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RESEARCH ARTICLE

HERBAL REMEDIAL PRACTICES FOR VIRAL DISEASES AMONG INDIGENOUS PEOPLE OF TINSUKIA DISTRICT OF UPPER ASSAM (INDIA)

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Abstract

Among infectious diseases, particularly viral infections sometimes become epidemic leading cause of death of man and animals. To prevent, cure and treatment of commonly occurring viral infections, indigenous rural population of Tinsukia district rely on traditional medicinal practitioners who have not only the knowledge of plants but also have the knowledge of disease diagnosis based on symptoms. They have been using phytoconstituents of the plant parts like leaves, roots, stem, barks, fruits, flowers, seeds, and animal products as medicines traditionally for the treatment of various viral diseases. In this study an attempt has been made to assess the traditional practices for common viral diseases of human and domestic animals among indigenous communities of Tinsukia district of Upper Assam. Forty different species of plants procured from the district identified which have been using traditionally as herbal medicine to treat eleven viral diseases of human and domestic animals. Further study in this field will uncover the traditional knowledge of herbal remedies for viral infections.

Introduction:-

Traditional herbal practices have been in use globally among all the ethnic communities since time immemorial. Primitive people were initially developed these herbal remedies through trial-and-error method and the information have been mainly passed verbally from generation to generation (Puspangadan, et al., 1984). The present world is getting the benefit of modern health care facilities. But it is mainly confined in urban and semi- urban areas. So, the people from rural and under developed areas still prefer traditional herbal medication as best alternative to cope with human and animal diseases. These medicines are considered to be safe, effective and inexpensive, for which there is a global trend for the revival of traditional herbal medicine. Screening of medicinal herbs used by different ethnic communities has now become a potential source for isolation of bioactive compound (Buragohain, 2011). Hence, World Health Organization (WHO) has shown great interest in documenting the use of medicinal plants from tribes in different parts of the world (Dev, 1997). Several researches on traditional herbal medicines of different communities have been conducted in Assam. Very few studies on plants based folk medicines such as Kalita & Deb (2004), Buragohain (2008), Dutta, et al. (2008), Das, et al. (2009), Barpujari & Dutta (2015), Borah (2017), etc., are from Tinsukia district. But, to the best knowledge of the authors, no significant work on traditional herbal practices in viral diseases has been carried out in Tinsukia district till date. Human health is directly or indirectly related with

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the health status of domestic animals. That's why the main objective of the present study was to document the traditional herbal remedies of common viral diseases among human and domestic animals in Tinsukia district.

Tinsukia district is located between 95°22' to 95°38'E longitude and 27°23' to 27°48'N latitude; elevation ranges from 143 to 124 meter. Total geographical area of the district is about 3790 sq.km. Total population is about 13, 16,948 (Census, 2011). The district is bounded from north by Dhemaji District and Arunachal Pradesh, from south and east by Arunachal Pradesh and west by Dibrugarh district. Tinsukia district has four revenue circles (i.e., Tinsukia circle, Doomdoma circle, Sadiya Circle & Margherita circle) which are divided into three subdivisions; viz, Tinsukia, Sadiya and Margherita. The soil of the study area is mainly alluvial. The district is characterized by humid subtropical climate with summer, winter and monsoon forming the seasonal cycle. The maximum average temperature of about 35^0C and minimum of about 13^0C with average annual relative humidity of the district is about 75%. The vegetation of the district comprises grassland, swamp growth with an admixture of deciduous, semi evergreen and evergreen forests. (Das, et al., 2018). The major ethnic inhabitants in the district are Moran, Motok, Sonowal-Kasari, Ahum, Chutia, Singphoo, Deori, Mising, Tea Tribes, etc. Most of the villages inhabited by ethnic communities are situated in the remote areas of the district.

