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A review on Ethnopharmacological aspects of a Siddha drug *Nilavembu Kudineer*

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ABSTRACT

Siddha physicians prescribe many drugs to bring around several viral infections such as swine flu, chikungunya and dengue nowadays. The polyherbal decoction *Nilavembu Kudineer* (NK) is a familiar one in this series. This drug is administered for all age groups and observed by nil adverse effects. Even Tamil speaking people are well known of this drug irrespective of their literacy, knowledge about medicine etc. Many researchers rivet over this drug because of its rescuing nature from various microbial infections. Here, an attempt has been made to summarize the explored ethno pharmacological activities of the ingredients in order to strengthen the scientific facts favouring this drug. This will put a step ahead in the field of research for further studies.

Keywords: Siddha, *Nilavembu*, Dengue

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INTRODUCTION

Many awful viral fevers have been reported recently in India and other Asian countries. Mortality rate of some of dreadful viral fevers like Dengue, Chikungunya and Swine flu have been increased which creates panic among the people. Moreover children, old ages are getting affected more frequently. In Siddha clinical practice *Nilavembu Kudineer* (NK) a decoction based polyherbal Siddha formulation is prescribed for *suram* (fever) of unknown origin (PUO). It is used as first line therapy and general remedy for some types of fever caused by unidentified microbial infections[1] .This drug is administered for all age groups. In spite of its bitter taste, it is being administered for other systemic disorders such as diabetes mellitus etc. The aim and objective of this article is to reveal the scientific data of the ingredients of *Nilavembu Kudineer* (Figure 1) supporting for its clinical utility.

Fig.1 Photographs of the ingredients

MATERIALS AND METHOD

The scientific data pertains to active principles and other pharmacological activities have been collected from published papers available at online. They are justified with relevance to the Siddha texts as indicated for the same actions.

Siddha Perspective-*Nilavembu Kudineer*:

According to saint Theriayar "*Kudal thannil seethamalathu suramum varathu"* which implies accumulation of *Kabam* (water) in the intestine predisposes to the development of fever and more "*Asseranamindri suram varathu"* which explains that the indigestion may leads to the development of fever. The indigestion may be due to increased *Kabam* in the digestive mechanism in the gastro intestinal tract. It has been observed from the above said prose the increased *Kabam* is the primary cause for the evolution of fever[2].

The famous *Kannusamiyam* text says that the combination of three tastes viz. *Karppu* (acrid), *Thuvarppu* (astringent) and *Kaippu* (bitter) will neutralize the increased *Kabam*, another combination of three tastes *Thuvarppu* (astringent), *Innipu* (sweet)and *Kaippu* (bitter) will neutralize *Pitham* (fire). When we observe the tastes of these nine ingredients the predominant tastes are Bitter, Acrid, Astringent and Sweet which will reduce or neutralize increased *Kabam* and *Pitham* related disorders. By this inference the NK can betterly be correlated to cure fevers associated with *Kabam* and *Pitham* (Table. 1)[3].

Ethno Pharmacological aspect:

The Phyto chemical constituents and pharmacological actions of the ingredients in the Table 2 & 3 indicates that most of the herbs are having anti inflammatory, anti viral, anti bacterial, anti fungal, anti oxidant, hepato protective, anti diabetic and anti diarrhoeal activities. This poly herbal formulation has not been studied for its synergistic pharmacological activities. It is need of the hour to fulfill this grey area by more number of pharmacological and clinical studies in near future.

RESULTS AND DISCUSSION:

Many research articles show that these herbs posses effective antimicrobial activity without causing any damage to the liver cells rather like conventional drugs. When comparing with the ethno pharmacological aspects of these ingredients with Siddha literature strongly indicates that the decoction made out of these herbs can exhibit antipyretic action with hepato protective effect and serve as a good preventive as well as a curative one.

Table.1 Ingredients of *NV Kudineer*[4]

