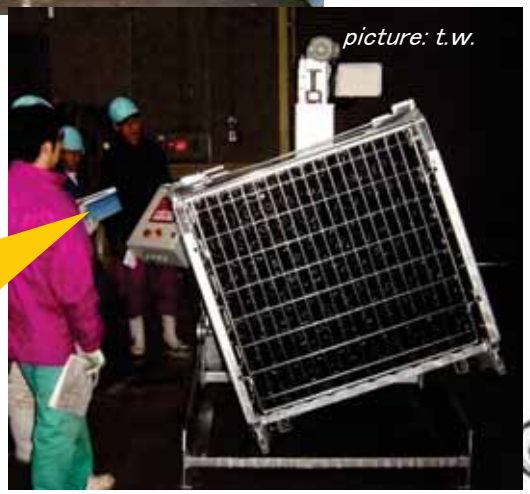
ABCDEFGHI Riddling by Gyropalette

Gyropalette

■504 bottles are in a palette.

■Even if the production scale is some thousands bottles, gyropalette is a good solution.

Click Video



■Gyropalette is a registered name of OENO CONCEPT.

■Two pictures are the machines, imported to Japan.

KITA SANGYO

ABCDEFGHI Riddling by Gyropalette

Temps: Temps de repos après chargement. | Position: Sens + correspond au sens des aiguilles d'une mo

TENUE	POSITION	ROTATION Gauche	ROTATION Droite	INCL. (en degré)	TEMPS (H / Min.)
0		RIGHT	LEFT		
1		1		3	10
2		1			2
3			1		2
4			1		2
5		1			2
6		1			2
7		1			2
8			2		2
9			1		2
10			1		2
11			1		2
12			1		2
13		2			2
14		1			2
15		2		3	3
16		2		3	3
17			3	3	5
18			3	3	5
19			2	4	5
20		3		4	5
21		3		3	5
22		2		3	5
23		2		3	5

TENUE	POSITION	ROTATION Gauche	ROTATION Droite	INCL. (en degré)	TEMPS (H / Min.)
24			3	3	3
25			3	3	3
26			2	3	3
27			2	3	3
28			2	3	3
29		3		3	3
30		3		5	3
31		3		5	3
32		3		5	3
33		3		5	3
34		3		5	3
35			4	5	3
36			4	5	3
			FIN		
Total					
40 steps		40	36	85°	116h

≒ 4.5 days

chart OENO CONCEPT

Program

- PLC controls all the riddling, i.e. right or left degree, inclination degree, and interval times.
- Though manual riddling requires 2-3 weeks, gyropalette usually can finish less than 7 days.
- This difference can be used for longer aging, thus makes more quality of champagne.
- The left chart is the sample, which is 4.5 days.

picture: t.k.

Ref) *Girasol* (pronounced hirasol, means sunflower in Spanish) is used at Cava in Spain. It doesn't go like gyropalette. No twist, only turn one way with "shaking". All process are less than 1 day. *Girasol* is not arrowed in Champagne.

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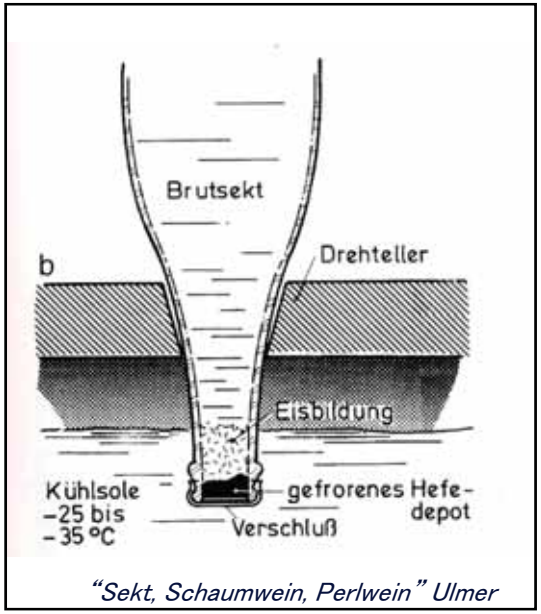
ABCDEFGHI Neck-freezing