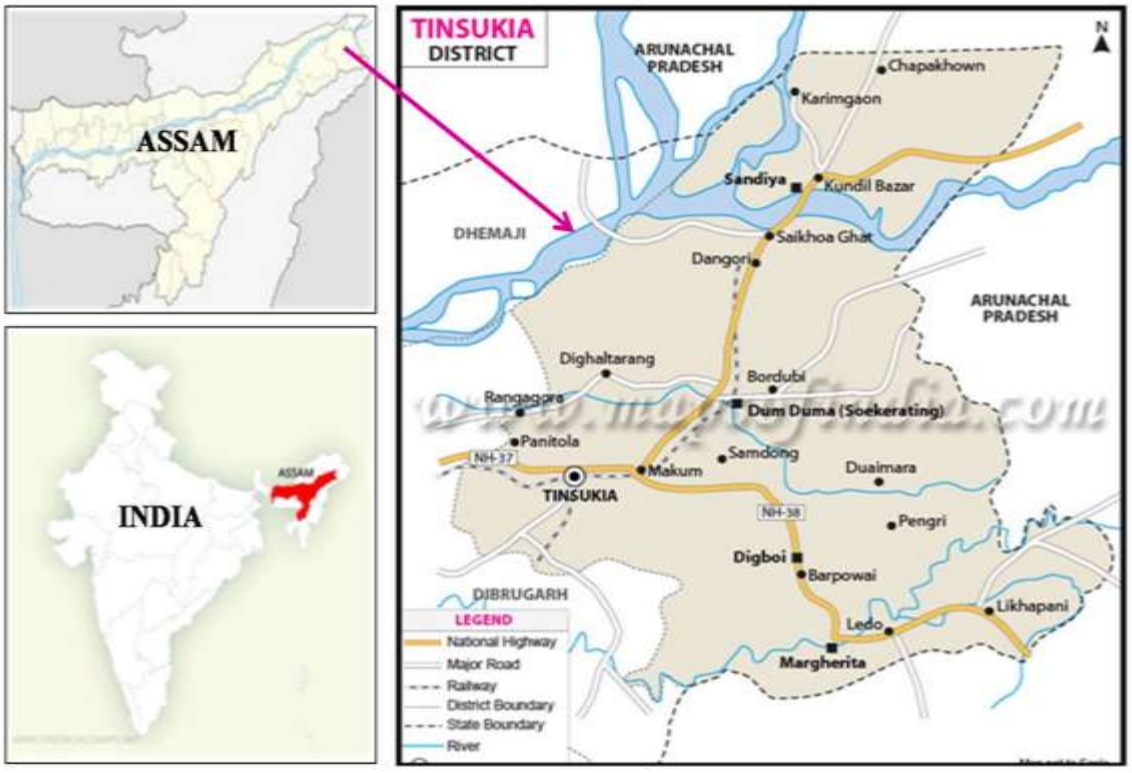

Fig. 1: Map of the Study Area (Not to Scale)

Methodology:-

Random field trips were conducted during the period March, 2021 to February, 2022 in various parts of Tinsukia district. The study was carried out in the areas, where the population distribution of different ethnic communities is dense. Information was gathered from the local herbal practitioners, and the elderly men and women of the respective communities through interview with semi structured questionnaire and discussion. With their collaboration medicinal plants were collected and preserved in herbarium. The information was also gathered from some village markets, where some medicinal plants were sold. Repeated cross verification of data from the informants located in different places was made during the field works. Only the specific and reliable information were incorporated in the present study. The collected plant species were identified with the help of standard literatures (Kanjilal et. al. 1935 – 1940, Chopra 1958 & Hooker 1872 - 1897). Botanical names of the plants were cross checked in International Plant Name Index (IPNI) database. A list of diseases and medicinal plant uses was complied. The number of plants used against each disease was estimated.

Result and Discussion:-

In this study 39 plant species belonging to 28 families are recorded which have been used in the treatment of 10 commonly occurring viral diseases in Tinsukia district (Table- 1). Out of 39 plant species 25 species are dicotyledons and 14 species are monocotyledons. Herb is the dominant category of the medicinal plants revealed during our study. The most cited families are Euphorbeaceae, Zingiberaceae and Liliaceae. In maximum medicines aerial parts of the plant body like leaf, bark, twig, flower, fruits, seeds, etc. are used; but in some cases whole plant is used. Underground plant parts such as bulb, rhizomes, roots, etc. are also used in some preparations. Leaf is the most widely used plant part (Fig. 2). Most common mood of administration the medicine is 'oral application'. From the data presented in Table-1, we observe that remedies can be divided into three classes: those that use a single plant, two plants and three plants. There are 26 medicines prepared from single plant species; 12 medicines are prepared by combining two plants and 3 medicines are prepared by combining three plants. The remedies, which involve the use of single plant, could be of special interest for the development of effective drugs.

