●Ingredient of Tea・Special Quality●

●【Moisture content】

Green tea is hygroscopic and if moisture content becomes higher, its quality will deteriorate easily. For this reason, it is important to control the green tea product at storage or for the economic efficiency of the manufacture.
4 to 6 percent of the moisture content is proper for unrefined tea. As for refined tea, 2 to 4 percent is proper.

●【Total Nitrogen（T−N)】

The total amount of the nitrogen contained in protein, free amino acid, caffeine, etc. among green tea ingredients is called total nitrogen. Between the quantity of total nitrogen and organic-functions examination evaluation of green tea reveals positive high correlation. Good tea has more total nitrogen. Therefore, the content of total nitrogen has been regarded as the important index on quality evaluation.
The content of total nitrogen is about 3 percent in lower class tea generally available to consumers, while about 7 percent in the higher rank tea like being awarded at a competitive show.

●【Total Free Amino Acid（TFAA)】

There are 16 kinds of main amino acid existing in green tea. This total quantity is measured as all the free amino acid (TFAA). Generally, the proportion balance of the amino acid is considered to be the mother of exquisite taste of green tea. A TFAA content is about 1 percent in lower class green tea, and about 7 percent in upper green tea.

●【Theanine】

Theanine accounts for the largest portion in the free amino acid of green tea, and it is considered to be the main ingredients of green tea taste. It is more contained in the tea leaves especially cultivated under shading.
The theanine content of green tea is about 0.1 percent in lower class tea, and about 3 percent in upper tea.

●【Fiber<Neutral Detergent Fiber (NDF) includes ash>】

Neutral detergent fiber (NDF) is the ingredient which builds the cell wall of green tea.
For this reason, NDF is related to the degree of ripeness of green tea. The content is 12 percent in young buds, it increases as growth progresses, and it becomes as high as about 35 percent in mature leaves.
Although, NDF measurement value can be noted by either methods, with ash or without ash, our company takes the NDF measurement with ash.

●【Tannin】

The astringency ingredient in green tea is tannin and green tea contains 8 to 18 percent. Generally, in the cultivation under much sunshine, the quantity of tannin increases and decreases under shading. It has a tendency to be less at the first flush than the second crop of tea. Tannin is not a single component, it is a mixture of catechin, that is polyphenol which controls elevation-of-blood-pressure, mutation and prevents mouth odor, etc. it has played the central role of the effect of the green tea being reported in the media.

●【Caffeine】

The bitter taste ingredient in green tea is caffeine and it is contained 1.5 to 4 percent in green tea. Generally young buds or shaded tea contains more, and less in coarse tea or black tea.
Caffeine excites the central nerves system and has cardiotonic effect and diuretic effect, etc. By cutting down caffeine to less than 1 percent, low caffeine tea has been made, whose stimulus property is weakened, good for pregnant women or children.

●【Vitamin C（TVC:Total Vitamin C)】

Much vitamin C is contained in green tea.
Since much vitamin C is contained in green tea immediately after processing and gets decreased with time, the vitamin C content gives the indication how green tea is fresh.
Vitamin C is contained in green tea 0.2 to 0.6 percent and it is less in tea leaves cultivated under shading. Furthermore, oolong tea has even less since vitamin C is decomposed during fermentation and black tea does not have it at all.

● 【Catechin】

The principal ingredient of bitter taste in green tea is catechin, and it is contained 10 to 15 percent in green tea. Green tea contains mainly four kinds; epicatechin of free catechin, epigallocatechin, epicatechin gallate of ester type catechin and epigallocatechin gallate. Above all, epigallocatechin gallate accounts for a little more than 50 percent. Catechin easily gets oxidized during fermentation, so the catechin content of oolong tea is less than half of the volume green tea has and black tea is even less than oolong tea.

