

# Neera tapping for making coconut the most profitable horticultural crop for future

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Coconut palm, an oil seed crop of tree origin has emerged as the best option for diversification to meet the need for food, nutrition, health care besides providing better returns and employment generation. One of the ways to increase income from coconut to the maximum extent is to tap neera the healthy, nutritionally rich natural juice from coconut inflorescence. Though this most profitable avenue from Kalpavriksha was identified years ago, so far it was not commercially utilized in our country as the abkari act was not permitting neera tapping by the farmers. In major coconut growing countries viz; Philippines, Indonesia, Malaysia and Srilanka neera and neera sugar agribusiness has been established as a profitable enterprise earning foreign exchange to the country. Neera tapping need to be promoted in order to make coconut farming globally competitive and to make coconut a profitable horticulture crop in future. Time has come to consider coconut as neera producing beverage crop and natural, healthy sugar producing sugar crop. Out of the 12 bunches of inflorescence (spadix) produced by a healthy medium height coconut palm six bunches (50%) can be utilized for neera production in a year. The farmer can increase his income by 15 times from a palm by adopting neera tapping. From one healthy spadix, a farmer will get 50 liters of neera. If six spadixes are used for tapping in a year, he will



get 300 liters of neera. The farmer will get Rs.15, 000/- per tree per year @ farm gate price of Rs.50/- per liter as income. At the same time if he allow the spadix grow for harvesting coconut, he may get maximum 60 coconut and @ Rs.15/- per nut, an amount of Rs. 900/-only from the same palm. Thus the income can be increased fifteen times by tapping neera.

Neera, the unfermented natural sap from the unopened inflorescences of coconut has high sucrose content. Analysis showed that the average sugar content varied between 12% to14.4%. A maximum sugar content of 17% was reported

from Malaysia. This shows that there is great variation in sugar content between cultivars. The health benefits of coconut sap sugar has already been established in other coconut growing countries and classified it as low GI (35) alternative sweetener for diabetics. There is vast scope for development of this industry with vast economic prospects in the local and global market in future.

## Guidelines to tap neera

- The best time to start tapping is prior to the splitting of the inner bract and the emergence of the spikes from the spathe. Sap yield is much lower if the tapping starts

- after the spadices have burst open.
- A spadix tapped prematurely may burst open and become discolored at the cut portion. The same may happen to a spadix tapped when over-mature. In both cases neera production may be much reduced because there will be a delay in the commencement of the neera flow and a rapid spadix consumption, as each day the discolored portion has to be cut off.
  - During the first week, the spathe is tied firmly over its entire length with strong string or with fibrous strands stripped off from petioles of young leaves, so as to prevent premature splitting of the inner bract due to expansion of the spadix.
  - Twice a day, the outer surface of the spathe is gently beaten all around with a wooden mallet. The tapping process is an art, and therefore the result depends upon the skill of the tapper. The technique consists of carefully bruising and rupturing the tender tissues of the floral branch by gently hammering and pounding the spathe. Special care is taken not to reduce the flower buds inside the spathe to a pulp, in which case the spadix becomes useless. Beating is stopped once the sap starts dripping
  - After about three days, five cm of the apical tissues is sliced off. During preparation, the spathe is bent downwards, so that later the sap can be collected in a container. To facilitate the bending of the spathe, the sheath covering the inflorescence may be split at the base. The bending is a delicate operation, as too much force would result in breaking the rachis tissues.
  - From the first day of tapping onwards, after beating, a very thin slice of the apical tissue is cut off (about 2 mm thick). This slicing is performed twice daily and the beating is done in the morning only. This continues until the sap starts oozing out.
  - It is observed that the interval from the beginning of the tapping to the dripping of the neera varies much. It differed from tree to tree and from spadix to spadix in the same tree. The commencement of the flow takes place as early as five days and as late as 32 days after the tip of the spadix had been cut off for the first time.
  - When the sap starts flowing, a container is placed under the dripping spadix. The sap flow gradually increases and may reach a peak after 3-5 weeks. The peak may then continue for 1-3 weeks, after which the flow declines. The flow may continue for about a month until the length of the spathe is reduced to a length of about 10-15 cm. The longest productive period observed was 74 days. This may also depend on the spadix length. Palms with relatively low nut yields also have shorter productivity of the spadix than high yielders.
  - The flow of neera dwindles when the spadix is damaged by rats, insects, catter pillers / worms etc., and also when the spathe covering the inflorescence is removed partially or totally after it has cracked open. When the cut-end of the spadix touches the liquid in the container, the neera flow may reduce as well.
  - To prevent sap fermentation after slicing, the fresh cut may be brushed with anti-ferment solution, or some anti-ferment solution may be put in the container.
  - The most effective harvesting cycle is twice a day. More harvests are not profitable in relation to the additional work, and fewer harvesters involve the risk of breaking the spathe under the excessive weight of the container, and they may also provoke other problems such as sap fermentation and drying of cuts.