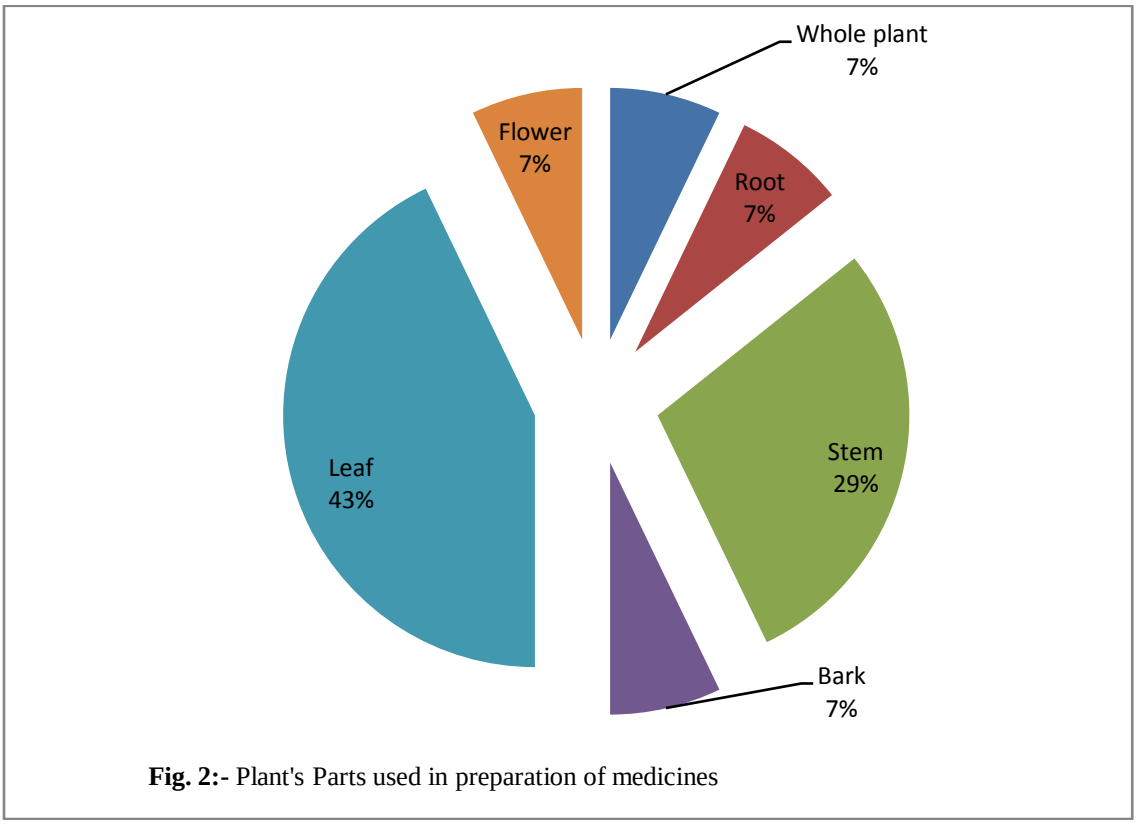

Fig. 2:- Plant's Parts used in preparation of medicines

In addition to pure herbal preparations, in some cases, the drugs are administered with the animal products such as honey, cow milk, curd, etc. Sugar, jaggery, sugar candy, palm candy, etc. are also used in some preparations. Most probably, these supplement ingredients may enhance the effectiveness of the herbal preparations or it makes the preparation palatable to the patient. But, the exact role of these materials in curing the diseases is not clearly understood. It is also found that bird's feathers (particularly duck's feather) are used in some medicines for their topical application. Probably, feather is helping in smooth and uniform spreading of the medicines over the infected portion of the patient body. The herbal practitioners usually collect the medicinal plants from wild when there is a need. A very few are preserved in their homestead gardens. They normally prefer to keep those plants in their natural habitat. Some of the medicinal plant species were observed to sell in village markets, which were also collected from wild. Total number of medicinal plants identified against the viral diseases is expressed graphically in Fig. 3.

