LOW GROWN TEA MANUFACTURE

D.S.A. Samaraweera and C. Kandappah

(Head, Technology Division and Research Officer, respectively, Tea Research Institute of Sri Lanka, Talawakele, Sri Lanka)

Ceylon (Sri Lanka) is known to be the home of good quality tea. In this instance, the word quality refers to overall goodness in tea, a broad description of overall characteristics. The word quality is also used to define seasonal character in high grown teas. Low grown teas do not possess such seasonal quality. It was pointed out by a person well experienced in the tea trade the other day that quality is the value of the produce. If a product consistantly gets a high price it must be a high quality product.

Total shipments of Low Grown teas amounted to 38 % and 36 % respectively of the shipments of tea in 1983 and 1984. The gross sale average price of Low Grown teas were Rs. 46.73 and Rs. 65.36 per kg in these two years. The National gross sale average price in corresponding years were Rs. 43.67 and Rs. 62.79 per kg. Over the years Low Grown teas have ranked highest among elevational categories. Therefore, by definition, Low Grown teas must be of high quality. Without doubt it can be said that today Low Grown teas enjoy a very steady market condition, certainly so in comparison to teas produced in other elevations in the country. This means that in terms of quantity and quality, the supply and demand are well balanced. Therefore, further development of factories by way of new machinery etc, should really be geared towards achieving even stronger supply and demand balance in quality and quantity. It is necessary to realise that there is no profit in producing a product that is not in demand.

Several Middle Eastern countries are known to support the Low Grown tea market over the years. Among them are Iran, Iraq, United Arab Republic, Saudi Arabia, Libya and Syria. They are the buyers of traditional Low Grown teas. Fortunately for Sir Lanka not very many tea growing regions of the world produce teas similar to Sri Lanka Low Grown teas. Therefore, it is very likely that traditional Low Grown teas will have a good and steady market for many more years to come.

In traditional Low Grown tea manufacture, three types of teas are produced. They are the Flowery grades with show of tips which is a result of gentle rolling, stylish wiry OP grades and the inevitable Broken grades. The percentages of these three types of teas cannot be changed *ad hoc* without sacrificing on the style of the grades and hence the price. During the last couple of years the grades such as BOP 1 and OP have fetched premium prices. The average price realised by Broken grades such as BOP, BOPF and Dusts were quite satisfactory in the early 1980's. However, with the present prevailing low price levels of all teas, the market for Brokens has suffered considerably. Producers must however be very careful in attempting to reduce the percentage of Broken grades, as it can adversely affect the style of BOP 1 and OP grades. In respect of all grades it is necessary to adhere to accepted styles, sizes and characteristics.

In any manufacturing process the composition and quality of raw materials have considerable influence on the quality of the produce. Tea manufacture is not an exception. The tender flush has a relatively large quantity of important chemical constituents compared to coarser leaf and this is the reason why leaf should be picked carefully for the production of good quality teas. Further the rollability of the leaf is considerably enhanced by a better standard of leaf. The rolled leaf appearance, particularly of premium priced Low Country grades being of vital importance every attempt must be made to supply leaf of good standard to the factory. The crop intake

distribution of Low Country factories are quite uniform as the growing conditions in these regions are very satisfactory and devoid of fluctuations over most times of the year. The maximum intake is unlikely to exceed 150 % level of the average intake in factories in these regions. Therefore, organisation of plucking rounds should pose no problems. If labour availability is a problem then consistently poor standard of leaf will have to be accepted as a bitter fact. To overcome this problem, more broad based solutions which may not lie within the purview of the individual Manager, will have to be sought.

An area where sufficient attention is not paid in our industry is in the matter of green leaf transport. The final made tea can develop considerable undesirable character due to negligence in handling green leaf material. Mechanical damage to leaf due to use of improper sacks or due to excessive quantities of leaf being stacked in a sack can be considerable. High temperature being one of the main factors responsible for spoilage of leaf all attempts must be made to transport leaf to the factory as quickly as possible without being allowed to build up heat in warm conditions. Under no circumstances leaf bags should be kept exposed to direct sunlight as it will increase the temperature of leaf quite unnecessarily.

After receiving the leaf in the factory there should be no room for any further spoilage of material. From this point onwards all activities must be done in a precise manner. There should be no cause for any lapse particularly in factories which are equipped to carry out basic operations.

