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RESEARCH ARTICLE

TRADITIONAL KNOWLEDGE OF THERAPEUTIC USES OF ANIMAL RESOURCE AMONG INDIGENOUS TRIBAL COMMUNITIES IN WAYANAD DISTRICT, KERALA STATE, INDIA.

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Abstract

Ethnozoology is a hybrid discipline that integrates both the natural and social science that examines the historical, sociological, anthropological, economical and environmental aspects of the relationships between humans and animals. The present study was intended to seek animal based resources with medicinal uses in the traditional healing system among the indigenous tribal communities in Wayanad District, Kerala State, India. Field survey was carried out from November 2016 to March 2017 by personal interviews through semi-structured questionnaires with tribal elders, healers and tribal families. The study recorded a total of 29 different species which are used for the treatment of 51 different ailments. Chordata occupied the highest uses (76%), followed by Arthropoda (10.3%), Mollusca (6.8%) and Annelida (6.8%). Among Chordata, Mammals occupied a highest number of animals (44.8%), followed by Aves (10.3%), Reptiles (10.3%), Fish (6.8%), and Amphibians (3.4%). The findings showed that the traditional knowledge of animal derived medicines followed by tribal communities in Wayanad play an important role in their primary health care. The documentation of this indigenous traditional knowledge on ethnobiology will be helpful in the formulation of strategies for sustainable management and conservation of bio-resources as well as providing potential for the novel drug discovery.

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Introduction:-

India has vast faunal, floral, more over cultural diversity with many indigenous communities who are basically dependent on the traditional knowledge and traditional medicine for their health care. Ethnobiology describes how people of a particular culture and region make use of indigenous plants and animals (Padmanabhan, 2007). The science of ethnozoology is a sub-field of anthropology concerned with how human beings perceive, manage, classify and use animal species (Solavan *et al.*, 2004). It also focuses on the ways in which animals influence the people they interact with and how man utilized animals for food, clothing, work, worship and companionship (Solavan *et al.*, 2004). Zootherapy is a component of ethnozoology where the medicinal use of animals and animal derived products are studied. The healing of human ailments by using therapeutics based on medicines obtained from animals or ultimately derived from them is known as zootherapy (Holennavar, 2015). According to the zootherapeutic universality hypothesis, all human civilizations with a structured medical system will utilize animals as medicines (Marques, 1994). Animal based medicines have always played a significant role in the healing practices, magic rituals and religions of indigenous and western societies all over the world (Rosner, 1992). Of the 252 essential

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chemicals selected by the World Health Organization (WHO), 11% come from plants and 9% from animals (Marques, 1997). About 15 to 20% of the Ayurvedic medicine in India is based on animal derived substances such as cheese, milk, meat, eggs, chicken, sea shell and animal parts. (Unnikrishnan, 1998; Yirga *et al.*, 2011).

Chemicals from nature have been a part of human civilization ever since our early ancestors began exploiting natural compounds to improve and enrich their own lives (Agosta, 1996). Animal based medicines have been elaborated from the parts of the animal body, from products of its metabolism (corporal secretions and excrements) or from non-animal materials (nests and cocoons) (Costa-Neto, 2005). The investigation of traditional medicine has proven a valuable tool in the developing art of bio-prospecting for pharmaceutical compounds (Costa-Neto, 2005). The traditional knowledge about medicines among indigenous communities all over the world has played an important role in discovering biological resources worthy of commercial utilization and also to conserve them.

According to Majumdar, “a tribe is a collection of families or common group bearing a common name, the members of which occupy the same territory, speak the same language and observe certain taboos, regarding marriage, professions and have developed a well assured system of reciprocity and mutuality of obligations” (Mehta, 2006). The tribe is a social group with definite territory, common name, common district, common culture, behavior of an endogamous group, common taboos, and existence of distinctive social and political system, full faith in leaders and self-sufficiency in their distinct economy (Vidyarthi, 1981; Jayakumar and Palaniyammal, 2016). Tribals are mostly the forest dwellers who have gathered prolific knowledge of forest resources over centuries. India possesses a total of 427 tribal communities (Kala, 2005). Tribal peoples have managed, protected, nurtured and shaped their land for generations. They, more than anyone, have the best knowledge about the agriculture, resource management and biodiversity in their land. The tribals who depend on plants and animals for their day-to-day life and health problems are the real custodians of the knowledge of medicinally important plants and animals (Solavan *et al.*, 2004). Most of the knowledge gathered by the tribals over several generations about medicinal plants and animals are not yet revealed to the outside world.