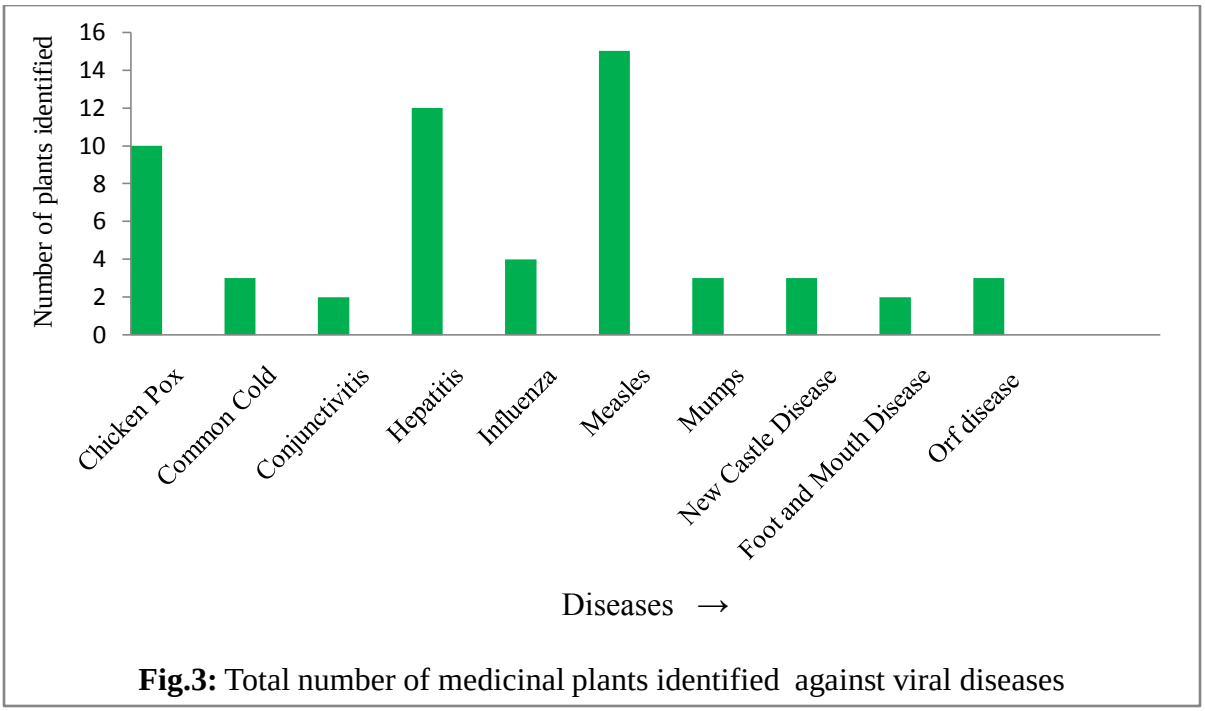

Fig.3: Total number of medicinal plants identified against viral diseases

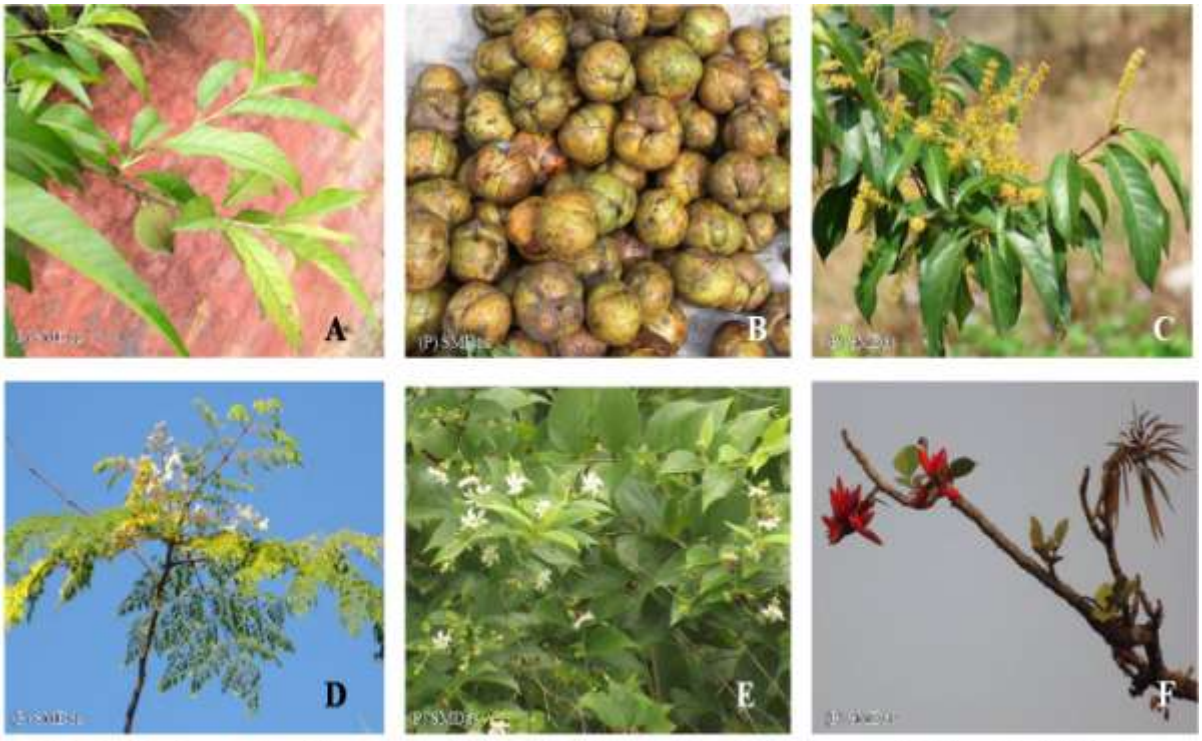

Fig.3:- Photographs of some medicinal plants used in viral diseases in Tinsukia district.
A= *Prunus persica* ; B=*Dillenia indica* ; C=*Terminalia chebula* ; D=*Moringa oleifera* ;
E= *Nyctanthes arbortristis* ; F=*Erythrina stricta*

Table 1:- Herbal remedial practices for viral diseases among indigenous people of Tinsukia district of upper Assam

Sl. No.	Diseases	Local Name	Scientific Name of Plants with Family	Vernacular Name	Part Use	Preparation & Administration	
						For Prevention	For Cure
1(a)	Chicken pox	Haru Ai	*Azadirachta indica* A. Juss. (Meliaceae)	Maha Neem	Leaves	Leaves are kept under the mattress of bed.	i. One fresh leaf is soaked in half glass of water for whole night; that water is administered orally twice a day until cure. ii. Decoction of leaves mixed with normal clean water and take bath. iii. Fresh leaves are used to rub on itching.
1(b)	Chicken pox	Haru Ai	*Dillenia indica* L. (Dilleniaceae)	Owtenga	Sepals	Sepals are kept under the mattress of bed.	
1(c)	Chicken pox	Haru Ai	*Moringa oleifera* Lam. (Moringaceae)	Sajina	Young leaves	Young leaves are used as vegetable during spring season.	
1(d)	Chicken Pox	Haru Ai	*Trigonella foenum – graecum* L. (Papilionaceae)	Methi Guti	Seeds		Two teaspoons of clean dry seeds soaked in a glass of water for whole night and the water is administered orally early in the morning at empty stomach (It helps to express the pox symptoms distinctly).
1(e)	Chicken pox	Haru Ai	*Ocimum sanctum* L.	Tulsi	Leaf		Leaf extract is

