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Socioeconomic and Traditional Medicament through Wild Date Palm in India

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Abstract

Information and knowledge were collected for the first time through questionnaire and interviews on medicinal aspects of wild date palm. Wild date palm plant is useful in one way or another; from its sap to its fermented product like *tari*. Raw sap and *Tari* manufacturing is the most profitable business for the small and marginal farmers of North Eastern Plains Zone (NEPZ) of India. This business was showed better B: C ratio (1.83) along with 77.35% recovery of *Tari* from sap. Raw sap and *tari* are used for treatment of several diseases like, anti-heat stroke activity, jaundice, eye flu, constipation, stomach problems, urinary complaint, weight gain, leucorrhoea, *Mamrakha* in children, recovery after pregnancy, power booster for bullocks, relief in menstrual cycle and let down of milk in women. Among different diseases, farmers put anti-heat stroke activity (mean score 52.56%) at rank I followed by jaundice (mean score 41.38%) at rank II and eye flu (mean score 38.30%) at rank III.

Keywords: Date palm; Diseases; Folk uses; Medicinal properties; Sap; *Tari*

Introduction

Indigenous knowledge has an important role in development of commercial products and sourcing of medical remedies. Wild date palm (*Phoenix sylvestris* Roxb), locally known as *Khajur* is one of the most common popular palms and a well-known source of sugar [1]. It grows in a wide belt from the desert areas of northern Africa, the Middle East and southern Asia especially Bangladesh and NEPZ of India providing food, ornament, material for shelter, fiber and fuel in a harsh environment [2]. Even it does not require sun to flourish as it has the great capability of thriving under shade [3]. Such versatility has given it an endurance to resist the negative influences which affect its economic development [4]. The palm family (Palmae, or more recently Arecaceae), with some 2200 species, is distributed throughout the tropics and subtropics [5]; representing an integral and important part of tropical forests [6]. All species belonging to the genus Phoenix grow vertically to form an un branched trunk driven by the activity of a single terminal shoot apex. To support such elevated vertical growth, the root system is highly developed and reaches deep for water resources. Date palm leaves are very developed and can reach several square meters in area. The leaves are erect, arranged in a spiral pattern on the trunk. Sheathing becomes denser at the top of the tree forming a crown with hundreds of leaves forming a terminal rosette. The leaves are pinnate with needle-sharp tips to defend the plant from grazing animals and reduce water loss.

In India, *Khajur* palm is produced as a homestead crop; however, it grows naturally or is cultivated in fallow lands, around homesteads, farmland boundary and even in the marginal lands along the roads, canals and river. Sap has been used from time immemorial to produce traditional *tari*. Because of the extensive use of its sap in making sugar, it is of considerable importance for household economy in Bihar, Orisha, and West Bengal where cultivation of the palm for tapping is an age-old practice. The palm can be tapped regularly and year after year for long time with a small amount of investment for maintenance [7]. *P. sylvestris* is only seasonal sap producing tree. Besides the use of fresh fruits for human consumption, a number of by-products derived from dates also have various uses. These include sap and fermented beverage. Dali bard enlisted 30 different palm species that are traditionally tapped in parts of tropical world. *P. sylvestris* along with all other domesticated palms provides a wide array of commercial products for human kind6 and is often the main subsistence resource for the poorest people [8]. By tapping a sound Khajur palm for sap one can earn substantial amount of cash money annually [9], which appears important where about 70% people are living in the villages and depend mainly on agriculture and tree-based products. To make it worthwhile, Johnson emphasizes on the documentation of indigenous knowledge because private growers are the source of a vast amount of valuable technical information on the *tari*

making process and medicinal uses of palms sap [6]. The present study was undertaken to explore the indigenous medicament and economic sustainability in a palm abundant region for marginal farmers.

Methodology

The present investigation was carried out during 2013-2015 at Indian Agricultural Research Institute Regional Station, Pusa, Samastipur (Bihar). Usually more than 5 years old palms are selected for tapping when woody stem attains a height of at least 2 feet. The instruments used for pruning and tapping observed in the study area were *hasuli* (a sharp iron made cutting device with larger and thinner blade), a chisel, bamboo made basket used for carrying the instruments, rope, leather strip (*paski*), bamboo made carrier, earthen jars (*katia/lavni*) etc. After 6 days of pruning the palm is scratched with the *hasuli* and chisel during which thin scraps from the upper portion of the trunk are removed. On the 7th day, a tapping channel is cut and a bamboo made spout of 4 inches is inserted on the freshly cut trunk, another end of which is poured into the earthen jar placed and fastened just below the spout. The scratching of the trunk is done in every 7^{th} day providing the palm a resting period of three to four days. After tapping, the palms were reported to produce sap in the successive 3 days, including the day of tapping. Generally, sap is collected from one side of the palm in one season and the successive season sap must be collected from the upper opposite side of the previous cut. This was evident from the zigzag appearance of the palm stems in the study area.