It is rather disturbing to note, that after more than 20 years of experience in the use of troughs for withering, this department ranks the weakest in most factories. It is our experience that the problems in most factories are a result of incorrect withering of leaf. It is necessary to realise that in comparison to tat withering,

troughs are very much more efficient in terms of space utilization and labour requirements. Inherent with this efficiency lies the need for attention to detail. The following are the key points in trough withering:

i. At the time of loading leaf must be loosened.

ii. Spread the leaf as evenly as possible bearing in mind that thinner the spreading rate more even the final product.

iii. Correct turning over of leaf; it is necessary to systematically turn over the leaf and loosen the lumps. In most instances the workers cannot easily reach the centre of the trough for turning over. In such instances permanent cat walks must be constructed so that the worker can do the job with the least inconvenience.

iv. Use of hot air should be minimised. The gravest mistake made in most factories is the excessive use of hot air. It must also be ensured that there is no possibility of hot air leaking into the loft when there is no need for hot air. It is a common practice to allow hot air to be sucked up by troughs when the dryer room gets unbearably warm whereas for this purpose only those troughs without leaf should be used.

v. The temperature of withering leaf should be kept as low as possible to avoid spoilage. This will also help to manage the dhool temperature later.

For Low Grown manufacture a wither of 43-45 % outturn is satisfactory. However, what is important is the evenness of the wither. A mixture of hard withered

burnt leaf and underwithered leaf is useless for good tea manufacture, although it may show up as an ideal wither outturn of the day.

It must be fully realised that the "grade-mix" of the produce as well as basic style and characteristics of grades depend largely on rolling room operations. For traditional Low Country manufacture a programme of light rolling must be employed. Towards this end it is necessary that:

i. Rollers are undercharged, otherwise the weight of leaf itself can lead to excessive and premature crushing of leaf material,

   For example a 46.5" or 47" roller should preferably be charged only 275 kg of withered leaf.

ii. Rollers must be fitted with suitable cones. For example for gentle rolling mild Rettle cones are preferable to steep Rettle cones, and

iii. The pressure application must be done only in the latter rolls.

A typical low country rolling programme that will give a satisfactory grade mix would be a 5 x 20 min. roll programme where;

1st roll	-	no pressure
2nd roll	-	5 ON/5 OFF touch pressure
3rd roll	-	5 ON/5 OFF light pressure
4th roll	-	full pressure
5th roll	-	light pressure

to result in dhool percentages of 8,10,10,25,10 and 35 per cent big bulk. As double roll breaking is often employed, adequate roll breaking time should be allowed between each roll. Oscillatory roll breakers with Nylon meshes are often used in order to extract wiry shaped dhools. The efficiency of the rolling room work can be judged by the rolled leaf appearance of the big bulk. Presence of badly rolled big bulk results in excessive cuttings in the grading room.

In low grown tea manufacture the length of the fermentation period is not very critical. Usually 2 1/2 - 3 h are employed so that liquoring grades will have the optimum character. In any case it is necessary to draw up the rolling programme so as to match the drier capacity so that fermentation period is maintained as desired.

Irrespective of the method of manufacture employed it is vital that the final product is stable and its keeping qualities are good so that it will reach the consumer in satisfactory condition. Proper firing of tea is therefore very important. It is also important to make sure that teas are not unduly exposed during post drying operations. Firing of Low Country teas is straight forward and it is done in conventional driers, standard operating conditions being 200 - 205° F inlet, 125 - 130° F exhaust and 21 minutes time through the drier. The ultimate criteria on performance of a drier lies in the moisture content of the final product. This can be ascertained by regular checking of moisture by an accurate method. If samples of teas are sent to the TRI we can report on them free of charge. Samples should be about 1 oz each, packed in tins and sellotaped to avoid any moisture ingress. In Low Country manufacture, the length of fermentation period being relatively long it is always possible to arrange for the rolling programme to match the drier continuously and thereby to control the firing well.

In low country manufacture sorting of fired teas is generally a cumbersome and expensive operation. If the

rolling room operations had been satisfactory and therefore individual dhools were true to type, then, grading room work becomes considerably simple and easy to organise and supervise.

Basically sorting of teas are centered around three machines: First, the Chota, for sorting of Broken grades, second, the Michie, for sorting of wiry grades. third, the Myddleton for separation of large leafy particles from the rest. Usually Myddleton is used first in the sorting line so as to increase the efficiency for Chotas and Michies in terms of style of the grades. Michie is a very low output machine particularly when the style of the grade is stressed. Therefore supervision is very important to make sure that Michie machines are not idling during the operation. As cleanliness of the grades are very important, stalk and fibre removal is vital. Fibre is removed by mini pickers, stalk by Electrostatic Stalk Extractors and Myddletons. Hand picking of red leaf is an expensive but essential part of cleaning of leafy teas. In most low country factories it is common to see a large backlog of leafy teas which can be minimised by organising the aspects of sorting particularly the red leaf picking. As black leaf appearance is very important in Low Grown teas greying of teas should be minimised by avoiding any superfluous operations.

In most Low Country factories more than a dozen grades of teas are produced. It is not possible to lay down norms as to the ideal number of grades or to the minimum percentage for grades to be produced. It should be noted however that high prices can be achieved for so called special grades only at the expense of lower prices for the balance teas. Further, smaller the percentage, it takes a longer time to make a break at the auctions. Therefore the percentages, potential price levels as well as the cost of delay in making breaks must all be considered before taking a decision to make these very low percentage grades.