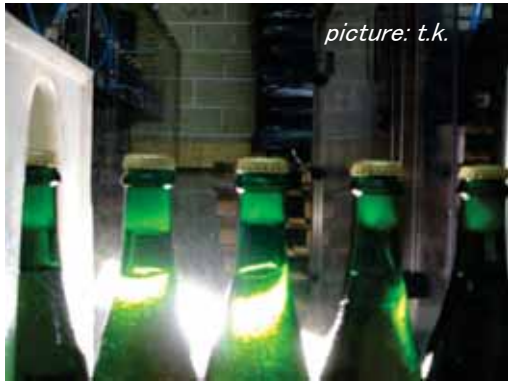
"Sekt, Schaumwein, Perlwein" Ulmer

Neck Freezer

■Dipping the bottle neck into a neck-freezer in which brine is kept at around -25 degree C. After some minutes, this creates an ice plug which traps all the deposit.

■Rotating board type is a good one for small scale production.

■*Rotating board type neck freezer with 60 holes, approx. 500bph.*
■*Food grade and safe brine must be used.*



Like the picture, 3-4cm ice is good. Too much ice makes disgorgement difficult, less ice can't catch all deposit.

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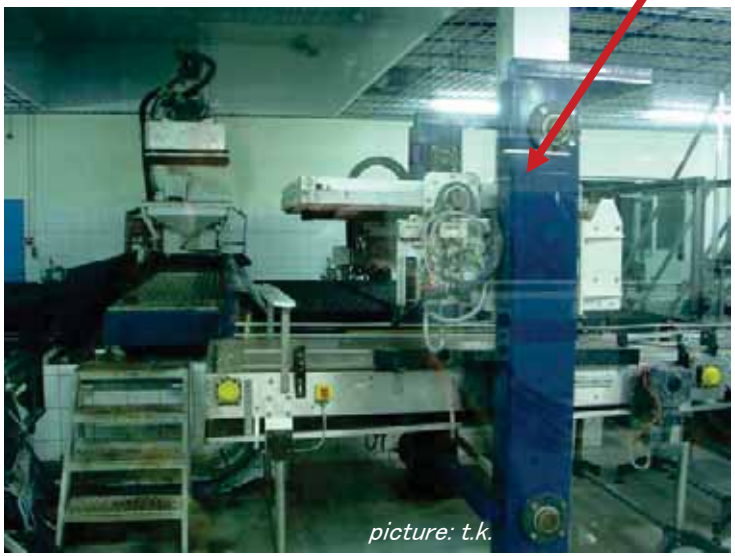
ABCDEFGHI Neck-freezing

Click Video



3 samples of neck freezers

1. Big dia. rotating（800bph）
2. Go and back, man feeding（3000bph）
3. Like a pool, fully automatic（10000bph?）

Now, almost all champagne is made thru. neck freezing procedure

4 reasons of freezing

1. Constant disgorgement
2. Low wine loss
3. Low CO_2 gas loss
4. Get clear wine (<0.3NTU)

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ABCDEFGHI Disgorgement and Dosage

manual Disgorgement and manual Dosage

■Using special pliers (a bit different from usual crown opener) or box covered equipment, open the crown, then the pressure flies out (disgorge) the frozen deposit. Just after disgorgement, the bottle should be closed by the thumb of left hand.

■Then, the bottle is placed on the dosage machine. Manual dosage machine of *Grilliat* was standard in the world.

Old picture of Codorniu

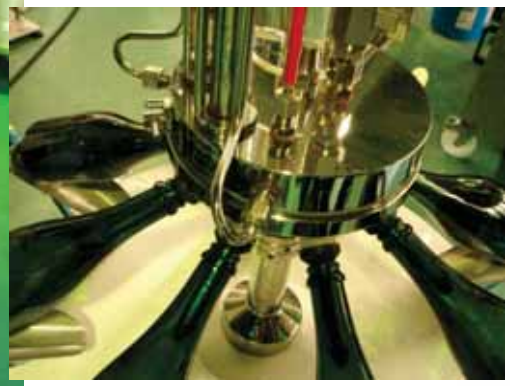
Kita Sangyo Co., Ltd.

Kita Sangyo Co., Ltd.

