

CHIURI: A REVIEW ON ITS MULTIPURPOSE USE IN NEPAL

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ABSTRACT

Diploknema is a medium to large sized deciduous tree, mostly found in the sub- Himalayan regions. Chepangs, a tribal community of Nepal, uses Chiuri in a multipurpose uses. It has high medicinal value and is used as a fruit and fodder for livestock. It's oil is widely used in cooking, for medicinal purposes, biofuel and as an edible oils. Chiuri by-products are widely used as manure and bio-pesticides, in agriculture fields. The tribal community uses cakes as a fish poison in River and rivulets. In recent days, the uses of Chiuri is limited to tribal people however its use can be expanded. The essential fats and oils present in this plant increases demand of Chiuri in detergent manufacturing industries. It is also used in manufacturing beverages, beauty products, bakery and confectionery. The flowers of Chiuri also have high value and used in making sweets and consumed as a vegetable. Future prospectus of Chiuri oil as a substitute to diesel should be focused as it has superior quality than that of diesel. Till date no importance is given to the Chiuri, thus for raising production modification policies are necessary to be launched by the government and non-government organization.

Keywords: Chepangs, Biofuel, Bio-pesticides, Oil expeller

INTRODUCTION

Diploknema butyraceae is a tree belonging to family Sapotaceae found from the altitude of 400m to 1400masl, commonly known as but-ter nut tree(Chiuri or Mahua locally). Chiuri is widespread in all over the country and is also found in India, Srilanka, Bangladesh. Chiuri is a medium sized to large sized deciduous tree of Nepal and its fame is increasing at recent years because of its multipurpose use. Out of 75 districts, Chiuri is found in 50 districts of Nepal and covers an mixed area of 1900 hectare in a forest. As per the social survey of FRA in chure zones, 7 nutritional and 6 medicinal uses including cosmetics was found (MSFC,2016). According to Edwards, about 10000 to 11000 tons of medicinal plants are produced in a year in which Chiuri houses a significant production .However the production scale of Chiuri is still low and mechanization in extraction of products is still lacking. The multipurpose use of Chiuri is obtained by the use of its various plant parts like seeds, flowers (sun dried), leaves, roots, stem

and barks. The exudation of stem and barks like latex, gums, resins and tannins are also used for medicinal purpose (Mishra,2005). Chiuri is found in cool and warm regions with a moderate rainfall.

CHIURI AND ITS POTENTIAL USE

Chiuri is common among the tribal communities in Nepal and India. In Nepal, Chepang community utilizes the forest products for various purposes like medicinal purpose, fruit, food, timber and use of chiuri is also high among the community people and are also known as Alasi sal (Rijal., 2011; Shakya., 2000). Chiuri is given as a dowry to the daughter in marriage by the Chepangs (Shakya, 2000). Chiuri is found mostly in the forests and its cultivation with the aim of orchard establishment is still not found. The plant population is maintained naturally. However, national parks and conservation area focuses on Chiuri plantation.

Chiuri is not familiar among all and its smell at the time of flowering is mostly not desired by all. However, its alternative products like beverages, cosmetics items, confectionary and bakery items has a high demand. Chiuri is also demanded by the detergent companies. The use of Chiuri in different sectors are soap companies-1,080 mt Monasteries and temples-120 mt Cosmetic companies-100 mt and Exports for cosmetics-240 mt (GIZ 2015; MSFC 2016). The price allocated per kg of Chiuri is Rs.25 for collectors as per GIZ,2013 but the price per kg changes as the firm changes from collectors to traders and whole-sellers. The price is also increased as the oils are extracted from seeds but still the low production and imperfect knowledge about the market status of product to the collectors and farmers, utility of Chiuri is not pretainably high. The main problem regarding the low production of Chiuri is failure of concerning bodies to focus on high production area and to extend the services and techniques for increasing the production. The production of Chiuri and it's products are as shown in figure: 1 (MSFC, 2016).