The loss of traditional knowledge represents the irreversible loss of information about different ways to manage natural resources. Most of the biodiversity associated with tribals have either disappeared or are on the verge of extinction (Vedavathy, 2002). Therefore, our immediate concern is to document the indigenous knowledge related to therapeutic use of animal species and to devise strategies to preserve and tap this rich knowledge in a more sustainable way for the benefit of mankind (Solavan *et al.*, 2004).

Ethnozoological exploration and documentation among the ethnic groups are the need of present era, where chances of cultural mixing up and adoption of modern technologies in all fields of life are happening. Due to the rapid globalization, it is evident that the erosion rate of knowledge base among the tribal people is also high and chances for getting the knowledge documented for the welfare of entire humanity is of at most importance (Padmanabhan, 2007). Hence there is an urgent need to study about their zootherapeutic methods before it erodes due to the impact of modernization.

Study Area

Study areas are located in Wayand district, Kerala State (Fig. 1). According to census of India 2001, Wayanad has the highest number of tribals (1, 36,062). Wayanad is a place with large number of ethnic society who lives in the vicinity of forests and have enormous knowledge of ethnozoological therapeutic methods. The State of Kerala is situated between 8° 18' and 12° 48' N latitude and 74° 52' and 77° 22' E longitude. It is located in the southernmost corner of India bordered by Arabian Sea in the west, Indian Ocean in south, Tamil Nadu in the east and Karnataka in the north. The state is 38,864 km² in extent spread over 14 districts and is just 1.8 per cent in size of the entire Indian subcontinent. Ethnozoological studies were carried out in three Panchayats namely Mullankolli, Panamaram and Ambalavayal in Wayanad District in Kerala State shown in Fig. 1.

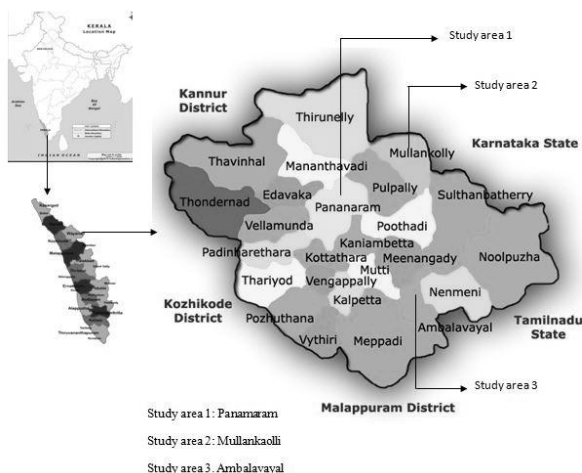


Figure 1:- Wayanad district panchayats

Methodology:-

A field study was carried out in the study area from November 2016 to March 2017. While visiting their colonies, information about tribals living style, traditional dressing style and their culture were collected by direct observation. Both statistical and question based survey was conducted in 5 houses belonging to each tribal community. The information was collected using a structured questionnaire. Questionnaire was consisted of questions related to their family details, animals utilized by them, purpose of use of those animals, their local name etc. A qualitative semi-structured interview was conducted during field work. To take interview judgmental selection was used to identify tribal members who are aware about the animal medicine, identification, preparation and usage. Door to door visit was carried out to identify the key respondent and asked about the ailments for which the animal derived remedies were used and the manner in which the medicines were prepared and administered. Before each interview, permission was taken from the tribals to record the conversations and to take photographs. The length of each interview lasted for approximately two hours. The age of the tribals interviewed ranged between 20 and 85 years. The tribals had a belief that the efficacy of the medicine will be lost if it is revealed to outsiders. Some tribal elders hesitated to reveal the procedure of medicine preparation. Data collected from Non Governmental Organisations working for tribal developments were also used as a support. Most of the species are very common and were identified using standard zoological references available. Rare and threatened species are also identified and recommendations for the sustainable utilization of animal resources are suggested.