■*New Grilliat machine is no more available, however good rebuilt machine is available.*

■*A little tricky equipment to use, but works well for small scale production.*

■*Please do not dose by pipette!*



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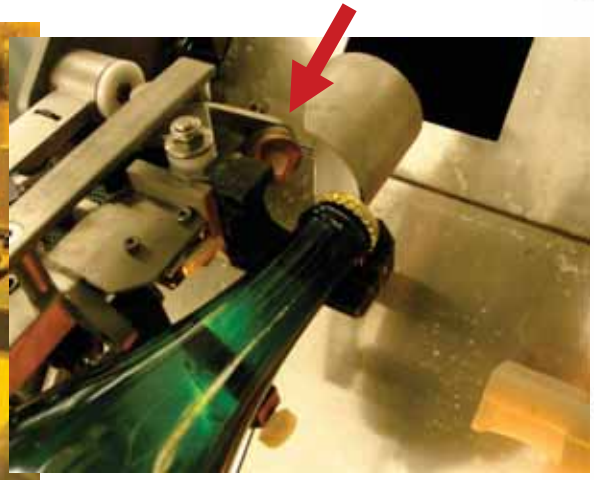
ABCDEFGHI Disgorgement and Dosage

TDD catalogue


picture: t.k.



TDD machine in Japan.
The red arrow shows
"automatic thumb" device.

Semi-automatic by TDD

Put the bottle on the left, then the machine automatically works as follows;

1) disgorgement
2) absorption to make constant liquid level
3) dose *liqueur d'expédition*
4) fill wine to make the final level.

This is not TDD, but similar machine.

liqueur d'expédition
Sugar mixed wine. Some maisons add cognac, port, etc., which is not possible in Japan regulation. In some case, SO2 or tannin also may be added.

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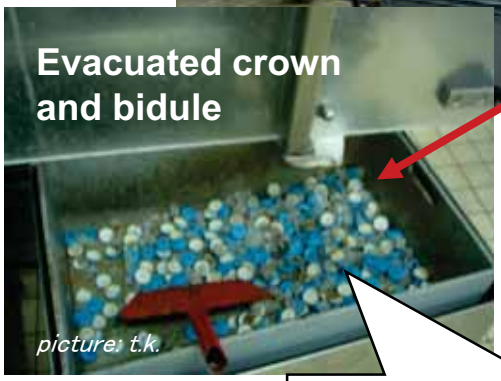
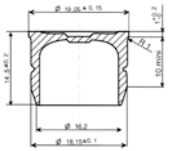
ABCDEFGHI Disgorgement and Dosage





catalogue, ALCAN

Why bidule? **Straight direction of fly-out, can disgorge even if thick ice, can remove deposit more completely.**

Over 3000bph

■Perrier machines are standard in the world. For less than 3000bph, TDD and some other suppliers are available

Click Video

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Corking and after

■**Shaking is "must" to homogenize *liqueur d'expédition*. Capsule machine align (twist) the printed side to front before actual capsuling. Typically 3 labels are applied, front, rear and round neck.**

■**Recently in some maisons, "jetter" is used to make foam and reduce head space air.**

Click Video

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ABCDEFGHI Corking, Wiring, Shaking, Capsuling, Labeling

Ref) TCA removal technique is now applied to some champagne cork in commercial basis.

Champagne bottle

■Champagne bottle is designed to resist 12bar pressure, piling up pressure, etc. STD bottle weighs 860g. Smooth inside surface to easy slide of sediments.

We stock STD and Magnum champagne bottles, no-print capsules, champagne corks, wire-hood, 29mm crown, etc.

Premium shaped bottles and logo printed capsules can be ordered. We have a label printing subsidiary company.

Ref) Plastic stoppers are used for some inexpensive German sekt, etc. In Australia, GreenPoint uses 29mm crown for final products

Ref) ZORK SPK, new comer from 2009

Ref) "Wall" to prevent from "corked".

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ABCDEFGHI Marketing driven products

Building the Bland

■An advertisement on NIKKEI news paper. No company name, no products name, but appeals potential customers.

■Champagne ads. on magazines are also very impressive. Different from other products.

