ABSTRACT
Jharkhand a land of forests and tribals with flora and fauna is in itself an interesting subject to be studied extensively. Recent revival of interest in documenting medicinal plants used by tribal is a centre of focus for different government institutions, NGOs and Science and Technology Department of Jharkhand- state Govt. Most of the ethnic people here are dependent on forest for their livelihood. The Mundas, Oraons, Santhals, Kharias, Birhors, Paharias and Asurs constitute the prominent ethnic groups of Jharkhand. The BPL (Below poverty line) people of those communities work hard and the source of their good health is the leafy vegetables, corms and rhizomes from wild sources which supplement their mineral and vitamin requirement and also as substitute of medicine in general health problems. The present survey of the wild tubers/rhizomes of Jharkhand has been done with an objective to know particularly those wild edible tubers/rhizomes which are used as vegetable or spices and medicine by the folk in this region.

Keywords: Wild Tubers; Vegetables; Spices; Medicine; Ethnic People; Jharkhand

INTRODUCTION
The local tribe in Jharkhand inhibits far flung interiors of forest infested land and is out of the reach of medicinal facility. But Nature has provided them the substitutes in medical emergency. They use herbs and edible tubers/rhizomes as vegetables and spices in health problems and also apply them as paste in problems of different part of body.
Again the preliminary investigation has suggested that many edible tubers and roots are somewhat alike in morphology and grows besides each other however some of them are poisonous. For example tuber of young Butea monosperma (Palsh) is edible but it resembles with that of Gloriosa superba which is deadly poisonous and much causality have been reported due to consumption of the tuber of Gloriosa in place of Butea in confusion. So, the objective of this paper is also to educate target population about the identification and proper use of the edible tubers and how to differentiate them with poisonous ones, by organizing and installing stalls for display of these in ‘Kisan melas’ or other way out..

MATERIALS AND METHODS
Both intensive and extensive ethno botanical survey have been carried out during the Year 2013-2015 in remote tribal dominated villages and village haats (markets) of different areas of Jharkhand viz. Dumka tin bazar, Sikaripara and Masanjore in Dumka district. In Ranchi districts the markets include Norhi, Rargaon and Salgadih in Tamark Block; Taimara, Nailagara and Bundu in Bundu Block. The survey included Runtukel, Lili and Kote in Murhu block of Khunti district also. The information collected and recorded is related to those wild tubers/rhizomes being used as vegetables and spices. The information was collected by interviews, observations and participation with the ethnic respondents. Identification of these plants specimens were done with Haines (1921-25), Ghosh (1971), Singh et al., (2001), Sarma and Sarkar (2002), and also by matching the herbaria at NBRI (LWG), Lucknow.

Enumeration
Abelmoschus crinitus Wallich [Malvaceae]
Local Name: Ban bhindi
Voucher specimen: SK 2114
Uses: Fresh root is eaten raw by local tribes.
Asparagus racemosus Wild. [Liliaceae]
Local Name: Goge Tarang  
Voucher specimen: SK 2115  
Uses: Boiled root is used as tonic while the raw roots are used in making Rice beer. It is useful to check dysentery, gastric complain and urine problems.

*Bombax ceiba* L. [Bombacaceae]  
Local Name: Semar  
Voucher specimen: SK 2118  
Uses: Root of young plant is eaten raw and also as tonic in case of weakness after boiling.

*Butea monosperma* (Lam.) Taub [Fabaceae]  
Local Name: Palas  
Voucher specimen: SK 2119  
Uses: Root of young plant is sweet and often sucked by tribals in forest.

*Curcuma angustifolia* Roxb. [Zingiberaceae]  
Local Name: Ban haldi  
Voucher specimen: SK 2120  
Uses: Rhizome are used as paste over swelling and also as spices.

*Curcuma caesia* Roxb. [Zingiberaceae]  
Local Name: Neelkanth  
Voucher specimen: SK 2128  
Uses: Used by Mundas to cure snake bites. Also used to give flavour to rice beer. Its decoction is used in treatment of pneumonia and cough in child.

*Dioscorea bulbifera* L. [Dioscoreaceae]  
Local Name: Piska sanga  
Voucher specimen: SK 2125  
Uses: Yam is used as vegetable and also sold in the village market. It is also applied as paste in the treatment of gout and joint pain.

*Dioscorea esculenta* (Lour.) Burkill [Dioscoreaceae]  
Local Name: Suthni sanga  
Voucher specimen: SK 2124  
Uses: Boiled tubers are edible. It is popularly used as offerings to the Sun god during 'Chhath festival' and sold costly prior to this festival in markets.

