13

Organic Cultivation of Medicinal Plants as Inter/Mixed Crops in Coconut Gardens

H.P. Maheswarappa, D.V. Srinivasa Reddy, V. Krishnakumar
P. Subramanian and R. Dhanapal

INTRODUCTION

Coconut (*Cocos nucifera* L.), widely known as 'Kalpavriksha' or " tree of heaven" is an important perennial oil yielding crop of humid tropics and is a versatile crop providing food, medicine, health drink, shelter, fuel, timber and fibre. It is grown in 92 countries and India, Indonesia, Philippines and Sri Lanka are the major growing countries. In India, it is mainly grown in the southern states like Kerala, Karnataka, Tamil Nadu and Andhra Pradesh. Coconut palms planted at the recommended spacing of 7.5m × 7.5m does not utilize fully the available resources such as land space, aerial space, water and nutrients. Active root zone of coconut is confined to 25% of the available land area and the remaining area could be profitable exploited for raising subsidiary crops. In adult plantation of more than 25 years old, about 45–50% of sunlight is wasted without being intercepted by coconut.

Plant-based drugs are available throughout the world in one or the other form. The use of medicinal plants in the health care management programme has not remained under the domain of the developing world, but their use has also been ever increasing in the developed industrialized countries. The interest in the plant medicines in developed countries has been dramatically surged up to 60% since 1989. Even now the market continues to grow at the rate of 15% annually. The increasing demand of medicinal plant based products have created problems of supply of raw materials and one of the major difficulties being faced by the industries and entrepreneurs is that of obtaining sufficient quantities of raw materials of desired quality for the internal consumption as well as for export. To address this situation, measures are needed to promote the cultivation and domestication of medicinal plants.

Performance of different medicinal plants was tried as inter/mixed crops at Central Plantation Crops Research Institute (CPCRI), Kasaragod during 2003–06 in 30 years old coconut garden spaced at 7.5m × 7.5m. The crops were cultivated with only organic manure in the form of vermi-compost. Details of package of practices followed for different crops are given in the Table 13.1. During summer months irrigation was provided with perfo system at IW/CPE ratio of 1.0. As crops vary in their growth habit, the harvesting period also varied. The economic products were harvested as and when ready.

Table 13.1. Details of package of practices followed for different medicinal plants

Crop	*Planting material*	*Duration*	*Spacing*	*Organic manure*
Orila – *Desmodium gangeticum* DC	Seed	8 months	30 x 30 cm flat bed	Vermi-compost : 10t/ha (At the time of sowing)
Moovila – *Pseudarthria viscida*	Seed	8 months	30 x 30 cm flat bed	Vermi-compost : 10t/ha (At the time of sowing)
Chittadalodakam – *Adhatoda beddomei*	Cutting	1½ to 2 years	60 x 60 cm flat bed	Vermi-compost : 15t/ha (two splits)
Karimkurinji – *Nilgiranthus ciliatus*	Cutting	1½ to 2 years	60 x 60 cm flat bed	Vermi-compost : 15t/ha (two splits)
Nagadanthi – *Baliospermum montanum*	Cutting	1½ to 2 years	60 x 60 cm flat bed	Vermi-compost : 15t/ha (two splits)
Panikkorkka – *Coleus aromaticus* Benth	Cutting	Perennial	30 x 30 cm flat bed	Vermi-compost : 10t/ha (two splits)

Among the annuals tried, *coleus aromaticus* could not establish well in the coconut garden. Among the annuals, orila had higher height and number of branches compared to moovila (Table 13.2). Among the biennials, the plant height was more in Nagadanthi and number of branches produced were more in Nilgirianthus.

Table 13.2. Growth characters of medicinal plants (mean of 2 seasons)

Crop	*Plant height (cm)*	*No. of branches/plant*
Orila	86.6	6.4
Moovila	64.3	5.3
Nilgirianthus	107.7	22.1
Chittadalodakam	128.5	5.7
Nagadanthi	206.7	4.5

The mean dry root yield of orila was 764.3 kg/ha, whereas, moovila produced dry root yield of 590.8 kg/ha (Table 13.3). Among the biennials, the dry root and stem yield of Nilgirianthus was 2.45 and 17.34 t/ha, respectively. The dry root and stem yield in the case of Chittdalodakam was 1.73 t/ha and 9.04 t/ha, respectively. The Nagadanthi crop produced 9.26 t/ha of dry roots.

Table 13.3. Economic yield of medicinal plants (kg/ha)

Crop	2003-04		2005-06		Mean	
	Root (DW)	Stem (DW)	Root (DW)	Stem (DW)	Root (DW)	Stem(DW)
Orila	664.3	-	864.3	-	764.3	-
Moovila	570.0	-	611.7	-	590.8	-
Nilgirianthus	2530.0	16903.3	2436.7	17773.3	2483.3	17338.3
Chittadalodakam	1685.7	9007.0	1765.3	9068.7	1725.5	9037.8
Nagadanthi	8868.3	-	9660.7	-	9264.5	-

DW = Dry weight

The cost of cultivation was higher during the first season due to high cost of planting materials. Planting materials were produced in the farm itself in the subsequent years and hence cost towards this item was less. Cost of production was higher for Nilgirianthus crop and was lower for annuals (Table13.4). Among the annuals, orila recorded the highest net return of Rs. 14,929/ha compared to moovila in 8 months duration. Among the biennials, the highest net return obtained was with Nilgirianthus (Rs.1,93,049/ha) in 18 months duration. This was followed by Rs. 1,65,290/ha in the case of Nagadanthi crop. Sujatha *et al.* (2006) also reported higher return from Nilgirianthus when grown as inter-crop in arecanut garden.

Table 13.4. Economics of medicinal plants (Mean of two seasons) (Rs./ha)

Crop	Cost of production	Gross return	Net return
Orila	8,000	22,928	14,929
Moovila	8,000	17,724	9,724
Nilgirianthus	30,000	2,23,049	1,93,049
Chittadalodakam	20,000	1,24,888	1,04,888
Nagadanthi	20,000	1,85,290	1,65,290

The coconut equivalent (copra) of intercrops (Table 13.5) was significantly higher under Nilgirianthus crop and the lowest was with Moovila crop. Inter-cropping of medicinal plants did not affect the yield of coconut rather there was increase in the yield of coconut. The pre-experimental (2002-03) yield of coconut was 103.2 nuts/palm/year, whereas, the yield obtained during 2005-06 was 133.0 nuts/palm/year. From the above study it can be concluded that, growing medicinal crops organically as mixed crops in coconut garden is economically beneficial depending upon the market facility for selling economic produce of the medicinal plants.

Table 13.5. Coconut equivalent (copra) of intercrops yield (kg/ha)

Crop	*2003-04*	*2005-06*	*Mean*
Orila	442.9	576.2	509.5
Moovila	380.0	407.8	393.9
Nilgirianthus	4880.8	5032.6	956.7
Chittadalodakam	2750.7	2799.8	774.1
Nagadanthi	3941.7	4293.2	117.5
CD (P=0.05)	372.56	332.38	67.42

Reference

Sujatha, S., Ravi Bhat, Balasimha, D. and Kannan, C. 2006. Crop diversification in arecanut plantation through intercropping of medicinal and aromatic plants. *J. Plantation Crops* **34**(3): 318-22.