Ref) Big maisons

■Historically, Möet et Chandon and Pommery are the two tops.

■After many acquisitions and joint movement, now,,,

the top is LVMH (Möet et Chandon, Veuve Clicquot, Krug, etc.),

the second is BCC（Boizel Chanoine Champagne. Lanson is also in this group),

the third is Vranken-Pommery Monopole.

KITA SANGYO

Kita Sangyo / Roots Machinery Lab. provide all required machines, equipments and materials for Traditional Method

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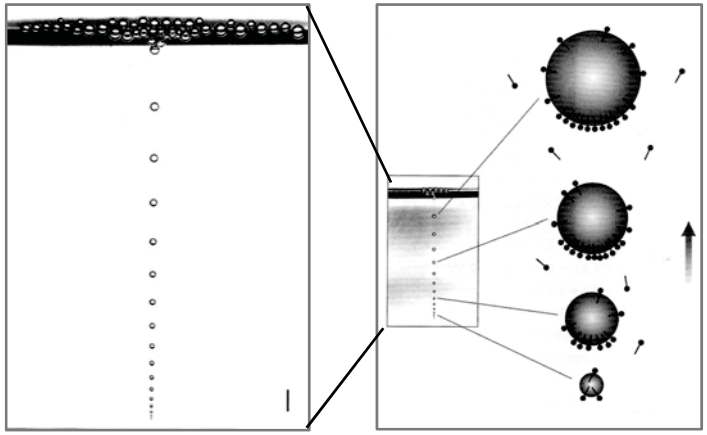
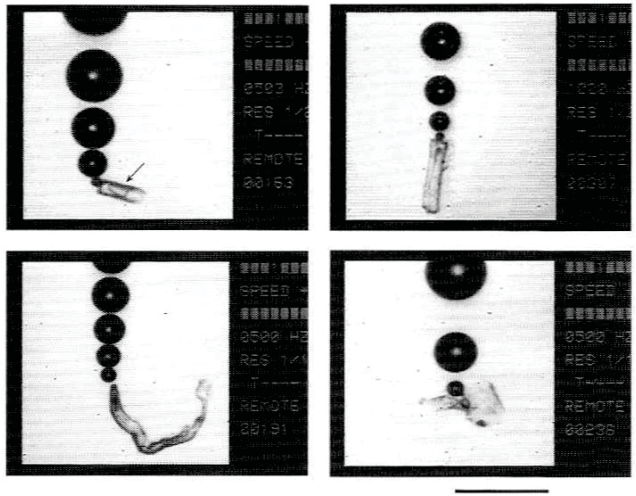
Ref) The bubble of Champagne

Compared to champagne, beer bubbles rise more slowly. Both liquid viscosity are very similar, but beer has more surfactant (protein, etc.). Once the surfactant attach on the surface of the bubbles, the bubbles rise slowly.

picture: t.k.





bottle fermented sparkling wine
ed.5.0

sauce
UNCORKED
The Science of Champagne
by Gérard Liger-Belair

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Ref) Organic acid

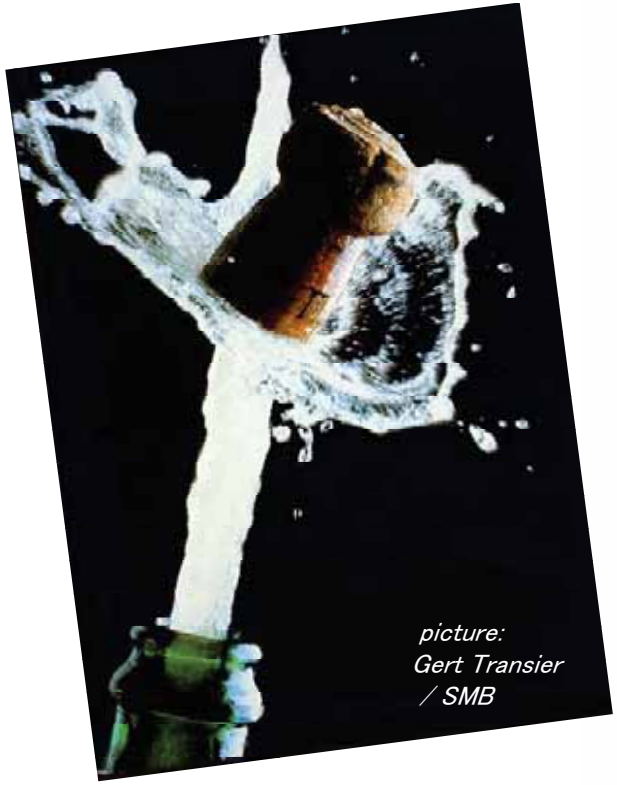
●It is said the below relation is generally observed between temperature and taste. For example, sparkling beverage (which should be served in chilled) contains citric acid and malic acid has a good taste, neat finish. Sparkling beverages contain lactic acid and tannin, may taste no so good, dull feeling.