			(Lamiaceae)				applied over the skin to remove the spots.
1(f)	Chicken pox	Haru Ai	i. *Cinnamomum camphora* (L.) J.Presl. (Lauraceae) ii. *Cocos nucifera* L. (Arecaceae)	i. Karpur ii. Narikol	Leaves & Barks Seed		A paste of powdered camphor (little amount) and coconut oil is applied externally with the help birds feather over the infected regions.
1(g)	Chicken pox	Haru Ai	i. *Phyllanthus emblica* L. (Euphorbeaceae) ii. *Curcuma longa* L. (Zingiberaceae)	i. Amlakhi ii. Halodhi	Fruit Rhizome		Two teaspoons of *P. emblica* fruit juice mixed with equal amount of *C. longa* rhizome extract and administered orally once daily for 5 to 7 days.
1(h)	Chicken pox	Haru Ai	*Nyctanthes arbortristis* L. (Oleaceae)	Sewali Phool	Flower		One tea spoon dry flower powder mixed with equal amount of honey and administered orally once daily for 7 days.
2(a)	Common Cold	Pani-loga Jar	i. *Allium sativum* L. (Liliaceae) ii. *Brassica campestris* L. (Fabaceae)	i. Naharu ii. Hariyah	Bulb Seed		Three clove of *A. sativum* are fried in little amount mustered (*B. campestris*) oil and the warm mixture is used to massage the body. The mixture is also applied as drops in the nostrils to clear nasal congestion.
2(b)	Common Cold	Pani-loga Jar	*Nyctanthes arbortristis* L. (Oleaceae)	Sewali Phool	Leaf		Two teaspoons of leaf extract mixed with

							one teaspoon of honey and administered orally twice daily for 3 to 5 days.
3(a)	Conjunctivitis	Chakuutha	*Ricinus communis* L. (Euphorbeaceae)	Era Goss	Leaf		Juice is squished out from young leaves after heating and applied 2 drops on the infected eye twice in a day until cure.
3(b)	Conjunctivitis	Chakuutha	*Heliotropium indicum* L. (Boraginaceae)	Hatihuria	Leaf		One drop of young leaf extract is applied in the infected eye once in a day until cure.
4(a)	Hepatitis	Kamala Rug	*Asparagus racemosus* Willd. (Liliaceae)	Satamul	Root		Extracted juice of three roots is mixed with a cup of cow milk; administered orally in the morning at empty stomach for 5 to7 days.
4(b)	Hepatitis	Kamala Rug	*Saccharum officinarum* L. (Poaceae)	Pura Kunhiar	Stem		About 1 feet long stem is roosted at night and the extracted juice of roosted stem is administered orally early in the morning at empty stomach. The process is continued for 7 days.
4(c)	Hepatitis	Kamala Rug	*Averrhoa caramboa* L. (Oxalidaceae)	Kardoi	Fruit		Ripen fruit allow to eat thrice in a day until cure.
4(d)	Hepatitis	Kamala Rug	*Alpinia allughas* Rose.	Tara Gos	Rhizom		Rhizome extract of about

			(Zingiberaceae)				three teaspoon is administered orally early in the morning at empty stomach for 3 days.
4(e)	Hepatitis	Kamala Rug	i. *Hydrocotyle sibthorpioides* Lam. (Apiaceae) ii. *Centella asiatica* (L.)Urb (Apiaceae)	i. Haru Manimuni ii. Bar Manimuni	Whole plant Whole plant		½ cup of extract of both the plants is mixed with little amount of sugar candy and administer orally at empty stomach early in the morning; alternately for three days.
4(f)	Hepatitis	Kamala Rug	*Phyllanthus niruri* L. (Euphorbeaceae)	Bhui Amlokhi	Twig		Three teaspoons twig extract mixed with curd (of cow milk) and administered orally in empty stomach, early in the morning for 7 days.
4(g)	Hepatitis	Kamala Rug	*Costus speciosus* (J.Koenig) Sm. (Costaceae)	Jam Lakhuti	Stem		½ cup of stem extract is mixed with one marble size piece of palm candy and administered orally early in the morning at empty stomach for 5 days.
4(h)	Hepatitis	Kamala Rug	*Justicia adhatoda* L. (Acanthaceae)	Boga Bahek	Leaf		Two teaspoons of leaf extract mixed with ½ teaspoon sugar and administered orally twice daily for 3 days.
4(i)	Hepatitis	Kamala Rug	*Ananas comosus* (L.)Merr. (Bromaliaceae)	Anarash	Fruit		Ripen fruit is eaten with sugar candy until cure.
4(j)	Hepatitis	Kamala Rug	*Carica papaya* L. (Caricaceae)	Amita	Fruit		Young fruit is boiled and eaten with little table salt.

