■Measurement Objects ・Pretreatment Apparatus ・Measurement Ingredients

GTN－9

Measurement Objects	Pretreatment Apparatus	Measurement Ingredients [1] Standard error (%) [3]									Index [4]
		Moisture content	Total Nitrogen	Total Free Amino Acid	Theanine	Fiber [2]	Tannin	Catechin	Caffeine	Vitamin C	
Unrefined Tea Refined Tea	Grinding	● / 0.2	● / 0.15	● / 0.4	● / 0.3	● / 1.0	● / 0.6	● / 0.6	● / 0.15	● / 0.06	AF score
Unrefined Tea Refined Tea	No Grinding	● / 0.3	● / 0.2			● / 1.5					NF index
Dry Material Leaf [5]	Microwave Oven Grinder		● / 0.2			● / 1.5					NF index

RTN－7

Measurement Objects	Pretreatment Apparatus	Measurement Ingredients [1] Standard error (%) [3]							Index [4]
		Moisture content	Total Nitrogen	Total Free Amino Acid	Theanine	Fiber [2]	Tannin	Catechin	
Unrefined Tea Refined Tea	Grinding	● / 0.2	● / 0.15	● / 0.4	● / 0.3	● / 1.0	● / 0.6	● / 0.6	AF score
Unrefined Tea Refined Tea	No Grinding	● / 0.3	● / 0.2			● / 1.5			NF index
Dry Material Leaf [5]	Microwave Oven Grinder		● / 0.2			● / 1.5			NF index
Fresh Leaf	Particle Cutter	● / 1.0	● / 0.4			● / 2.0			NF index

Rem. 1 ● the ingredient can be analyzed.
2 Fiber means NDF measurement value can be noted with ash.
3 Standard errors depend on data of *Yabukita* cultivar from Shizuoka.There is no telling whether to become like this with other places of production or cultivars. Those values adapt dry base.
4 The described index is standard at each measurement object.
5 Dry material leaf of Measurement object is optional.

■Specifications

Model	GTN－9	RTN－7
Measurement system	NIR Spectroscopy	
Measurement Objects	Unrefined Tea・Refined Tea (Domestic Crop・Orthodox *Sencha*)	Fresh Leaf・Unrefined Tea・Refined Tea (Domestic Crop・Orthodox *Sencha*)
	Dry Material Leaf (Optional)　*Please consult about tea species other than *Sencha* .	
Measurement Time	Approx. 15seconds after closing the sample drawer	
Pretreatment Apparatus	Drying by a microwave oven Grinding by the fixed grinder	Cutting by a particle cutter, Drying by a microwave oven Grinding by the fixed grinder
Dimension	Width４００mm × Height３５４mm × Depth３６２mm	
Weight	Approx. 15Kg (Main Instrument)	
Power Supply	ＡＣ１００Ｖ（５０/６０Ｈｚ）	
Power Consumption	１００Ｗ	
Measurement Environment	10-15 degree Celsius　25-80 percent relative humidity	
Storage Temperature	０ ～ ５０ degree Celsius	
Accessories	Loading tray、Brush、Sweeping brush、Screw driver、Spare fuse、Earth code、Specific printer、Printer cable、Printer form、Sample bottle１２	
	sample cell	Particle Cutter、Large sample cup for fresh leaf
Optional	Dry Material Leaf、Grinder、Dust collector（Vacuum cleaner）、Personal computer、printer、Dedicated software package	

* In the following case, please keep in mind not measured correctly.
 1. The additive is mixed 2. Coloring etc. are performed 3.Several hours passed and it has discolored after plucking

* Note that specifications and appearance are subject to change without notice in order to improve the machine.

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2017.5

GTN-9

PRODUCTS CATALOGUE

Tea Ingredients Analyzer

KAWASAKI launches the

new Tea Ingredients Analyzer.

More Speedy! More Safety!! More Simple!!!

Manufacturer　　　　　　**Shizuoka Seiki Co., Ltd.**
Sales and Maintenance　**Kawasaki Kiko Co., Ltd.**

Tea Ingredients Analyzer

GTN-9
Good for the ideal quality evaluation of unrefined tea and refined tea
The combination of all the free amino acid and neutral detergent fiber is computed by measuring of main nine ingredients.
Easy to use, More Speedy!   More Safety!!   More Simple!!!

RTN-7
Ideal for the ingredient analysis of green leaf
Moisture, total nitrogen, and a fiber are analyzed speedily.
Calculation of NF index
Unrefined tea and refined tea (seven ingredients) can also be analyzed.

Everyone would be able to analyze ingredients easily, safely quickly.