organic acid, tastes good in cool temp.	*organic acid, tastes good in room temp.*
malic acid, caproic acid, tartaric acid, citric acid	lactic acid, tannin, amber acid, gluconic acid

●Other examples; red wine, which served usually at room temp. includes more lactic acid, tannin. White wine, which served at lower temp., includes more malic acid and tartaric acid.
●We need also keep in mind that organic acid is required for esterification (make ester) in the aging stage.

Other bottle fermented sparkling wines in the world:
A-1CAVA, A-2 Franciacorta, A-3 Transfer Method

Non-bottle ferment sparkling wines and test equipments:
B-1 Charmat, B-2 Physical gas dissolve, B-3 Pilot Plant



Text:
Tsuneo Kita,
0202-050219-060204-070508.0611-090710

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A-1 CAVA in Spain

http://www.kitasangyo.com/Archive/Data/cava_y_jerez_2007.pdf

Cava production is 220 mil bottles, 2/3 of 320 mil. bottles of Champagne.

A-1 CAVA in Spain

2 tops of CAVA

Freixenet **:130 mil bottles per year,** ***Codorniu*****: 50 mil. bottles per year. (Note, The top of Champagne, LVMH (inc.** ***Möet et Chandon*** **and others): 60 mil. Bottles)**

No specific local area

By historical reasons, many divided areas in Spain have the CAVA DO, appellation of origin.

Similar to *méthode champenoise*

,,, however, the details of method and equipment are different. Per examples, the riddling machine used at major Cava houses, *Girasol* doesn't go like gyropalette. Minimum aging period: 15 months for *Reserva*, 30 months for *Grand Reserva*.

Chardonnay and Pinot Noir

Traditionally *Xarel-lo*, *Parellada* and *Macabeo* grapes are used, but Chardonnay and Pinot Noir had been allowed as DO, and are becoming important Cava grapes. Regarding with using non-traditional Chardonnay and Pinot Noir, both positive and negative opinions are existing in the industry.

No MLF

Daylight hours are more than 50 percent longer than Champagne district. It makes enough sugar content. Usually they do not do MLF.

A-2 Franciacorta in Italy

More strict than Champagne AOC?

- Franciacorta DOCG is now getting very high reputation in the world.
- Pinot Noir, Chardonnay and Pinot Blanc are used.
- Minimum aging is 25 months (whereas Champagne is minimum 15 months).
- Allowed grape harvest quantity per ha: In Champagne, 13tons/ha until 2007, 15.5tons/ha in 2008. In Franciacorta, 10tons/ha.

Membrane press by DIEMME. Closed type is used.

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A-2 Franciacorta in Italy

2 tops: Ca'del Bosco and Bella Vista

Both have superb facilities. For example, Ca'del Bosco has; gradual low temperature storages of harvested grapes, built-in "elevator tanks" make complete gravity layout, absolutely no pump (except sanitation pump). Not only sparklings, but still wines are also beautiful.

CA'del BOSCO
Surprisingly, Japan flag waits for a private visitor from Japan.