Ethnos

As per the Scheduled Castes and Scheduled Tribes Orders (Amendment) Act, 2002(Act 10 of 2003) vide Part-VII Kerala-Second Schedule notified in the Gazette of India, dated 8th January, 2003, the Government of Kerala has enlisted 36 Adivasi communities in the state as Scheduled Tribes. There are 9 tribal communities in Wayanad District namely Paniyars, Kurichiar, Mullukkurumar, Kattunayikkans or Thenkurumars, Wayanad Kadars, Adiyar, Kunduvadiyar, Kanalaadikal, Uraly and Thachanadans. Three tribal communities are selected for the study namely 'Paniyas', 'Kurichiar', and 'Uraly'. The etymological meaning of the term 'Paniyars' indicates that they earn their livelihood from labour as the term 'Pani' in Malayalam means 'labour' (P. Somashekar Nair, Paniyarude, Gothrangal). Thus the word 'Paniya' literally means 'labourer' or 'worker'. Paniyas are the largest scheduled tribes of Kerala. The majority of the Paniya tribal population (71.95%) is found in Wayanad District alone. They are mainly settled in Wayanad. Some of them are settled in Malappuram, Kozhikode and Palakkad districts. The word 'Uraly' means the ruler of a village. Uraly enjoy the right of cultivating the forest land. They are nomadic agriculturists. They are mainly found in Sulthan Bathery and Mananthavady blocks in Wayanad, with concentrations in Tirunelly, Panamaram, Poothadi, Noolpuzha, Mullankolli, Kaniyampetta, Ambalavayal and Nenmeni. Kurichiya (Kurichiyar) also called as Hill Brahmins (Malai Brahmins) are a group of matrilineal tribe of Kerala. Since this class of people was skilled in archery Kottayam Raja named them as 'Kurichian' which is derived from combination of two words kuri (target) and chiyar (people). They are experts in hunting. They are the first agricultural tribe to have settled in the Wayanad district. They are mainly distributed in Wayanad and Kannur districts of Kerala, India.

Ethnozoological Analysis

The study recorded a total of 29 species of animals which were used to treat 51 different human ailments. Table 1 summarizes the classification, disease or purpose of use, part(s) used, preparation of medicine and mode of application. These 29 species of animals belonged to both vertebrates (22 species) and invertebrates (7 species). Chordata occupied the highest uses (76%), followed by arthropoda (10.3%), mollusca (6.8%) and 313tilize (6.8%) (Fig.2). among Chordata, mammals occupied a highest number of animals (44.8%), followed by aves (10.3%), reptiles (10.3%), pisces (6.8%) and amphibians (3.4%) (Fig.3). Highest zootherapeutic animals to be used are mammals as most of them are domesticated animals.

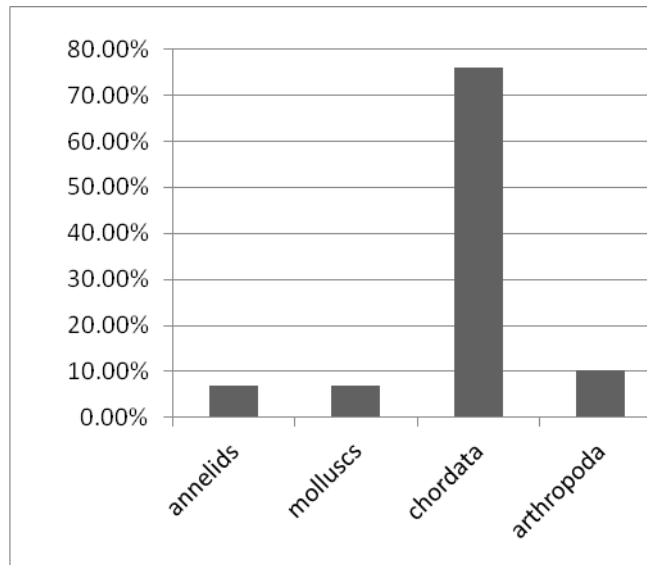


Figure 2:- Percentage of animal categories being used in zootherapeutic practices by the traditional healers among tribal communities in Wayanad district.