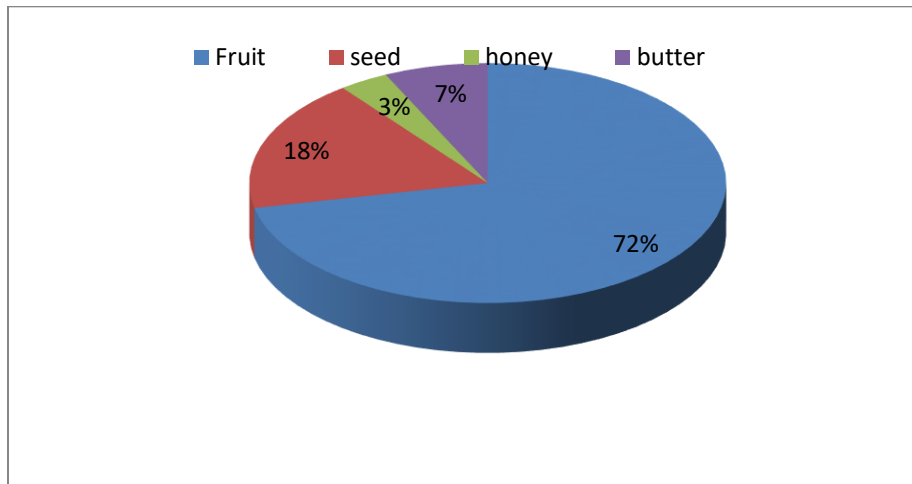


Figure 1: production of chiuri and chiuri products

BOTANICAL DESCRIPTION OF PLANT:

The Binomial system of classification for Chiuri or Butternut tree is shown in table : 1.

Table 1: BINOMIAL SYSTEM OF CLASSIFICATION

BINOMIAL SYSTEM OF CLASSIFICATION
Kingdom: Plantae
Subkingdom: Angiospermae
Order :Ericales
Family : Sapotaceae
Subfamily: Sapotoideae
Genus : <i>Diploknema</i>
Species: <i>butyraceae</i>

Binomial names: *Aesandra butyraceae (Roxb.)*, *Baehni*, *Bassia butyraceae Roxb.*, *Madhuca butyraceae (Roxb.) J.F. Macbr.*

LOCAL NAMES: English (Butter nut tree), Nepali (Chiuri, Cheura), Hindi (Mahuwa, Mouwa, Mauwa) (Patel et.al., 2012 ; Siddiqui et.al 2010)

Diploknema is a large sized deciduous plant mostly found in sub Himalayan regions of Nepal, India, Srilanka, Bangladesh. Leaves are elliptical in shape, thick and leathery, angular base, pointed tip, margin entire or wavy and leaves are 10 to 30cm long (Mishra and Padhan, 2013). Flowers are in bunches at tip of stem, white coloured, sweet scented and 2cm long. Corolla is tubular and freshly pale yellow and fleshy type (Variers and Vaidyarathanam, 1995). Stem is compact, hard and woody with a blackish brown coloured bark. Bark is about 2-3 cm thick and the diameter of trunk and stems varies greatly from 12m to 17m in height (Yadav et.al.,2012). Bark of stem is cracked and fissured which exudates latex, resins, gums and tannins. Fruit is orange brownish and highly juicy housing about 1-4 seeds. Fruits are about 2-4cm and seed are about 2-3cm long. Seeds of Chiuri are rich in edible fats, oils and other various organic and inorganic compounds (Awasthi, 1967).

USED FOR MEDICINAL PURPOSE

Chiuri belonging to the family Sapotaceae has a wide range of medicinal prospectus. Mostly, all the parts of plant have their significant importance on curing diseases. Seeds of Chiuri is rich in fats and oils and ghee extracted from it is known as Vanaspati ghee (Meena and Meena, 2016). Chiuri ghee is used on therapy, as an antipyretics, as an anti-inflammatory, analgesics, during headache, rheumatism (Mishra & Padhan, 2013). Leaf extracts are found to show the antibacterial and antifungal activity (Khathuriya and Singh, 2015). Leaf extract has shown best results on bacterial dysentery. Leaf extracts are also practiced over cushings disease and bronchitis (Yadav. et.al, 2012; Prajapati et.al, 2003),controls bleeding (Amirthalingam, 2000). Leaves are applied as cataplasm to alleviate pain; liss; to relieve eczema (Bhist et.al. 2018). Leaves extract shows cytotoxic effect on Ehrlich Ascites carcinoma cell lines (Saluja. et.al, 2011).