*Dioscorea glabra* Roxb. [Dioscoreaceae]  
Local Name: Byang sanga  
Voucher specimen: SK 2129  
Uses: The erect tuberous root is sold costly in the village markets as vegetable.

*Dioscorea hispida* Dennst. [Dioscoreaceae]  
Local Name: Kulu sanga  
Voucher specimen: SK 2130  
Uses: The fresh tubers are sweet but cause vomiting. They are eaten only after having been steeped in water for 36 hours.

*Dioscorea pentaphylla* L. [Dioscoreaceae]  
Local Name: Hasear sanga  
Voucher specimen: SK 2131  
Uses: Boiled tubers are edible.

*Hemidesmus indicus* (L.) R.Br. [Asclepiadaceae]  
Local Name: Anant mool / Chhoti dudhi  
Voucher specimen: SK 2132  
Uses: Root is used to provide a different flavor to tea by housewives. Local area and also gives a flavor to rice beer. Decoction of root is anti inflammatory, diuretic, prevents miscarriage and improves fertility.

*Plesmonium margaritiferum* (Roxb.) Schott. [Araceae]
Research Article

Local Name: Ban ole
Voucher specimen: SK 2134
Uses: The tubers are eaten but have to be boiled several times with lime juice or tamarind. Well grounded tuber are rubbed to reduce swelling.

*Pueraria tuberosa* (Roxb. ex Wild) DC (Fabaceae)

Local Name: Patal kumhra
Voucher specimen: SK 2127
Uses: The Yam is eaten raw. The crust yam is rubbed on the body in fever and rheumatism.

*Sauromatum venosum* (Aiton) Kunth [Araceae]

Local Name: Lapra
Voucher specimen: SK 2126
Uses: The Yam is used by the Mundas as flavour giving spice. Paste of tuber is used against protuberance.

*Schoenoplectus grossus* (L.f) Palla [Cyperaceae]

Local Name: Kesor / Khesari
Voucher specimen: SK 2135
Uses: The bulblets are considered delicate food among tribes.

*Vigna vexillata* (L.) A. Rich var vexillata [Fabaceae]

Local Name: Ban mung
Voucher specimen: SK 2136
Uses: The tubers are eaten raw or boiled by tribals. Paste and decoction is applied in case of arthritis and joint disorders. Decoction is effective in checking internal bleeding.

*Zingiber purpureum* Roscoe [Zingiberaceae]

Local Name: Ban ada
Voucher specimen: SK 2138
Uses: The rhizome is used as flavor spice. Mundas make use of it against cough, intestinal disorder and rheumatism. Paste of rhizome is applied in case of joint pain and decoction is used to check diarrhea, flatulence and constipation.

*Zingiber zerumbet* (L.) Roscoe ex. Sm [Zingiberaceae]

Local Name: Harmu sing
Voucher specimen: SK 2140
Uses: Rhizome is used as spice. The paste of root is used to cure wounds by Mundas. It is also used to relieve stomachache. Softened rhizome is pressed into the hollow teeth as long as needed to check toothache. The grounded rhizome is taken with water to check stomachache.

RESULTS AND DISCUSSION

Discussion

The survey and documentation reveals that only eight tubers/rhizomes of the above nineteen listed are found being sold in the village markets. While going through literatures it has been observed that the various authors have reported varied properties of medicinal value of these tubers/rhizomes. Misra and Misra (2014) reported that boiled root of *Abelmoschus crinitus* is used as vegetable in Odisha. The root powder is used by Valmiki Tribes of Muchingibutta Mandal of Vishakhapatnam district of Andhra Pradesh to increase memory power (Padal & Devender, 2012). Meena and Rao (2010) have found that in Rajasthan Meena community use *Asparagus racemosus* to increase lactation, check diabetes, muscle pain, muscular disorders, leucorrhea and to increase fertility. Root bark of *Bombax ceiba* is used in leucorrhoea and urinary problems in Rajasthan and Chattisgarh (Chaudhary and Khadabadi, 2012). Patil et al., (2006) have reported that root pieces of *Butea monosperma* are eaten and the juice extracted from the root. This root is used as remedy against impotency in Maharashtra. Rhizome of *Curcuma angustifolia* is boiled and used as vegetable in South Odisha (Misra and Misra, 2014). Root and rhizome of *Curcuma caesia* is used in piles, leprosy, asthma and in rheumatic arthritis as paste (Das et al., 2013). Yam of
Dioscorea bulbifera is boiled and used as vegetable in Odisha (Misra and Misra, 2014). Dioscorea bulbifera is used by tribal ladies of Rajasthan as contra receptive (Choudhary et al., 2008).
Figure 9: *Curcuma angustifolia* Roxb.