- For any reason the spadix is not sliced for a period of two days, a type of healing latex exudes from the wound which blocks the sap flow. Two weeks of tapping is required to recover normal sap production. Sometimes a closed spadix has to be abandoned. One or two days' rest for the harvester may lead to a production loss of 15-20 days. It is therefore important that tapping be performed by a team, whose members can substitute each other in case of sickness etc. About three weeks before the end of tapping, preparation of another spadix may begin.
- Freshness of the sap is the main factor determining the quality of neera and palm sugar. Fresh sap has a pH of six and any reduction in pH is indicative of deterioration

#### Factors affecting Neera Yield

The growing conditions of the palm and its vigour play an important role in neera production. Tapping may be continued for periods of one year or longer. Continuous tapping of coconut inflorescences does not affect the palm. Once the tapping is stopped, nut yields may show a temporary increase compared to the normal nut

yield of the palm. Higher nut yields after tapping are due to more female flowers being produced per spadix after tapping, with a similar percentage of fruit set compared to non-tapped trees.

Neera yields differ with palm variety, palm vigor and season. It is reported that average yield of sap per day with eight months tapping per year is 1500 ml. It is observed that sap flow is closely associated with the leaves water content, suggesting an influence on sap flow by the internal water condition of the trees. The neera yield decrease strongly after the relative water content of the leaves decline. Low rainfall, particularly when the soil water reserves were low and palms suffered from water stress affects neera yield. As the flow of neera decreases with increasing transpiration, high temperature and low relative humidity have similar effects. Neera yield was not significantly correlated with photosynthetically active radiation. Sap production is relatively high at night, due to reduced transpiration and increased sap pressure. It was also observed that neera flow had an inverse relationship with the total soluble solids content of the neera. Tall palms yield much more neera than dwarf palms. A good tall palm

may yield about two liter per day and hybrids even more. At a sugar content of about 15%, this would mean a sugar yield of 300 - 400 g per palm per day. According to the reports, yield recorded in Indonesia is 300-600 g of raw sugar per palm per day under very favorable conditions. At 150 palms per ha, this would represent a production of 66 kg per ha per day, or almost 24 tones per ha per year, which is very high. If such yields are possible under favourable conditions, yields of 12 tons of sugar per ha per year appear to be within reach of well-managed plantations under average growing conditions. Good quality coconut palm sugar can be obtained by gradually boiling fresh coconut sap to a temperature of 118-120°C and then cooling it. This sugar should have a moisture content of 8%. The sugar can be hygienically bagged in oriented polypropylene laminated with polyethylene or polypropylene or thermoform container for a period of six months with slight loss of moisture.

It is concluded that neera tapping and coconut palm sugar industry can be a welcome source of higher income to small holders especially in situations where copra prices are low and making coconut farming more profitable in future. More neera tapping and palm sugar producing units are to be established in suitable locations by the coconut farmer's collectives. Commercial production and marketing the product by the farmer's collectives will help to get better income from the crop to farmers on sustainable basis and this will make coconut a most profitable horticulture crop of the future. However, it is suggested that sap yields and sap sugar contents of more cultivars are to be measured in different seasons in comparison trials.