S.No	Ingredients	Taste	Pancha bootham	Action	Indications as per literature
1	*Andrographis paniculata* (Nilavembu)	Bitter	Air+Space	Stomachic,Tonic,Alterative Stimulant	Fever, Sinusitis
2	*Vetiveria zizanioides* (Vetiver)	Sweet	Earth+Water	Tonic, Stimulant, Antispasmodic,Diaphoretic, Diuretic,Emmenogogue, Febrifuge	Thirst, Jaundice, Hypertension, Fever, Cervical problem, Impotence, Psychiatric Eye disease, Burns, Delirium
3	*Plectranthus vettiveroides* (Vilamichuver)	Bitter	Air+Space	Refrigerant,Anti pitha	Diabetic mellitus, Hypertension, Sweating Psychiatric, Delirium Dropsy, Migrain
4	*Zingiber officinale* (Chukku)	Acrid	Fire+Air	Stimulant,Stomachic, Carminative	Indigestion, Hyperthermia Asthma, Cough, Diarrhoea Sinusitis, Peptic ulcer, Ascitis, Anaemia
5	*Piper nigrum* (Milagu)	Bitter +Acrid	Air+Space Fire+Air	Acrid, Carminative Anti periodic,Rubefacient, Stimulant, Resolvent Antivatha, Antidote	Fever with rigor, Anaemia Cold, Diarrhoea, Peptic ulcer,Gastritis, Loss of taste –sensation, Psychiatric Plies, Delirium,Cough, Hemiplegia, Ear problem, Indigestion, Jaundice
6	*Cyper rotundus* (Korai)	Astrigent	Earth+Air	Astrigent,Stimulant,Tonic, Diuretic,Diaphoretic,Demulent, Emmenagogue Diaphoretic,Vermifuge	Fever with rigor,Hypertension All type of fever, Thirst, Delirium, Diarrhoea, Psychiatric, Cold, Calcaneus spur, Tuberculosis
7	*Santalum album* (Chandanam)	Bitter +Little Astrigent	Air+Space Earth+Air	Alternative,Diuretic,Diaphoretic, Stimulant,Disinfectant,Astrigent, Cooling	Delirium,Confusion Fever,Leucorrhoea Thirst,Itching
8	*Mollugo cerviana* (Parpatakam)	Bitter	Air+Space	Laxative, Stomachic,Antiseptic, Fabrifuge,Diaphoretic	Fever, Psychiatric, Thirst
9	*Trichosanthus cucumerina* (Pudal)	Bitter	Air+Space	Refrigerant,Aphrodisiac	Aphrodiasic,Cold , sychiatric

Table.2 *NV Kudineer* - Pharmacognosy & Ethno pharmacological aspect[2,3,4,5,6,7,8,9,10,11]

S.No	Ingredient	Family	Morphology	Part used	Phytochemical constituents
1	*Andrographis paniculata*	Acanthaceae	Habit-Erect,annual herb,	Leaves, Stem	Leaves-sitosterol,glucoside; Andrographolide and panicolide,polyphenols,caffeic & chlorogenic acids and mixture of dicaffeoylquinic acids.Roots flavones, andrographin & panicolin & sitosterol.
2	*Vetiveria zizanioides*	Poaceae	Habit- Perennial herb	Root	Isobisabolene, khusol, khusinol, khusilal, khusinol oxide, isokhusimol, khusillrol,khusimene, khusenic acid, sokhusenic acid, khusimone, cyclocopa, carnphenol epicyclocopacampheno1 (C-I1epimer), vetiselinenol and zizanol, zizanene levojunenol, epikhusinol, C,,ketones
3	*Plectranthus vettiveroides*	Lamiaceae	Habit- aromatic herb , Roots - deep straw-coloured aromatic	Root	Flavonoids, glycosides, phenolic compounds,volatile,constituents,hydrocarbons, alcohols, aldehydes, ketones, esters,Diterpenoids,essential oil, forskolin, alpha-tocopherol and ascorbic acid
4	*Zingiber officinale*	Zingiberaceae	Habit- Perennial, erect herbwith horizontal tuberous rhizome	Rhizome	Starch(50%), lipids,Tryglycerides, phosphatidic acid, lecithins, free fatty acids (e.g., palmitic acid, oleic acid, linoleic acid, lauric acid, stearic acid, linolenic acid); oils.Other chemicals - cineole, gingiberene, zingiberol;gingediol, methyl gingediol, gingediaceate& methylgingediacetate, paradol
5	*Piper nigrum*	Piperaceae	Habit- slender,aromatic & climber .	Fruit	Long chain of hydrocarbon,mono & sesquiterpene,caryophyllene, piperine, piplartine,piperlongumine,perlongumine&its dihydro-derivative, pipernonaline, piperundecalidine,pipercide & guineensine,sesamin,diuedesmin,sitosterol & dihydrostigmasterol
6	*Cyper rotundus*	Cyperaceae	Habit-perennial shrub	Rhizome	Pinene, trace of cineole, sesquiterpenes & iso-cyperol;fatty oil-glycerol ,linolenic ,linolic, oleic,myristic&stearic acids;tubers-oleanolic acid & its glycosides, sitosterol
7	*Santalum album*	Santalaceae	Habit- small evergreen tree	Wood	Santalic acid, palmitic acid ,oleic acid, linoleic acid and glucose,fructose, n-octacosanol, n-triacontancol,palmitonce, alpha-beta santalences, santenol. Terpenoids, saponin, phenolics and tannins
8	*Mollugo cerviana*	Molluginaceae	Habit- Erect, slender, branched herbs	Whole plant	Phenols, tannins, flavonoids , flavone-c-glycoside orientin, vitexin, saponins,, steroids, terpenoids, and alkaloids.