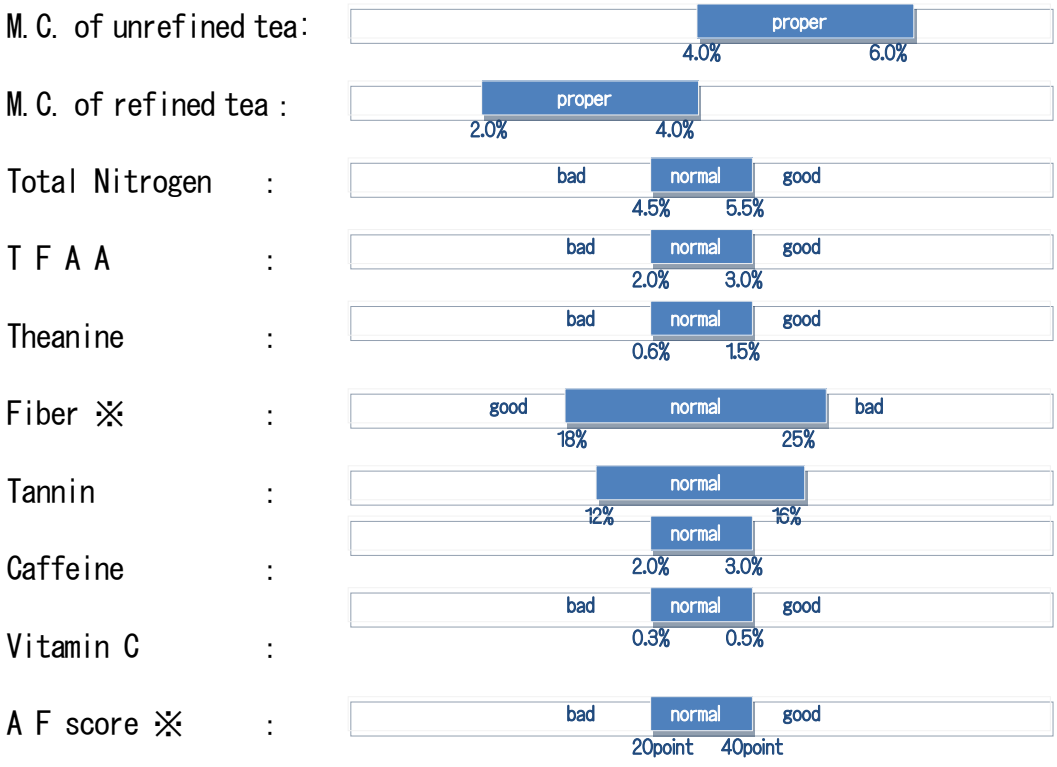
◆Quality evaluation by the combination of Ingredients◆

It may be better to evaluate the quality based on the combined ingredients in green tea rather than an independent ingredient estimation.
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.

■About the notation method of Ingredient contents■

Two kinds are shown in the notation method of moisture content. One method is the ratio of moisture weight and the amount of dry matter weights 'Dry Base %' and the other is the moisture rate in the whole sample 'Wet Base %'. This analyzer has adopted the wet basis according to "Standard tables of food composition in Japan 4th Edition". For this reason, the display of 300DB% often seen at the time of tea processing is also displayed as 75WB%. It means the both have the same moisture contents.
Two kinds are shown also in the notation method of the each content of total nitrogen, NDF, TFAA, theanine tannin, caffeine, vitamin C and catechin other than moisture.
One is a notation of an ingredient content depending on making a sample of moisture content zero percent 'Dry Base DRY%' and the other is the notation of an ingredient content according to moisture at the time of sample measurement 'ASIS%'.
We have adopted the dry base DRY% so that the mutual comparison of the ingredient of a green tea sample can be carried out.
In order to carry out comparison examination of the content of each ingredient correctly, it is necessary to check exactly which notation method has been adopted.

■The standard of measured value■



Bibliography

The volume Shizuoka Shida Haibara agricultural improvement spread center and Shizuoka Tea Experiment Station "NIR analyzer manual for tea ingredient analysis" (1995)

Fiber※ Neutral Detergent Fiber (NDF)<includes ash>
AFscore※ AF score is based on the joint research of Shizuoka agriculture and forestry Research Institute Tea Research Center and Shizuoka Seiki Co., Ltd.