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A-3 Transfer Method

No riddling, no disgorgement

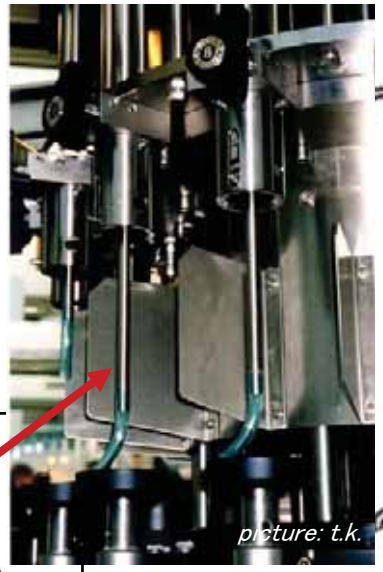
■As well as traditional method, transfer method is also increasing in Germany, Australia and Russia.

■Like champagne, bottle fermented , *sur lie* wine is going long aging in each bottles. However, no riddling, no disgorgement are required, so very labor-saving method.

General procedure

■Specially designed “transfer machine” is applied. Piercing needle pierces the crown, and all wines with sediments are transferred into tank, without any gas loss.

■Then, the sediments are removed by a filter, and refilled into the bottle again.



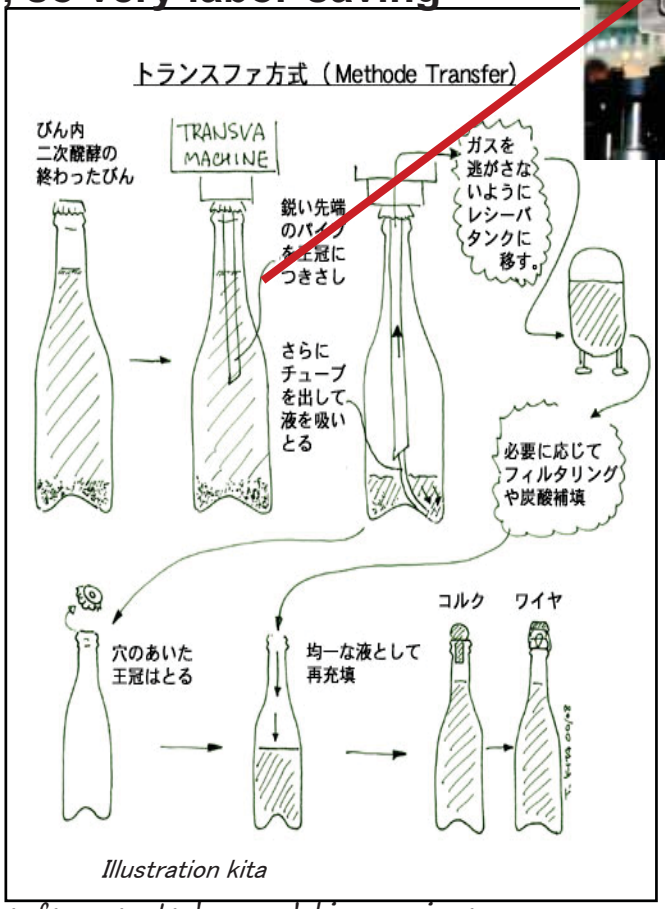


Illustration kita

KITA SANGYO

A-3 Transfer Method

SMB

■A German company, SMB is producing transfer machine.

■If “de-capper” (works for taking off pierced crown cap) is placed just after the transfer machine, the empty bottle can be used immediately to fill the filtered wine.

■The counter pressure filling machine must be also special, because of exceptionally high pressure.

picture: t.k.

Transvasa of SMB is used not only for transfer method, but also for transfer from STD to magnum or quarter (187.5ml) bottles in Champagne maisons.

picture: t.k.