Figure 10: Root of *Curcuma angustifolia* Roxb.

Figure 11: *Curcuma caesia* Roxb.

Figure 12: Root of *Curcuma caesia* Roxb.

Figure 13: *Dioscorea bulbifera* L.

Figure 14: Root of *Dioscorea bulbifera* L.

Figure 15: *Dioscorea esculenta* (Lour.) Burkill

Figure 16: Root of *Dioscorea esculenta* (Lour.) Burkill

Plate 2

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Figure 17: *Dioscorea glabra* Roxb.

Figure 18: Root of *Dioscorea glabra* Roxb.

Figure 19: *Dioscorea hispida* Dennst.

Figure 20: Root of *Dioscorea hispida* Dennst.

Figure 21: *Dioscorea pentaphylla* L.

Figure 22: Root of *Dioscorea pentaphylla* L.

Figure 23: *Hemidesmus indicus* (L.) R.Br.

Figure 24: Root of *Hemidesmus indicus* (L.) R.Br.

Plate 3
Figure 25: Plesmonium margaritiferum (Roxb.) Schott.

Figure 26: Corm of Plesmonium margaritiferum (Roxb.) Schott.

Figure 27: Pueraria tuberosa (Roxb. ex Wild) DC

Figure 28: Tuberous root of Pueraria tuberosa (Roxb. ex Wild) DC

Figure 29: Sauromatum venosum (Aiton) Kunth

Figure 30: Corm of Sauromatum venosum (Aiton) Kunth

Figure 31: Schoenoplectus grossus (L.f) Palla

Figure 32: Root of Schoenoplectus grossus (L.f) Palla

Plate 4
Dioscorea esculenta is boiled and taken to increase body weight by tribals of Assam (Dutta, 2015). Dioscorea glabra is used as fresh snacks in south Odisha (Misra and Misra, 2014). In Meghalaya the yam of Dioscorea glabra is boiled and used as vegetable (Sheikh et al., 2013). Root of Dioscorea hispida called ‘Ubi gadong’ by Temuan tribe of Malaysia and is used to decrease the glucose level in blood (Hanum and Hamzah, 1999). Root of Dioscorea pentaphylla is used as medicine related to digestive tract and respiration in Malaysia (Nashriyah et al., 2011). Pragada et al., (2012) reported that Hemidesmus indicus root is used by tribes of North Andhra Pradesh to check dysentery in form of decoction. Kumar and Goel (2008) also reported previously about the use root of Hemidesmus indicus as flavoring agent of tea in Jharkhand.
Research Article

Sen and Behera (2008) observed that Root paste of *Plesmonium margaritiferum* mixed with *Piper nigrum* is taken twice daily to cure dysentery by the tribals of Bargarh district in Orrissa. Kapale (2012) reported from Amarkantak area of Madhya Pradesh that Baiga tribes there eat *Paeraria tuberosa* tuber to cure abdominal disorder. Chaudhary et al., (2008) observed during their study in Rajasthan that tuber of *Sauromatum venosum* have anti-tumor property. Banik et al., (2014) reported that *Schoenoplectus grossus* is edible and used for medicinal purposes in Chhattisgarh. Adhikari et al., have reported from Dehradun that root and whole plant is used in the treatment of Rheumatism, ulcer, cholera, weakness. Sirirugsa (1999) found that in Thailand the rhizome of *Zinziber purpurium* is used to treat fevers and intestinal disorder. Various lotions and decoctions applied to swellings, rheumatism, bruise, numb feet, and painful parts while the rhizome of *Zinziber zerumbet* is used to relieve stomachache, macerated in alcohol is regarded as tonic, stimulant and depurative. It is also used as the spice ginger. Saikia et al., (2010) also confirmed that rhizome of *Zinziber purpurium* called as ‘Bara-ud’ by Bodo tribes in Assam is used for cure of stomachache and indigestion. The present investigation indicated how poor people of this area have developed an alternative source of vegetables and spices to be used particularly in the times of scarcity of vegetables. In this way the ethnic community would be having more choices of vegetables and spices with medicinal properties before them.

Conclusion

Thus the information documented above about the ethno medicinal properties that nature has bestowed on these wild roots/rhizome are of much use for these local people and need to be disseminated among more people around.

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