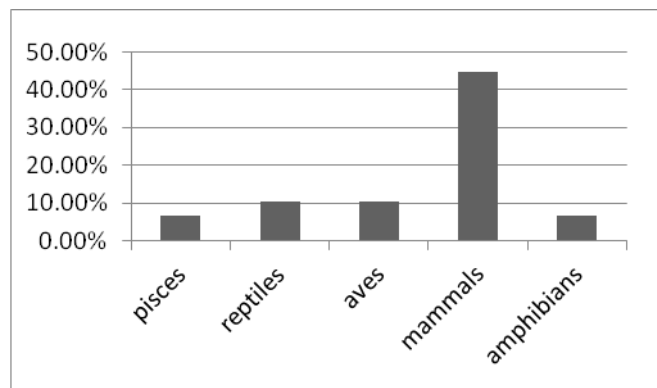


Figure 3:- Percentage of animal categories among Chordata being used in zootherapeutic practices by the traditional healers among tribal communities in Wayanad district.

Some of the traditional medicine were administrated orally and some through dermal application. Majority of the remedy preparation had different additive substances such as plant leaves, root etc. Different parts and products of animals were used for remedy preparations including teeth, intestine, milk, blood, gland, urine, hair and excreta. The medicinal animals have various methods of preparation for different types of ailments like crushing, powdering, squeezing, direct use and cooking. Asthma, piles, allergy, cough were some of the important diseases in the study area (Table 1).

Table 1:- Therapeutic uses of animal resource by the indigenous tribal communities in Wayanad District, Kerala

SL.No.	Classification	Common name	Disease treated/Purpose	Part(s) used	Medicine preparation	Mode of application
1.	Kingdom: Animalia Phylum: Chordata Class: Reptiles Order: Testudines Family: Testudinidae Genus: Intestudo	Tortoise	Burn/scald, crack heels, swollen throat	Plastron	Plastron is powdered and made into a fine paste by adding oil.	Applied over skin
2.	Kingdom: Animalia Phylum: Chordata Class: Reptilia Order: Squamata Genus: Python Species: <i>bivittatus</i>	Python	Arthritis	Body fat	Fat is converted to oil	Oil is applied over the skin
3.	Kingdom: Animalia Phylum: Chordata Class: Mammalia Order: Carnivora Family: Viverridae Genus: Paradoxurus	Civet	Asthma	Flesh/Skin	Flesh/skin is cooked	Oral administration
			Unhealthy body	Civet musk	Civet musk is fried and pepper powder is added.	Oral administration
4.	Kingdom: Animalia Phylum: Chordata Class: Reptilia Order: Squamata Family: Varanidae Genus: Varanus	Varanus	Tissue damage	Flesh	Flesh is cooked	Oral administration
			For body flexibility	fat	Body fat is extracted from its body	Applied all over the body
			For energetic body	Fresh tongue	Fresh tongue is cut off from is body	Oral administration
5.	Kingdom: Animalia Phylum: Annelida Class: Clitellata Order: Hirudinida Family: Hirudinidae Genus: Hirudo Species: <i>medicinalis</i>	Leech	Abscess	alive leech	leech is collected and kept alive	Live leech is made to bite on abscess and suck blood
6.	Kingdom: Animalia Phylum: Annelida Class: Oligochaeta Order: Haplotaxida Family: Megascolecidae Genus: Pheretima	Earthworm	Asthma	body	Fresh earthworm are collected directly from soil and made into juice	Oral administration
			Piles	Earthworm	Earthworm is fried and powdered along with rice	Oral administration
			Saggy stomach of kids	Earthworm	Bunch of earthworm bound in cloth and	Oral administration

