

## **HODGSONIA MACROCARPA—A NON-CONVENTIONAL EDIBLE FAT AND PROTEIN SOURCE**

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*Among large number of cucurbits found in North-East India, the roasted seed kernels of Hodgsonia macrocarpa (Bl.) Cogn. has been a valuable source of fat (62.71 per cent) and protein (31.21 per cent) to the tribals. The quality of oil in respect of saturated and unsaturated fatty acids is comparable to the palm oil. The identification of staminate and pistillate plants at seedling stage in order to establish populations in the right proportion is the major obstacle in its commercialisation. Further research efforts on this cucurbit would be required.*

*Hodgsonia macrocarpa* (Bl.) Cogn. syn. *H. heteroclita* Hook f. & Thomas, is a semi-woody cucurbitaceous perennial dioecious climber growing upto 25-30 m. It is believed to have its origin in North East India, China (Western Yunan), and Malaysia (Hu, 1964; Zaven and Zhukovsky, 1975). It grows widely upto 1500 m. altitude in hills of Meghalaya, Mizoram, Sikkim, Nagaland, North-Cachar Hills (Assam), Manipur etc. Its various vernacular names are Kadam seed (English), Thibe (Garo), Soh-mynthar (Khasi), Khaum (Mizo), Kat'hin-pot (Sikkim), Kathai (Manipuri), The bou-lata (Assamese), Til lau (Bengali) etc.. The climber is much branched and spreads on lofty trees. It bears leathery, 3-5 deeply lobed leaves 15-20 cm in diameter on 5 to 10 cm long petioles. The plant begins to flower in February-March and continues throughout the summer. The fruits ripen in autumn and winter (November-December). The staminate flowers borne on axillary racemes and the pistillate usually solitary appear on separate plants. The fruit is pomiform, 6-20 cm long and 20 to 25 cm in diameter, globose, reddish-brown (on maturity) and 12-grooved covered with reddish or grey hairs. The outer rind of fruits is thin but hard containing inedible spongy and juicy pulp embedded with 4-6 ellipsoid flattish seeds (5-8 cm x 2-4 cm) covered with woody wrappings (2-3 layers). The inside kernel of seed is slightly bitter, but is eaten after roasting or baking.

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The til lau (*Hodgsonia sp.*) kernels are eaten after roasting and in some areas oil is extracted for food and for burning in light lamps while leaves and young stems have been used as medicine for nose complaints and for relief of fever (Hu, 1964). Besides North-east India, it is widely grown/cultivated in hills of Upper Burma (Myanmar), Bangladesh, Vietnam, Java, Sumatra and Thailand.

### MATERIALS AND METHODS

The ripe fruits of *Hodgsonia macrocarpa* were collected from Mizoram, Nagaland and Meghalaya in the year 1990-91. The seed kernels were taken out and supplied to the Biochemistry Unit at NBPGR, New Delhi and at IARI, New Delhi for chemical analysis and determination of fatty oil composition. The oil content was estimated by NMR and protein by Kjeltex Auto 1030 Analyser. The fatty acid composition was determined by HPLC method. The related information on cultivation and local use were also collected from tribal farmers. The seeds were grown at Barapani Farm (Meghalaya). However, all the plants turned out to be male, hence no fruits were produced.

### RESULTS AND DISCUSSION

The results of chemical analysis revealed that the seeds contained 49.27 per cent kernel which showed the following per cent nutrient composition, viz., water, 2.48; fat, 62.71; protein, 31.25; fibre, 2.41 and Ash 1.15. Further analysis of fatty acid composition in the oil revealed palmitic acid (17.28%), stearic acid (9.36%), oleic acid (21.76%), linoleic acid (33.90%), hexadecenoic acid (7.25%), arachidic acid (6.86%) and myristic acid (3.56%). The results of fatty acid composition and oil content of present investigation are not in agreement with earlier reports (Arora and Hardas, 1976; Anon. 1959). This may be due to different source of material or the methodology of analysis. Hu (1964) compiled results of various reports indicating oil range from 57.4 to 80 per cent; specific gravity (at 15°C) 0.9164 — 0.998; saponification value 198.9-203.9; and iodine value from 63.6 — 107.3. The light yellow coloured oil had a melting point at 25°C. Comparison of fatty acid composition of some dietary fats (Vles and Gottenbos, 1989) with that of til lau show that its fatty acids are next to coconut and almost similar to palm oil (Table 1). Though the ratio of saturated and unsaturated acids is comparatively high, a desirable character of deep frying oils (Lapedes, 1977), and it also contains a good amount (56 %) of unsaturated fatty acids—linoleic and oleic. The high amount of linoleic acid (33.9 %) is useful as it is considered to be essential in human diets. It is also a precursor of

arachadonic acid being essential for normal growth and maintenance of skin (Lapedes, 1977).

**Table 1. Comparison of fatty acid composition (%) of some important dietary fats with *Hodgsonia macrocarpa***

Source (oil)	Saturated  A	Unsaturated				Total B(B <sub>1</sub> +B <sub>2</sub> +B <sub>3</sub> )	A/B
		Mono unsaturated B <sub>1</sub>	Poly-unsaturated		Others B <sub>3</sub>		
			Linoleic Acid B <sub>2</sub>				
Coconut	90	8	2	0	10	9.00	
Palm	50	39	10	1	50	1.00	
Olive	17	73	10	0	83	0.20	
Groundnut	18	52	30	0	82	0.22	
Maize	15	30	55	0	85	0.18	
Soybean	16	24	53	7	84	0.19	
Sunflower	12	21	67	0	88	0.14	
Safflower	10	15	75	0	90	0.11	
<i>Hodgsonia</i>	56	10	34	0	44	1.27	
Rape seed	6	67	17	10	94	0.06	

Nowhere in the North-east region, til lau is cultivated on commercial basis. A few plants of *Hodgsonia* are planted by farmers around their dwellings. These are usually grown from seeds in places where minimum temperature does not fall below freezing. However, survival rate of 50 per cent from cuttings and 90 per cent through layering has been obtained by chinese botanists (Hu, 1964). It was reported that a single plant is able to produce 40 to 100 fruits which can yield upto 10 kg of oil and at this rate it was found that 15 plants of til lau can produce the amount of oil equivalent to that obtained from the produce of rapeseed on one hectare area. In spite of above, it could not become a commercial oilseed crop because of the difficulties involved in the early identification and establishment of staminate and pistillate plants in the right proportion. Systematic and vigorous research programmes are required for exploitation of this cucurbit.

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