Flowers are collected by women and children as they fall off and sun dried (Sriwarkar, 2001). Flowers are mainly used as tonics, cough, increasing lactation (Mishra & Padhan, 2013). Flowers are also uses as nasal drops in head diseases (pitta diseases). Flowers are also used as refrigerant, stimulant, frequent urination, gastritis, liver protective (Seshagiri, Gaikwad, 2007; wealth of india, 2007).

Stem and barks are also found to have medicinal importance as antidote of snake, diabetes, itching and allergies (Seshagiri, Gaikwad, 2007), rheumatism, ulcer and tonsillitis (Prashanth et al 2010). The bark powder with ghee and honey is used to increase sex vigour and vitality (Meena and Meena, 2016) anti diabetic action is shown by flowers and bark extract of Chiuri (Mishra, 2015).

NUTRITIONAL VALUE:

The nutritional value of chiuri seeds and flower is presented in table: 2

Table 2: Nutritional Value Of Chiuri Flowers and Seeds

Constituents	Flowers(%)	constituents	Seeds(%)
Moisture	19.8	Refractive index	1.452-1.462
Protein	6.37	Saponification value	187-197
Fat	0.5	Iodine value	55-70
Total sugar	54.06	Unsaponifiable matter	1-3
Calcium	8.00	Palmitic C 16:0	24.3
Phosphorus	2.00	Stearic acid C 18:0	22.7
Ash	4.36	Oleic acid C 18:0	37.0
		Linolic acid C 18:2	14.3

Source: wealth of India, 2007

CHIURI FOODS AND PRODUCTS:

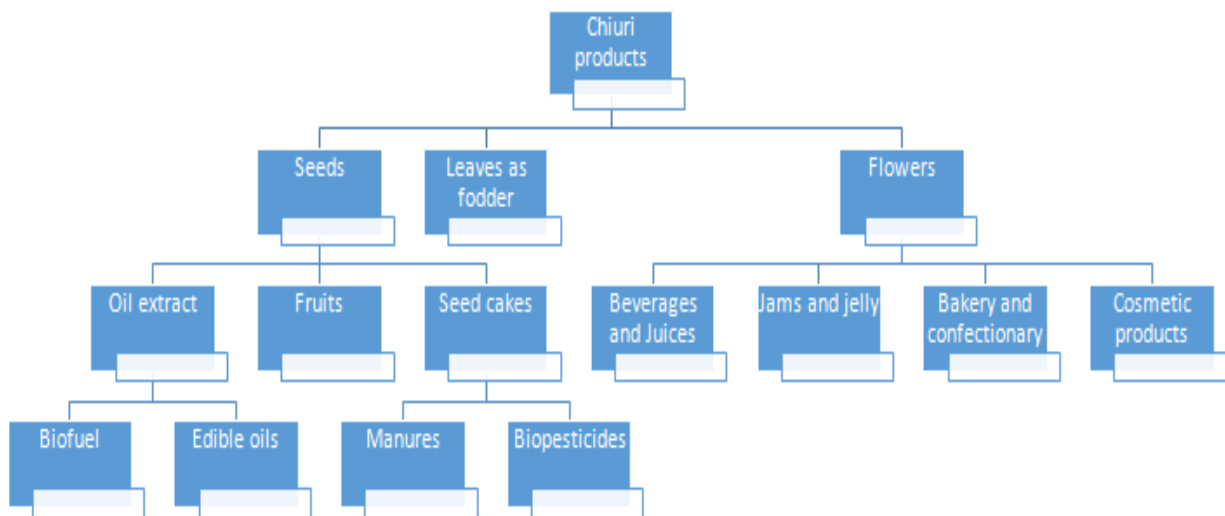


Figure 2: Chiuri products at a glance (Wealth of India, 1962; Wealth of India,2008)