4(k)	Hepatitis	Kamala Rug	*Erythrina stricta* Roxb. (Papilionaceae)	Madar	Bark		A piece of palm sized bark half ground ; then soaked it in a glass of water for whole night. The water is administered orally in the morning at empty stomach for 3 days.
5(a)	Influenza		i. *Piper betle* L. (Piperaceae) ii. *Zingiber officinale* Rosc. (Zingiberaceae)	i. Pan ii. Ada	Leaf Rhizome		Two teaspoons of leaf extract of *P. betle* and two teaspoons of rhizome extract of *Z .officinale* mixed with equal amount of honey and administered orally twice daily for 5 days.
5(b)	Influenza		i. *Allium sativum* L. (Liliaceae) ii. *Brassica campestris* L. (Fabaceae)	i. Naharu ii. Hariyah	Bulb Seed		Three clove of *A. sativum* are fried in little amount mustered (*B. campestris*) oil and the warm mixture is used to massage the body. The mixture is also applied as drops in the nostrils to clear nasal congestion.
6(a)	Measles	Maju Ai	*Azadirachta indica* A. Juss. (Meliaceae)	Maha Neem	Leaf	Fresh leaves are kept under the mattress of the bed.	i. Decoction of leaves mixed with normal clean warm water and take bath. ii. Fresh leaves are used to rub on itching. iii. Roosted

							leaves are allowed to eat.
6(b)	Measles	Maju Ai	*Dillenia indica* L. (Dilleniaceae)	Owtenga	Sepals	Dry sepals are kept under the mattress of bed.	
6(c)	Measles	Maju Ai	*Moringa oleifera* Lam. (Moringaceae)	Sajina	Young leaves	Young leaves are used as vegetable during spring season.	
6(d)	Measles	Maju Ai	*Areca catechu* L. (Arecaceae)	Tamul	Fruit		Little amount of dry fruit powder thoroughly mixed with half glass of water & filtered with a clean cloth. Filtrate is administered orally, 5 times daily for three days to get express the pimples quickly and get relief from the pain.
6(e)	Measles	Maju Ai	i. *Mormordica charantia* L. (Cucurbitaceae) ii. *Curcuma longa* L. (Zingiberaceae)	i. Tita Kerela ii. Halodhi	Leaf Rhizome		One tea spoon of *M. charantia* leaf juice warmed and mixed with pinch of *C. longa* powder and administered orally 2 to 3 times daily to get express the pimples and remove the spots on the skin.
6(f)	Measles	Maju Ai	i. *Azadirachta indica* A. Juss. (Meliaceae) i. *Curcuma longa* L.	i. Maha Neem ii. Halodhi	Leaf Rhizome		Fresh leaves of *A. indica* and rhizome of *C. longa* are ground to make paste