					then boiled in water. This water is taken and used to boil rice. This rice is used as medicine.		
7.	Kingdom: Animalia Phylum: Chordata Class: Mammalia Order: Artiodactyla Family: Suidae Genus: Sus	Boar	Crack heel, For healthy delivery, For joining broken bones	Fat	Body fat is extracted from its body	Massaged over affected area	
8.	Kingdom: Animalia Phylum: Chordata Class: Aves Order: Anseriformes Family: Anatidae Genus: Anas Species: <i>platyrhynchos</i>	Duck	Piles, Haemorrhoids	Egg	Egg is fried in neem oil	Oral administration	
9.	Kingdom: Animalia Phylum: Arthropoda Class: Malacostraca Order: Decapoda Family: Portunidae Genus: Scylla Species: <i>serrata</i>		Asthma	Fresh fluid from joints	Fluid from joints are collected and mixed with medicinal plants	Oral administration	
		Crab	Unhealthy bones and hair	Flesh	Crabs are collected and made into curry or chutney	Oral administration	
			For proper lactation	Flesh	Crab flesh curry is made with drum stick and <i>Perperomia pellucida</i>	Oral administration	
10.	Kingdom: Animalia Phylum: Chordata Class: Mammalia Order: Rodentia Family: Erithizontidae Genus: Hystrix Species: <i>indica</i>	Porcupine	Asthma	Intestine	Intestine is fried along with its contents	Oral consumption	
					Spines	Spines are collected and powdered	Oral administration
			Contraception/ to reduce fertility		Body fat	Fat is extracted from its body	Oral administration
			For abortion		Stomach	Stomach is smashed and made	Oral administration. Eat one spoon

					into paste	daily
			Chronic cough	Flesh	Decoction is prepared with its flesh, cumin, garlic, dried ginger, pepper and bird's eye chilli.	Oral administration
11.	Kingdom: Animalia Phylum: Mollusca Class: Bivalvia Order: Unionoida Family: Unionidae Genus: Unio	Unio	Scald	Shell	Shell is made into paste	Applied over affected area
			Spider poison	Shell	Shell is made into fine paste with turmeric powder	Applied over affected area
12.	Kingdom: Animalia Phylum: Chordata Class: Mammalia Order: Protoscidea Family: Elephantidae Genus: Elephas Species: <i>maximus indicus</i>	Elephant	Mumps	Teeth	Teeth is made into paste	Applied over affected area
			Allergy	Excreta	Excreta is mixed with gingelly oil	Applied over affected area
13.	Kingdom: Animalia Phylum: Chordata Class: Mammalia Order: Lagomorpha Family: Leporidae Genus: Lepus Species: <i>nigricollis</i>	Hare	Asthma	Excreta	Unknown	Oral administration
14.	Kingdom: Animalia Phylum: Mollusca Class: Gastropoda Family: Helicidae Genus: Helix	Snail	Cough	Body	Boil it in water	Oral administration
15.	Kingdom: Animalia Phylum: Chordata Class: Mammalia Order: Artiodactyla Family: Bovidae Order: Bovinae Genus: Bos Species: <i>gaurus</i>	Gaur	Hair loss	Dung	Dung is dried and powdered and then heated with coconut oil	Applied on hair scalp
16.	Kingdom: Animalia Phylum: Chordata Class: Mammalia Order: Carnivora Family: Canidae Genus: Canis Species: <i>lupus</i>	Dog	To make the person vomit who have eaten poison	Excreta	Fresh excreta is taken from a black coloured dog	Oral administration
17.	Kingdom: Animalia	eel	Asthma	Skin	Skin is dried	Oral

