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POST HARVEST LOSSES IN TEA PRODUCTION

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1. Introduction

Being the world's leading tea exporter, Sri Lanka presently supplies more than 280 million kg of made per year to the world market and earns more than 600 million USD annually.

Having a history of more than a century, the world-famous Ceylon Tea has also earned a reputation as being the 'best of the breed' in the world. In addition, Ceylon Tea is now accredited as being 'the cleanest tea in the world' with respect to pesticide residues. The future of our tea industry, therefore, undoubtedly depends on the consistent production of quality teas, free of contamination, for the export market.

It is a well-known fact that the quality of made tea is mainly dependent on the chemical composition and physical condition of the tea leaf supplied to the factory. In this context, the presence of coarse (or fibrous) leaf, and physical damage to the leaf, are the major determinants of quality. Indeed, tea makers believe that the quality of teas is made in the field, and only value may be added in the factory. Tea growers obtain a higher yield by maintaining proper plucking rounds which give a better standard of leaf. However, the least attention is paid to post harvest damage to the leaf and this has now become the major constraint in producing good-quality teas.

Physical damage to the tea shoots, and damage resulting from high temperature or inadequate aeration following harvesting (manifested as browning of the leaves), are referred to as post harvest damage, which is responsible for post harvest losses. Post-harvest damage to tea not only reduces overall production, but also causes a deterioration in the quality of the produce. Further, sand or other impurities, and chemicals substances, can be mixed with harvested leaf owing to poor handling and supervision.

As tea is a beverage, or a food commodity, such contamination is a health hazard. It is, therefore, of the utmost importance to prevent post harvest damage and contamination of tea.

2. Planning of field operations and transport for minimizing post harvest losses

The most critical operations during which harvested tea leaf is usually prone to damage are harvesting, spreading of leaf and filling of bags, and transportation.

2.1. Harvesting

If tea shoots are stripped from the bush merely by grabbing a clump of shoots rather than by being selective and picking each shoot separately, the succulent leaf is damaged in the hand. Moreover, shoots are crushed or bruised when a large number of shoots are collected and retained in each hand for a period, before they are deposited in the plucking basket. When a suitable plucking basket is not used, pluckers tend to hold several shoots in their hands in order to save time and achieve a higher plucking intake. Therefore, setting an achievable 'norm', and providing suitable plucking baskets, reduce post harvest losses. The use of a selective tea harvester also minimizes physical damage to shoots in the field.

2.2. Spreading and handling of leaf

Usually, tea leaves are spread on a floor, or leaf bags are kept on the ground, after harvesting, until loading into vehicles for transport. During this period, the harvested leaf may be exposed to hot sunlight, with the possibility also of sand and other impurities becoming mixing with the leaf. Moreover, leaf can be physically damaged by handling when they are being spread, and when bags are being emptied or refilled.

Some growers attempt to put large quantities of leaf into the bags by pressing hard on the leaves. This practice crushes the leaf and hinders aeration. High temperatures building up inside the bags also cause considerable damage to the shoots.

Therefore, it is extremely important to keep harvested leaf on a clean floor (or a clean sheet of a material like polythene), under shade and rain cover if necessary. Leaf should never be pressed into bags, and post harvest damage can be minimized by using well-woven coir bags into each of which not more than 15 kg of leaf are placed. This helps in providing adequate aeration of the green leaf during transport.

When the leaf bags provided are not suitable, and when weight deductions are made by leaf collectors or factories for the empty bag, water in the leaf, etc., pluckers tend to stuff leaf into the bags. Such deductions encourage the addition of water to the harvested leaf, which not only damage the leaf but also lead to contamination of the tea with microbes, and sand and silt and other impurities.

It should be realized by stakeholders that the final losses from such practices amount to more than the savings that can be made by supplying a smaller number of bags, or making weight deductions. No water should be added to harvested leaf at any stage. In order to minimize contamination and post harvest losses owing to handling, perforated, food-grade plastic crates or boxes can be used effectively, in place of coir bags or poly sacks.

2.3. Leaf transport

It is well-known that smallholders contribute more than 50 % of our national tea production. This means that most of the tea leaf harvested is transported from fields to distant factories, and hence the condition of the vehicles, the leaf bags and the infrastructural facilities, the distance traveled, and the leaf load per vehicle, determine the degree of leaf damage.

Post harvest losses are greater when leaf is transported in loosely-woven poly-sacks or in empty fertilizer bags, rather than in well-woven coir bags. Damage can be prevented by using perforated plastic boxes for transporting harvested leaf.

When harvested leaf is transported in old vehicles, and on very bad roads, over long periods of time, leaf can be greatly damaged. Usually, leaf collectors stack two or more layers of the leaf bags in vehicles to minimize transport costs. Sometimes leaf not contained in bags is loaded directly onto the floor of a vehicle, and this practice damages the leaf. Hence, it is of the utmost importance to limit the leaf load per vehicle, in order to provide adequate aeration and minimize physical damage.

Owing to heavy competition for leaf, collectors take their vehicles to all possible tea-growing areas, by-passing several tea factories and crossing other leaf-vehicles between factories. As a result, harvested crop usually reaches distant factories late in the evening or at night, after spending a long period of time en route. This is unfortunate when opportunities are available for supplying green leaf in a fresh condition, within comparatively short periods of time, without any damage arising from transportation. This is not only a waste of resources (fuel, vehicle wear and tear, etc.), but also causes even greater losses to the tea industry because of post harvest damage. Some leaf collectors may transport various goods (fertilizers, cement, hardware, etc.) with their leaf. This adds impurities to the leaf, and also damages it when the transported goods are loaded on top of the leaf bags.

3. Minimizing post harvest losses during rush crop periods

The post harvest losses described above are very common and severe during the heavy cropping (or 'rush') periods, which coincide with the two monsoonal rains. During these periods, post harvest losses are greater owing to the lack of adequate labour for plucking and allied operations (such as leaf handling), lack of leaf bags for the large volumes of harvested crop, and lack of vehicles for leaf transport. Further, during rush crop periods, most of the factories receive large quantities of leaf which may sometimes be over and above factory capacity. Under such conditions, poor quality teas are produced because of lack of space, machinery, and supervision. Therefore, it is extremely necessary to obtain quantities of green leaf which match the capacity of the factory and the machinery that is available.

4. Role of stakeholders in minimizing post harvest losses

When considering the causes and effects of post harvest losses of tea, it is clear that tea growers, leaf collectors and factory managers have to play a key rôle. Tea growers should harvest their leaf at the correct intervals, and provide leaf free of physical damage and impurities to the factories or to the collectors. It is the responsibility of the leaf

collectors and transporters to ensure that the leaf is brought to the factory without delay and before leaf quality can deteriorate. Factory managers should use the leaf provided to make good-quality teas by following all the correct procedures of tea manufacture and by providing optimum conditions.

The sustainability of our tea industry depends, therefore, on a mutual understanding and an honest interaction between growers, leaf collectors and factory managers. The extension services and all tea-related institutes have already launched a campaign to enlighten each party on their importance, duties and responsibilities, in the production of high-quality teas, in order to retain the world-position of Ceylon Tea.