SEEDS EDIBLE OILS:

Kernels of Chiuri is rich in fats and oils, contains about 40% of semi- solid fat (Bhist et.al.,2018) known as Phulmeri ghee. Chiuri ghee is used for cooking purpose as a substitute to oilseed crops as it has characteristic aroma. In Nepal, Chiuri products are widely used by the tribal communities Chepang (Shakya. 2000). Chiuri is also widely used as a fruit which is tender, juicy and has a pleasing flavor.

SEED CAKES:

Seed cakes are the by- product after the extraction of oils which is used as a manure found to show a pesticidal action in rice, pulses and other crops. It is also used as molluscicide, wormicide, nematocid and rodenticide in banana plantations (Narsimhan and Mariappan, 1998). Chiuri seed cakes substitutes the chemical pesticides as a crude fish poison (Das et.al., 2018), detoxification in poultry farming. Detoxified seed cake rich in protein is used as a protein supplement in a diet (Singh and Singh, 1991).

SEEDOIL AS A BIOFUEL:

Biofuel is extracted from Chiuri seed by trans-esterification process which is used as biodiesel a Mahua oil methyl ester (Meena and Meena, 2016). Biodiesel is found superior to diesel. The comparison properties of biodiesel and diesel is presented in table: 3 (Puhan et.al.,2005).

Table 3: Comparison of biodiesel and diesel

Properties	Bio-diesel	Diesel
Density (150C), kg/m	872	835
Kinematic Viscosity,400C, mm ² /s	4.0	2.4
Flash point °C	204	70
Fire point °C	230	76
Cloud point °C	6	-10 to -15
Pour point °C	1	-35 to -15
Acid value mg of KOH per gm oil	0.5	
Calorific value (MJ/kg)	41	43
Saponification value	130	

Color	Slight greenish yellow	Light brown
Cetane number	50	47
Aniline point, °C	63	69
Iodine value	60	
Diesel index	145	150

Source: Meena and Meena, 2016; S godiganur et.al.,2009

USES OF FLOWERS:

Flower of Chiuri is sweet in taste and hence used in distillary fermentation and sugar syrup fermentation. Tribals in Nepal and India process flower as a vegetable and salads . Chiuri flowers are used in preparation of confectionary items and bakery products. Dried flowers are used in preparation of fermentation products like sugar syrup, alcohol, brandy, acetone, ethanol, lactic acid (Swain, et.al. 2007; Boverton and Redwood, 1919). Sauces and puree are also prepared from flowers of Chiuri. Jams and biscuits are also prepared from sundried mass of flowers. Chiuri pickles are found to be sweet and tasty in nature. By-products of fermentation and distillation are given as feed to cattle (Hasan K et.al., 1928). Beauty products like face wash, cream, powder and lotions are manufactured from flower extracts. Chiuri has an ornamental value as an avenue tree in landscaping (Sarojini and Padhan.,2013).

LEAVES AND STEM:

Leaves of Chiuri is used as a fodder for livestock and the residue of leaves are used as manure. Stems of Chiuri are used as a source of timber and as alternative source of fuel.

OIL EXTRACTION PROCESS:

The details of oil extraction process is as shown in figure 3: steps in oil extraction process (GIZ, 2013).