	Phylum: Chordata Class: Actinopterygii Order: Anguilliformes Family: Anguillidae Genus: Anguilla Species: <i>bengalensis</i>				and powdered	administration
18.	Kingdom: Animalia Phylum: Chordata Class: Mammalia Order: Chiroptera Family: Pteropodidae Genus: Pteropus Species: <i>giganteus</i>	Fruit bat	Asthma	Flesh	Curry is made with its flesh	Oral administration
19.	Kingdom: Animalia Phylum: Chordata Class: Mammalia Order: Carnivora Family: Ursidae Genus: Melursus Species: <i>ursinus</i>	Bear	Crack heel	Body fat	Body fat is extracted from its body	Apply over the cracked heel
20.	Kingdom: Animalia Phylum: Chordata Class: Mammalia Order: Artiodactyla Family: Moschidae Genus: Moschus	Musk deer	For healthy hair, healthy eye, to treat ear ache	Musk gland	Oil is made with musk gland and medicinal plants.	Apply over affected area
21.	Kingdom: Animalia Phylum: Chordata Class: Mammalia Order: Primates Family: Cercopithecidae Genus: Trachypithecus Species: <i>johnii</i>	Nilgri langur	For good health	Flesh	Curry is made with its flesh along with medicinal plants.	Oral administration
22.	Kingdom: Animalia Phylum: Chordata Class: Actinopterygii Order: Siluriformes Family: Claridae Genus: Clarias	Cat fish	Chronic cough	Flesh	Curry is made with its flesh	Oral administration
23.	Kingdom: Animalia Phylum: Arthropoda Class: Insecta Order: Hymenoptera Family: Formicidae Genus: Oecophylla Species: <i>smaragdina</i>	Weaver ant	Blood pressure	Eggs	Eggs are collected and cooked	Oral administration
24.	Kingdom: Animalia Phylum: Chordata Class: Aves Order: Galliformes Family: Phasianidae Genus: Coturnix Species: <i>coturnix</i>	Common quail	Oligospermia	Egg	Egg is boiled	Oral administration
25.	Kingdom: Animalia Phylum: Chordata	Indian bullfrog	Asthma, Cough, Good health	Flesh	Flesh is fried along	Oral administration

	Class: Amphibia Order: Anura Family: Dicroglossidae Genus: Hoplobatrachus Species: <i>tigerinus</i>				with pepper and salt	
26.	Kingdom: Animalia Phylum: Chordata Class: Mammalia Order: Artiodactyla Family: Bovidae Genus: Capra Species: <i>aegagrus</i>	Goat	Arthritis	Bones	Bone soup is made	Oral administration
			Asthma	Excreta	Fresh excreta	Oral administration
			Eczema	Excreta	Excreta is burned and its ashes are mixed with turmeric powder and oil	Applied over affected area
			Tinea versicolor	Excreta of wild goat	Excreta is mixed with cow urine	Applied over affected area
			Asthma, Malnutrition	Milk	Milk is boiled	Oral administration
			Diarrhoea	Milk	Nut grass stem paste mixed with goat milk	Oral administration
			To eject blood and mucus from stomach	Milk	Indian hog plum skin is made into juice and mixed with milk and then boil it	Oral administration
27.	Kingdom: Animalia Phylum: Chordata Class: Aves Order: Galliformes Family: Phasianidae Genus: Gallus Species: <i>gallus</i>	Hen	Burned skin	Body fat	Fat is extracted from its body	Applied over burned skin
			Pimples	Egg shell	Powder the egg shell and add turmeric powder and medicinal leaf paste is mixed with it	Apply over pimples
			Body building	Flesh	Adathoda root, chicken flesh, ghee are cooked together	: Oral administration
			Holoplexia	Flesh (Black hen)	Oil is extracted from its body	Oil is massaged over body