An alcoholic beverage (locally called *Tari*) was also observed to be made by the farmers. The basic technique of manufacturing *Tari* lies on fermentation. For preparing this wine the farmers were found not to wash the earthen pictures for 2/3 days after removing fresh sap from it which results in the formation of whitish lees at the bottom of the vessels. Mostly last precipitate of big fermentation earthen picture was used as starter for fast fermentation of sap. The 250ml of starter have been used for 45 liters of raw sap. Then the earthen picture is filled with screened sap and kept open for 24 hours. The cost and returns of sap to *tari* production was calculated by primary data collected from randomly selected ten shopkeepers during the study period and analyzed as per the standard procedures. Three hundred farmers (locally known as *Pashi*) and shopkeepers were interacted during the study round the year. The data were collected by using both interaction and participatory rural appraisal (PRA) techniques. The investigation included individual and group interviews with the respondent. PRA techniques namely, talk and semi-structured interviews were conducted with the selected farmers, *Pashi* and shopkeepers. The mission of identifying the indigenous practices was accomplished with the help of check list of questions put during the interaction and interviews. After locating the indigenous practices, a check list of 13 diseases/ disorders was prepared. The data was also congregated on various aspects such as method of preparation and medicinal use of the *Tari*. The per cent of each rank was thus converted into scores. Then, for each problem, the score of individual farmers/ shopkeepers were added and divided by the total number. The mean score for all the values were arranged in ascending order to obtain the rankings. To measure the degree of medicinal value as experienced by the farmers used for disease management, the respondents were asked to indicate on a major thirteen diseases continuum about the extent to which each disease was perceived as crucial factor.

Results and Discussions

The study shows that palms in the agricultural fields and other forest area produce almost equal amount of sap. Ten to fifteen years old palm produce the highest amount of sap (2.0 litre/palm/day), while the younger and older palms were producing the least amount (1.0-1.25 litre/palm/day) of sap. Tapping of the palms for sap production started from October and continued to March for approximately 180 days in the winter season. The jar is placed at the morning on the palm leaving for the whole day and night and the sap-filled jar is collected very early in the next morning. Fresh sap was collected in one drum and handover to shopkeepers for processing (Figure 1).

Figure 1: Harvesting of Tari from Khajur tree in the study area.
[A] Initial cut
[B] Pashi in tapping operation
[C] Collection of sap in jar
[D] Collection of Tari by Pashi in early morning and
[E] Given to shopkeepers.

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A three-layer formation is then found inside the earthen picture. The topmost layer is of foam which is carefully cast away, the mid-layer possesses clear liquid which is the *Tari*, and third one is the white layer of lees. The *Tari* from the second layer is then filtered out which is ready for drink and sale (Figure 2). Approximately 77.35% *Tari* was recovered from crude sap, which can be stored for at best one to two days. The shopkeepers/*pashi* claimed that manufacturing of *Tari* is the most profitable business. The average total cost (16575.30), total return (30528.00), net return (13952.70) and B: C ratio (1.83) was observed during the study (Table 1).

Figure 2 : Processing of Tari by local shopkeepers

Table 1: Economics of *tari* sellers in pusa block of bihar.

Name of Shopkeeper	Raw Sap (Litre/ Month)	*Tari* (Litre/ Month)	Total Cost (6.30/Litre)	Total Return (15/Litre)	Net Return (Rs.)	B:C Ratio (%)
Shivchander Mahto	3930	3048	24759.00	45720.00	20961.00	1.85
Amarjeet Chaudhury	2340	1965	14742.00	29475.00	14733.00	1.99
Aklu Mahto	4860	3738	30618.00	56070.00	25452.00	1.83
Dinesh Paswan	3780	2925	23814.00	43875.00	20061.00	1.84
Ganesh Mahto	1380	1059	8694.00	15885.00	7191.00	1.83
Ashok Chaudhury	1320	972	8316.00	14580.00	6264.00	1.75
Mahendra Chaudhury	1200	900	7560.00	13500.00	5940.00	1.79
Manoj Sahani	1350	987	8505.00	14805.00	6300.00	1.74
Shinandan Mahto	4050	3120	25515.00	46800.00	21285.00	1.83
Sandeep Chaudhury	2100	1638	13230.00	24570.00	11340.00	1.86
Average	2631.00	2035.20	16575.30	30528.00	13952.70	1.83

Khajur palm for sap can earn substantial amount of cash money annually [9]. Chowdhury et al. [7] also reported that wild date plam was important for socioeconomic up liftment of small and marginal farmers in Bangladesh.