GTN-9

Benefits and Features

* Easy to evaluate the quality by everyone, to analyze ingredients easily, safely quickly
* Measurement of catechin is still attained from the measurement items of the previous equipment.
  GTN-9 Orthodox *Sencha* : Grinding
  Moisture content, Total Nitrogen, Total free amino acid, Teanine, Fiber, Tannin, Catechin, Caffeine, Vitamin C
  RTN-7 fresh leaf: Orthodox *Sencha* : Grinding
  Moisture content, Total Nitrogen, Total free amino acid, Teanine, Fiber, Tannin, Catechin
* Intuitive color touch screen, eliminating operator training and a measurement result also can be found at a glance
* Warm-up time is shortened more wonderfully than the previous equipment; GT8, RT-3. And it has a useful "Ready" indicator.
* This display can be changed to English from Japanese.
* The fixed small printer can be changed also to Chinese besides Japanese and English.
* The weight is less than half of the previous equipment.
* Dry material leaf is optional.
  Please consult about tea species other than *Sencha*.

GTN—9 Print sample

```
            TeaAnalyzer

      **Measurement Result**

  Date        2017/05/04  17:05:52
  Product     Sencha
  Sample ID   SM1
  Customer ID KAWASAKI

  MOISTURE            3.5 %
  T-N                 5.8 %
  TFAA                3.8 %
  THEANINE            1.9 %
  NDF-ASH            16.4 %
  TANNIN             14.1 %
  CATECHIN           13.4 %
  CAFFEINE            2.7 %
  T.V.C              0.53 %

       Moisture basis : 0.0%

      AF score        62
      rank             1
              GTN-9
```
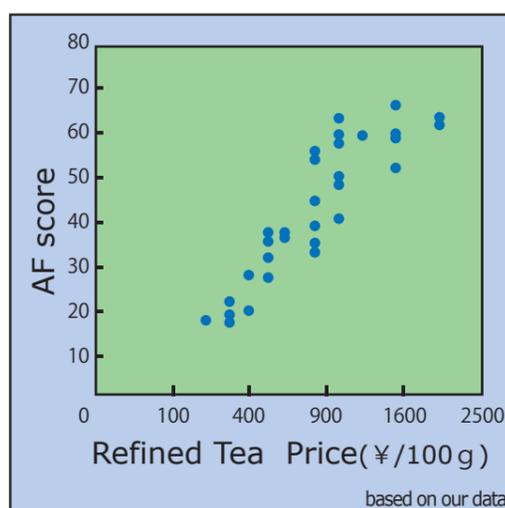
RTN—7 Print sample

```
            TeaAnalyzer

      **Measurement Result**

  Date        2017/05/04  17:05:52
  Product     Fresh Leaf
  Sample ID   SM1
  Customer ID KAWASAKI

  MOISTURE           75.4 %
  T-N                 6.0 %
  NDF-ASH            15.5 %

       Moisture basis : 0.0%

      NF index        72
      rank             1
              RTN-7
```

```
            TeaAnalyzer

      **Measurement Result**

  Date        2017/05/04  17:05:52
  Product     Sencha
  Sample ID   SM1
  Customer ID KAWASAKI

  MOISTURE            3.5 %
  T-N                 5.8 %
  TFAA                3.8 %
  THEANINE            1.9 %
  NDF-ASH            16.4 %
  TANNIN             14.1 %
  CATECHIN           13.4 %

       Moisture basis : 0.0%

      AF score        62
      rank             1
              RTN-7
```

Comparison of the quality evaluation method

	Organoleptic evaluation	Chemical analysis	This analyzer
rapidity	◎	✕	◎
safety	△	✕	◎
simplicity	△ (*)	✕	◎
objectivity	△	◎	◎
reproducibility	△	◎	◎

*Skill is required although a special facility or instrument is not needed.

Quality evaluation evaluated as the AF score.

Scatter plot: AF score (y-axis, 10–80) vs Refined Tea Price (¥/100 g) (x-axis, 0–2500)

based on our data

We have proposed AF score as the index of quality evaluation. This is computed with the combination of all the free amino acid and neutral detergent fiber including ash. The score is distributed in general from 10 to 80 points and we notice that it is highly correlative between the score and the price of unrefined tea or refined tea.

AF score is based on the joint research of Shizuoka agriculture and forestry Research Institute Tea Research Center and Shizuoka Seiki Co., Ltd.

Measurement Procedure

1.Unrefined tea, refined tea; Measuring without grinding is also possible.

Grinding → Packing → Measurement → Display/Print

Grinding	Packing	Measurement	Display/Print
Fixed grinder	Place sample cup filled tea cover on loading tray.	Close the sample drawer with the installed sample.	It displays automatically and prints.

2.Fresh leaf

Cutting → Packing → Measurement → Display/Print

Cutting	Packing	Measurement	Display/Print
Particle Cutter	Place sample cup filled tea cover on loading tray.	Close the sample drawer with the installed sample.	It displays automatically and prints.

3.Dry fresh leaf

Drying → Grinding → Packing → Measurement → Display/Print

Drying	Grinding	Packing	Measurement	Display/Print
Microwave oven	Fixed grinder	Place sample cup filled tea cover on loading tray.	Close the sample drawer with the installed sample.	It displays automatically and prints.