			Bruise	Egg white	Wild mussenda, touch me not plant and masoor dal are mixed together and a paste is made	Applied over bruise and tied by a cloth
			Dislocation of bones	Egg white	Gin berry leaves mixed with egg white and aloe vera powder	Massage over affected area
28.	Kingdom: Animalia Phylum: Arthropoda Class: Insecta Order: Hymenoptera Family: Apidae Genus: Apis	Honey bee	Loss of appetite, Cough	Honey	Honey mixed with pepper and adhatoda leaves	Oral administration
			Vaginal discharge	Honey	Mix honey with 50ml of coconut flower extract	
			Asthma	Honey	adhatoda leaves extract is mixed with one spoon of honey	Oral administration
			Stomach pain	Honey	<i>Leucas aspera</i> leaves extract mixed with curd and honey	Oral administration in empty stomach
			Skin burn	Honey	Bleeding from uterus	Apply over affected area
			Bleeding from uterus	Honey	30ml Coconut flower extract mixed with 20ml honey	Oral administration
			Cough	Honey	20ml honey mixed with 20ml ginger extract	Oral administration
29.	Kingdom: Animalia Phylum: Chordata Class: Mammalia Order: Artiodactyla	Cow	Jaundice	Milk	Milk mixed with stonebreaker leaves	Oral administration

Family: Bovidae Genus: Bos Species: <i>taurus</i>	Crack Heel	Body fat	Body fat is directly used	Apply over cracked heel
	Cancer	Urine	Cow urine mixed with neem leaf extract	Oral administration
	Asthma	Urine	Cow urine mixed with alcohol and pepper	Oral administration
	For memory power	Milk	Milk is mixed with 30ml Brahmi leaves extract	Oral administration
	Cholera	Milk	Milk mixed with stone breaker leaves extract or <i>L. aspera</i> extract	Oral administration in empty stomach
	Vaginal discharge	Milk	10gm <i>Molineria trichocarpa</i> root powder or 15gm blue pea root powder mixed with one glass of milk	Oral administration
	Pimples	Milk	Sweet cumin, black cumin seeds, sesame seeds and mustard seeds made into paste and added to milk	Apply over pimples
	Snake bite	Milk	Mix milk with lotus root paste	Oral administration
	Stomach pain	Milk	5-6 Guava tender leaves paste is mixed with milk	Oral administration
	Cat bite	Milk	Asafoetida is mixed	Oral administration

					with milk	or apply it over the bitten area
			For more blood and to purify	Milk	<i>Hemidesmus indicus</i> root extract or cutch tree boiled water mixed with milk	Oral administration
			Allergy	Milk	Milk is converted to curd	Apply over affected area
			Body building	Milk	<i>Cyperus rotundus</i> 5gm is mixed with milk	Oral administration
			Acid burps	Milk	curd and mixed with neem leaf paste	Oral administration
			Acid burps	Fat	Body fat is heated with garlic extract	Oral administration one spoon in morning
			Eczema	Milk	<i>Ixora coccinea</i> root and flower paste mixed with curd	Apply over affected area
			Pin worm infection in body	Milk	Dried drumstick powder mixed with milk	Oral administration
			Ulcers in mouth and intestine	Milk	Wild Neem leaves paste or Bishoop's weed paste mixed with curd and rock salt	Oral administration
			Vomiting	Milk	<i>Magnolia champaca</i> root which is grown in North direction is cut and its extract is taken and it is mixed	Oral administration

					with 15ml curd and a red hot iron rod is dipped in it	
			Tinea versicolor	Urine	Cow urine is mixed with papaya leaves extract	Oral administration
			To eject blood and mucus from stomach	Milk	Lemon juice is added to fresh cow milk	Oral administration
			To stop blood in stools of kids	Milk	Buckler leaved moon seed is fried in ghee, powder it	Oral administration
			Diarrhoea	Milk	Cashew tender leaves paste is mixed with curd	Oral administration daily
			Diabetes	Milk	50gm Arrow root powder mixed with milk	Oral administration

Discussion:-

Tribals live close to nature and they have acquired a unique and specific knowledge especially concerning the local flora, fauna and their use in medicine. Wayanad is the only District which has largest tribal population in Kerala State and there had not been any concerted effort to document traditional use of animals for food, medicine and other purposes. In this connection we believe that this is the first report of traditional knowledge of ethnozoological use of animals by panyiar, kurichiar and uraly tribal communities in Wayanad District.