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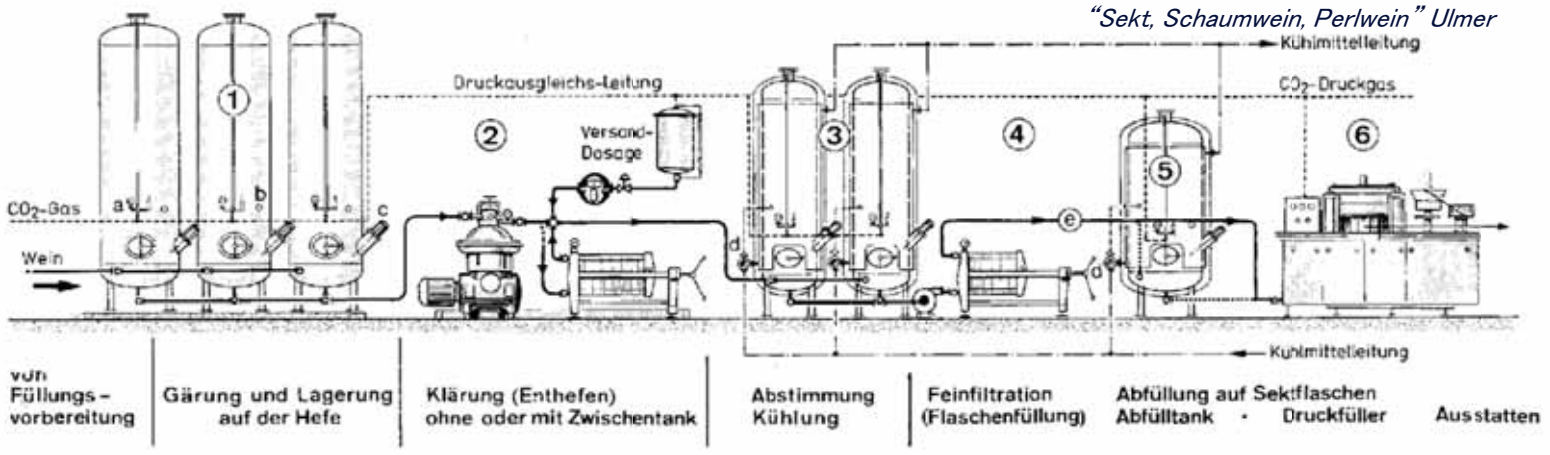
B-1 Charmat Method

"Sekt, Schaumwein, Perlwein" Ulmer



Kapazität per anno in 1/1 Flaschen	Großraum-Gärbehälter v. 8 bar Anzahl · Inhalt · Gesamtinh. Ltr.	Durchsatz bei Enthefen-Klären Separatortyp · Filter · Schichtenanzahl	Behandlungs- und Abfülltanks Anzahl · Inhalt/l · Inhalt zus./l	Flaschenfüllung je Stunde bei 85 % Wirkungsgrad	Füllerleistung per anno zu 1500 Füllstunden
1	2	3	4	5	6
6 000 000	90 · 50 000 · 4 500 000	4–5000 l/h mit SA 20 · 40er · 50	8 · 27600* · 220 800	24 Venta · 4080 Fl/h	6 100 000 Fl ≙ 4 600 000 Ltr.
15 000 000	110 · 100 000 · 11 000 000	12 000 l/h mit SA 60 · 60er · 60	8 · 52 630* · 421 200	50 Venta-U · 10 115 Fl/h	15 000 000 Fl ≙ 11 500 000 Ltr.

*entspricht 1 der Füllleistung eines Tages · 1/2 Gärtank · 5 % Versand-Dosage

In-tank second fermentation

■**General flow from a literature. Tanks are very high pressure proof, 5-8bar, and each tank has a mixing screw at the lower position to blend yeast etc.**

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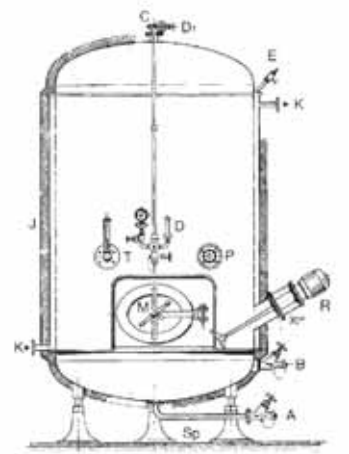
B-1 Charmat Method

For

- Labor saving, constant quality
- safe in the manufacturing process

Against

- Less flavor from amino acid caused by yeast
- high pressure tank and filling machines are very special and expensive.



"Sekt, Schaumwein, Perlwein" Ulmer

The difference between in-tank and in-bottle?

- The most important point is; the period of ***sur lie***, i.e. aging with autolysis yeast. Typically, aging period of charmat is some months.
- If we can apply longer period like 15 months (i.e. min. of champagne rule), I anticipate similar taste can be achieved. (However, if we want to do so, many many tanks are required.)