			(Zingiberaceae)				and apply externally over the pimples.
6(g)	Measles	Maju Ai	i. *Solanum torvum* Schltdl. (Solanaceae) ii. *Piper nigrum* L. (Piperaceae)	i. Hati Vekuri ii. Jaluk	Root Seed	Three seeds of *P. nigrum* are ground to fine powder and mixed with two tea spoon root juice of *S. torvum*; administered orally once daily.	
6(h)	Measles	Maju Ai	*Terminalia chebula* Retz. (Combretaceae)	Shilikha	seed	Two tea spoon fruit juice administered orally once daily	
6(i)	Measles	Maju Ai	i. *Cinnamomum camphora* (L.) J.Presl. (Lauraceae) ii.*Cocos nucifera*L. (Arecaceae)	i. Karpur ii.Narikol	Leaf & Bark Seed		Little amount of camphor is mixed with about 30 ml *C. nucifera* oil and applied externally over the infected regions with bird's feather.
6(j)	Measles	Maju Ai	i. *Tamarindus indic* L. (Caesalpiniaceae) ii. *Curcuma longa* L. (Zingiberaceae)	iii. Teteli iv. Halodhi	Leaf Rhizome		One teaspoon leaf juice if *T. indica* and one teaspoon of *C. longa* rhizome juice mixed with half cup of lukewarm water; administered orally once daily for three days.
7(a)	Mumps	Pitha Khowa	*Oryza sativa* L. (Poaceae)	Dhan	Grain		Rice flour pastes is prepared by mixing with water; then heated and apply the warm paste externally twice daily over the

							infected region for 3 to 5 days.
7(b)	Mumps	Pitha Khowa	*Azadirachta indica*A. Juss. (Meliaceae)	Maha Neem	Leaf		Roosted leaves are allowed to eat.
7(c)	Mumps	Pitha Khowa	i. *Musa acuminata* Colla (Musaceae) ii. *Oryza sativa* L. (Poaceae)	i. Cheni Kol ii. Dhan	Fruit Grain		On the fifth day, patient is allowed to eat a meal containing ripen banana of *M. acuminata*, rice flour, fresh cow milk and sugar.

[A] Viral diseases in Human
[B]**Viral diseases in Animals**

Conclusion:-

The paper is the outcome of a field work conducted in various places of Tinsukia district and reflects the folk medicine used by the rural ethnic communities for the treatment of various viral diseases. Needless to say that the information provided in the paper is limited and there is always a scope to initiate more information through intensive study. The information documented in the present study can be extended for future scientific investigation to discover and formulate more safer and effective drugs against viral diseases of human and domestic animals.

Sl. No.	Diseases	Local Name	Scientific Name of Plants with Family	Vernacular Name	Part Use	Preparation & Administration
1	New Castle Disease	Ranikhet	i. *Azadirachta indica* A. Juss. (Meliaceae) ii. *Phyllanthus niruri* L. (Euphorbeaceae) iii. *Alliam cepa*L. (Liliaceae)	i. Maha Neem ii. Bhui Amlokhi iii. Pinaj	Leaf Shoot Bulb	Leaves of *A. indica*, shoots of *P. niruri*and bulb of *A. cepa* are ground together to make a paste; Then the paste is mixed with little amount of jaggery and administered orally, 1/3 teaspoon, 3 times daily per bird until cure.
2	Foot and Mouth Disease	Chabaka	i. *Prunus persica* (L.) Batsch (Rosaceae) ii. *Curcuma longa* L. (Zingiberaceae) *iii. Alliam sativum*L. (Liliaceae)	i. Ahom Bagori ii. Halodhi iii. Naharu	Leaf Rhizome Bulb	Two bulbs of *A. sativum* are ground and mixed with about 1 liter water. The ulcers of foot washed with that water and paste of *P. persica* leaves is applied twice daily for 12- 15 days in the ulcerated areas. Honey is applied in the mouth 3 times daily until cure and the paste of *C. longa* is also administered in the ulcerated areas.
3	Orf disease in Goats		i. *Azadirachta indica* A. Juss. (Meliaceae) ii. *Curcuma longa* L. (Zingiberaceae) iii. *Citrus aurantiifolia* (Christen)Swing (Rutaceae)	i. Maha Neem ii. Halodhi iii. Gul Nemu	Leaf Rhizome Fruit	Three leaves of *A. indica* and a piece of *C. longa* rhizome are ground together; then one teaspoon juice of *C. aurantiifolia* and a pinch of table salt is added and mixed thoroughly. The paste is applied over the wound in lips, gums and ears twice daily after cleaning with warm water thoroughly.

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