In all, information of 29 species of medicinal animals was collected for treating 51 different human ailments. Majority of the animals had multipurpose use. From the study it is found that, whole animals, or their body parts, or products extracted from them, such as fat, honey, milk, butter, wax, urine, faeces, meat, skin, bones, tails, and eggs are used for various therapeutic purposes. Among these products, milk was the most used. Besides this, it is found that most of the animals used by all the three tribals for ethnozoological therapeutic purpose were belonging to class Mammalia of phylum Chordata. Since, most of the domesticated animals by tribals were belonging to Mammalia, this result indicates that the choice of zootherapeutics utilized depends upon the accessibility and availability of fauna locally. Similar results were found in ethnozoological study in Silent valley by Vijayakumar *et al.*

Vats and Thomas (2015) reported 42 various animal species as traditional medicine using for nearly 30 different medicinal purposes by Sukuma tribe of Busega district in North-western Tanzania. From the list of animals he has reported, about 6 animals used for ethnozoological purpose was found to be same as in the list of animals used for ethnozoological purpose by tribals in Wayanad District, Kerala.

Different researchers from India have reported altogether 448 ethnozoologically important animals. Out of these, ethnozoological study from the Silent Valley by Vijayakumar *et al.*, itself have contributed to the knowledge of 57 medicinal animals (Vijayakumar *et al.*, 2015). The use of honey to cure cough has been also reported amongst the

Iruhar, Mudugar, Kurumbar tribal communities in Attapadi hills of Western Ghats (Padmanabhan, 2008) while the same insect sting is used against paralysis and senselessness by some tribal communities in South India (Dixit et al., 2010). Medicine made using earthworm has been found to be effective in chronic illness, measles and typhoid (Lohani, 2011) while tribals in Wayanad use it for asthma as well as piles. Powdered porcupine spine is used against asthma by tribals in Wayanad while it is used to treat fever by Chakhesang Tribe of Nagaland, India (Kakati and Doulo, 2002)

The usage of droppings of dog taken orally to induce vomiting during stomach poisoning among tribals in Attapadi hills of Western Ghats (Padmanabhan and Sujana, 2008) was also found among tribals in Wayanad. The use of Honey against cough is common to most of the different tribal communities in India. The inherent property of teeth of elephant to act against mumps has never been reported before. Likewise, the use of fresh tongue of varanus as energy booster was not reported earlier; only its use in cooked manner was found in other studies. Unio has a long Indian history of bearing medicinal property but its use against spider has never been reported before. Therefore, it can be said now that the discovery of different animal species used by the Paniyars, Kurichiars, Uraly in Wayanad district of Kerala paves way the need to undertake detailed ethnozoological study of the whole districts of Kerala involving as many tribal communities as possible. Regardless of the rich plethora of bio-resources and ability, growth is far from meeting the expectations of tribal communities mainly concerning the current health care facilities. There has been increasing attention paid to animals as sources for new medicines (Jain *et al.*, 2007). They have been methodically tested by pharmaceutical companies as sources of drugs for modern medical science (Kunin and Lawton, 1996). From this project report, our results add some more knowledge to this field. This finding demonstrates the importance of local faunal diversity in furnishing folk medicine as suggested by Alves and Rosa who observed that faunal composition, accessibility and availability directly influence the type of zootherapeutic resources used in any given region (Borah and Prasad, 2017).

Conclusion:-

Chordata occupied the highest uses (76%), followed by Arthropoda (10.3 %), Mollusca (6.8%), Annelida (6.8%). Among Chordata, Mammals occupied a highest number of animals (44.8%), followed by Aves (10.3%), Reptiles (10.3%), Fish (6.8%), and Amphibians (3.4%). The findings show that the traditional knowledge of animal derived medicines followed by tribal communities in Wayanad play an important role in their primary health care. The information obtained from the present study concerning the ethnozoological use by the tribals in Wayanad need a thorough pharmacological exploration involving few lab trials and analysis. This could also help in generating awareness with regard to the necessity for conservation, preservation and enrichment of the gene bank of such economically important species before they are lost forever. The documentation of this indigenous traditional knowledge on animal derived medicines will be helpful in the formulation of strategies for sustainable management and conservation of bio-resources as well as providing potential for the novel drug discovery.

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