Traditional knowledge regarding medicinal uses of fresh sap (sap) and *Tari* for management of several common diseases were quarried. The diseases managed or controlled by the sap and *tari* were ranked in the order of merit according to the opinion of the respondents as per the Garret Ranking Technique (GRT) and the results have been presented in Table 2. Among the management of several common diseases, respondents ranked anti-heat stroke activity (mean score 52.56%) at rank I followed by jaundice (mean score 41.38%) at rank II and eye flu (mean score 38.30%) at rank III. Other diseases/problems like, constipation (37.00%) ranked IV, stomach problems (36.30%) ranked V, urinary complaint (27.00%) ranked VI, weight gain (26.00%) ranked VII, leucorrhoea (12.15%) ranked VIII, *Mamrakha* in children (9.06%) ranked IX, recovery after pregnancy (8.26%) ranked X, power booster for bullocks (7.66%) ranked XI, relief in menstrual cycle (0.22%) ranked XII and let down of milk in women (0.03%) ranked XIII. Heat stroke, Jaundice, eye flu and stomach problem are the major problems of this region.

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Table 2: Relative importance of various disease management categories perceived by the respondents.

Uses	Frequency of Adopter Farmers	
	Score (%)	Rank
Eye flu	38.30[b]	III
Anti-heat stroke activity	52.56[a]	I
Jaundice	41.38[b]	II
Recovery after pregnancy	8.26[e]	X
Mamrakha	9.06[e]	IX
Stomach problems (Digestive)	36.30[b]	V
Urinary complaints	27.00[c]	VI
Sugar problem	00.03[g]	XIII
Weight gain	26.00[c]	VII
Leucorrhoea	12.15[d]	VIII
Constipation	37.00[b]	IV
Relief in menstrual cycle	00.22[g]	XII
Power booster for bullocks	7.66e[f]	XI

The fresh sap (500ml/day) of particular date palm tree was consumed by jaundice patients just after harvesting without eating anything in the early morning up to one week is very effective in jaundice. The 1-2 drops of fresh sap were used up to 3 days for overcoming the problem of eye flue (locally known as *lali*) is found effective. Sap was also beneficial to recovery of one local disease known as *Mamrakha* in children. In this disease, infection in head along with eye lids also increases. One dose each in the morning and evening of sap (1-2 tea spoons) for 4-5 days was useful for the treatment of this disease. But regular use of sap is also harmful for the body and cause gastric problem.

Fresh as well as fermented sap (250-300ml/day) was effective against leucorrhoea disease in human. Regular use of fermented sap (*Tari*) up to 10-15 days @500ml/day is effective against heat stroke, recovery in pregnancy, let down and production of milk in women, relief in menstrual cycle, weight gain, constipation, urinary complaints and stomach problems. This may be due to cooling effect of fermented sap and better digestion of food etc. The farmers of Bihar were used tari precipitate (200-250ml/day) for 4-5 days to recovery of weakness in bulls due to aging along with heavy field work. Sometimes, tari precipitate also given to calves for limited period along with dry fodder for improving palatability. Otherwise it becomes habit in young animals and they never prefer to eat dry fodder without gaad. This malpractice was adopted by farmers due to fetching better price of their animals in market. The sap was reported to be consumed fresh, or after being fermented, or even distilled into alcoholic beverage, or evaporated down to the viscous (*gaad*) and crude sugar (molasses) [7]. The concept of such products was also cited by Anonymous [10]. Consumption of wild date palm fresh sap and its resulting country liquor was also extensively seen at Bidyadharpur and Arakhapada tribal village ecosystems of Eastern Ghats of Orissa, India [11].

In the front of their hut/shops, the shopkeepers put two bottles on raised or painted circle indicating the availability of tari or not. Such type of indications plays important role especially for new consumers and local people. Generally, tari is not used by the consumers without any food supplements because it is injurious for health and may cause liver damage. Always consumers may prefer *tari* along with food supplements like fried black gram, egg curry or chicken etc., as per their choice (Figure 3).

Figure 3 : *Tari* in the hut used by the local persons with food supplements.

Conclusion

We observed that fresh and fermented sap of wild date palm is used for treatment of several diseases. The fresh sap of particular date palm tree was used for jaundice, eye flue, *Mamrakha* in children, while fermented sap was effective against leucorrhoea disease in human, heat stroke, recovery in pregnancy, let down and production of milk in women, relief in menstrual cycle, weight gain, constipation, urinary complaints, stomach problems and recovery of weakness in bulls. It is the one of the profitable business for the small and marginal poor farmers of NEPZ, India with 1.83 B:C ratio.

Conflict of interest statement

We declare that we have no conflict of interest.

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