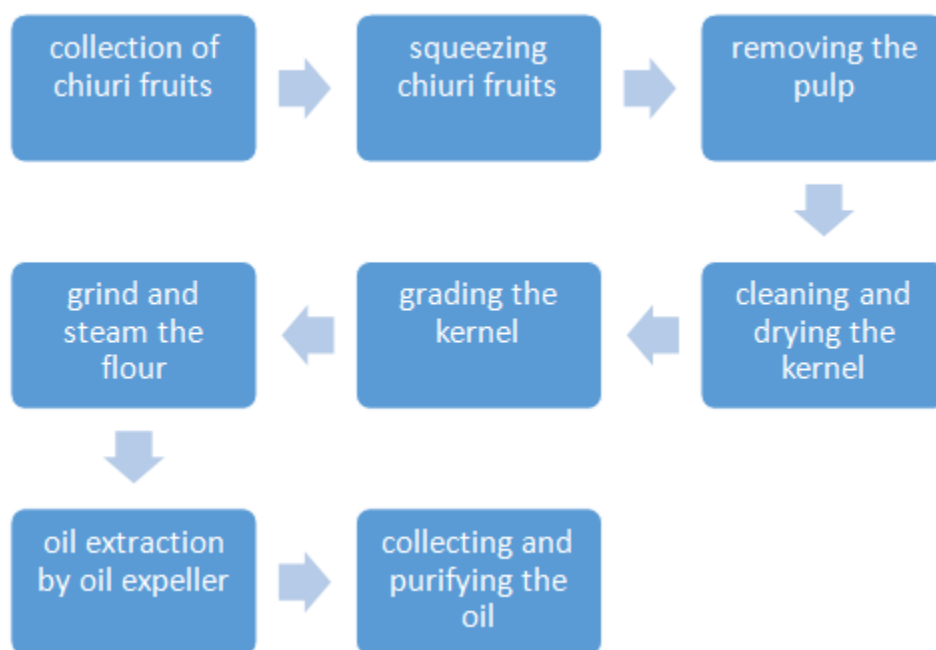


Figure 4: steps in oil extraction

CONCLUSION

Chiuri is a plant with diverse use belonging to the family Sapotaceae. Most of the plant parts have a high medicinal values. Seeds, flowers, leaves, roots, stem, bark , heartwood, latex, resins, tannins ,gums extracts are used by the herbal industry for manufacturing medicinal products and equal emphasis is given on beauty products. The edible oils have high nutritional value and characteristic aroma but it is not common in use. Use of Chiuri oil is limited among Chepangs and the people of sub-Himalayan regions of Western Nepal. The use is restricted to medicinal purposes in most part of the eastern Nepal. Its major medicinal uses are in cancer, fistula, fever, sprains. The demand of Chiuri kernel is high in soap and detergent manufacturing industry, bakery and cosmetics. The main problem regarding the market of Chiuri is its discriminated price policy. No fair policy had been developed for collectors and farmers for selling seeds and flowers. The consumption of Chiuri is mostly limited to household purpose only which also makes difficulty for valuation and marketing. The low productivity and also the use of traditional oil extractor is one of the main constraints for the difficulty in increasing the market value of Chiuri. Thus, the growers should be encouraged around the country in Chiuri production and subsidies and efficient trainings helps to cope up with the problem. They should be made aware with the use of Chiuri plant. Its importance in agriculture is significantly high as they are used as a manure and natural bio-pesticides which can be used as a substitute for chemical pesticides.

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DATA AVAILIABILITY STATEMENT:

All the data referenced in the literature were collected from secondary sources and are freely available for use online. We include those as supplementary material with this article. Complete listing of sources we obtained data from follows:

S.N.	DATA	SOURCES
1	Production of Chiuri and Chiuri product	Www.rrn.org.np
2	Nutritional value of Chiuri	Kureel et.al.,2009 ; wealth of India
3	Comparison of bio-diesel and diesel quality	(Meena and Meena, 2016 ; S godiganur et.al.,2009
4	Prices of chiuri seeds and oils	www.arunashukla.com/fate-chiuri-nepal/

SUPPLEMENTARY MATERIAL:

Supplementary data:

Production of Chiuri and Chiuri products:

COMMODITY	PRODUCTION IN TONS (mt.)
FRUIT	91980
SEEDS	22996
BUTTER	9049
HONEY	4331

SOURCE: MSFC, 2016 ;Www.rrn.org.np

Nutritional value of chiuri:

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