The method named after the inventor, Auguste Charmat (Montpellier University). Also called Méthode de la cuve close, Metodo Italiano, Metodo Charmat-Martinotti. Méthode russe may also a bit similar.

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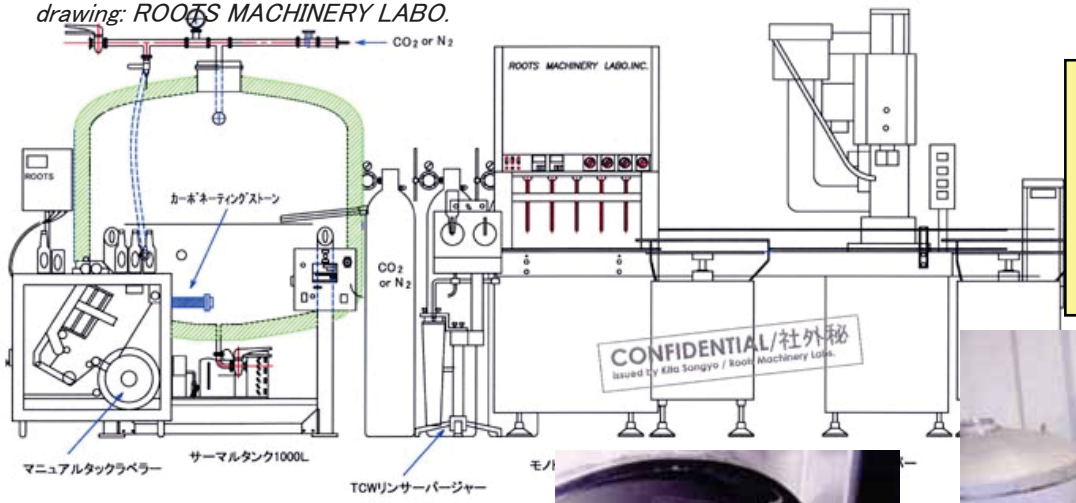
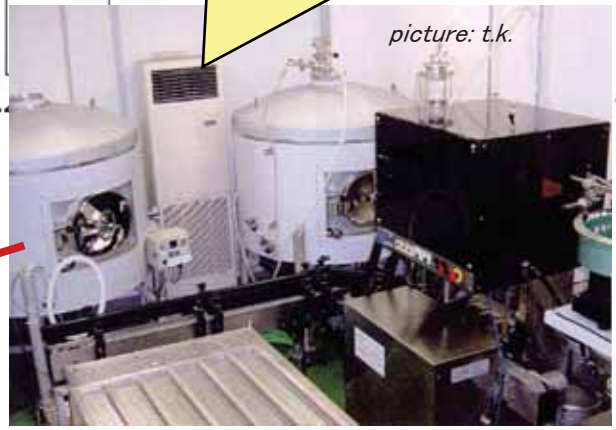
B-2 Physically Dissolving Gas

drawing: ROOTS MACHINERY LABO.



10 hl pressure tanks with ceramic carbonation system. Each tank has independent refrigerator. Complete plant inc. counter-pressure filling machine is designed by ROOTS Machinery Labo.



picture: t.k.

In-tank carbonation

■Some ways are used to dissolve in beverage industry, but for wine, in-tank carbonation through stone is recommended. Gentle movement is good for quality wine. Very small CO2 bubble will be disappeared until it reaches to the liquid surface, and prevent the dissipation of the aroma

Gassing method is cheap?

■The method should be selected depends on the targeted characteristics and price. The merit compared with second fermentation is, any base wine (any alcohol%, any color, etc.) can be used, any gas level is possible.

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B-3 Pilot Plant

■To test base wine or gas dissolving level, Pilot Plant is useful equipment. 5 gallons and 10 gallons are available.

■Small ceramic stone (specially for Japanese market) with observation windows to check bubbles. Hand counter-pressure filler. Note, no cooling device is included.

■Even if you take second fermentation method, it should be a good idea to check various base wine (acidity, sugar, etc) and various gas volume to decide the product design before you start. Second fermentation and aging is usually requires many months to get the conclusion.

(end of document text by t. kita)

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