9	*Trichosanthus cucumerina*	cucurbitaceae	Habit-Annual climber	Fruit	Phenolics and flavonoids ,Vitamin C and E,mineral-potassium and phosphorus, sodium, Magnesium and Zinc, triterpenes dihydroisocucurbitacin B, 23,24-dihydrocucurbitacin E,sterols 2 *β*-sitosterol stigmasterol ,galactose-specific lectin,trichoanguin,. isoflavone glucoside

Table.3 Pharmacological studies involved

S.No	Ingredients	Pharmacologial studies	Reference
1	*Andrographis paniculata*	Antiviral activity -inhibits herpes simplex virus type[12], In combination with *Hedyotis corymbosa* extracts and curcumin have antimalarialactivity[13,14] Xanthones in *root* shows antiprotozoal activity[15], Extract have hepatoprotective effects against ccl_4[16,17], hexachlorocyclohexane[18], galactosamine[19], paracetamol[19,20], Anti thrombotic effects[21] , Protective effects on post-infarction myocardium[22] , Prevention of atherosclerotic arterial stenosis and restenosis after angioplasty[23], Protects cardiomyocytes against hypoxia/reoxygenation injury by regulating cellular reduced glutathione level [24], In alleviating the Ca2+-overloading in myocardial ischemic reperfusion[25], Antioxidant[26,27,28,33], Antioedema[26] , Anti-inflammatory[29.30,31,32] , Analgesic activities[26], Anti hyper glycemic effect[33,,34,35] Exhibit anti-diabetic activity[36,37,] Shows its upshot in pharyngotonsilitis[38],	Wiart C, Kumar K *et al*.[12] Mishra K *et al*[13] , Dua VK *et al*.[14] Dua VK *et al*.[15] Rana AC *et al*,[16]Handa SS *et al* ,[17] Trivedi NP *et al*,[18]Handa SS *et al*,[19]Visen PK *et al*.[20] Zhao HY, *et al*,[21] Zhao HY, Fang WY *et al*.[22] Wang DW *et al*.[23] Woo AY *et al*.[24] Guo ZL, *et al*.[25] Lin FL,*et al*,[26]Verma N,*et al*,[27]Dandu AM,*et al*,[28]Zhang XF,*et al*[33] Lin FL *et al*.[26] Sheeja K*et al*,[29]Shen YC,*et al*,[30]Abu-Ghefreh ,*et al*,[31]Liu J,*et al*.[32] Lin FL,*et al*.[26] Zhang XF,*et al*,[33]Husen R,*et al*,[34]Yu BC *et al*.[35] Zhang XF,*et al*,[36]Reyes BA,*et al*.[37] Thamlikitkul V, *et al*.[38]

		Good results in treatment of uncomplicated upper respiratory tract infection[39,40,41] Reduces common cold symptoms[42]	Melchior J *et al*,[39]Gabrielian ES *et al*,[40]Spasov AA,*et al.*[41] Caceres DD *et al.*[42]
2	*Vetiveria zizanioides*	Oil posses antifungal activity[43], Antihelmintic activity[44]	Gangradel, S.K. *et* al.[43] Gilbert, B. *et al.*[44]
3	*Plectranthus vettiveroides*	Antibacterial and antifungal activities against *S.aureus* (gram + ve) *P.aeruginosa* and *E.coli* (gram negative)[45]	Catherine W. Lukhoba,et al.[45]
4	*Zingiber officinale*	[[6]-gingerol is anti-oxidant, anti-inflammatory and anti-apoptotic actions[46] The effectiveness of ginger in emesis due to hyperemesis gravidarum[47], Reducing motion sickness susceptibility[48] Anti emetic in cancer chemotherapy [49], Direct cholinergic agonistic effect on the post-synaptic M3 receptors, inhibitory effect on pre-synaptic uscarinic autoreceptors[50] [6]-gingerol, [6]-shogaol, and galanolactone have anti- serotonin effects[51] Gingerols derivatives [8]-paradol, have more potent anti-platelet and COX-1 inhibitors than aspirin[52] Effective against cytokines synthesized and secreted at sites of inflammation [53] [6]-, [8]-, and [10]-gingerol effects on blood pressure and heart rate by an atropine-resistant and LNAME- sensitive vasodilator activity and [6]-shogaol showed a mild vasodilator effect, anti-thrombotic and anti-inflammatory agent by effective in lowering serum PGE2[54]	Kim, H.W *et al.*[46] Fischer-Rasmussen, W[47] Stewart, J.J *et al.*[48] Sharma, S.S *et al.*[49] Ghayur, M.N. *et al.*[50] Yamahara, J *et al.*[51] Nurtjahja-Tjendraputra, E [52] Grzanna, R *et al.*[53] Thomson, M. *et al.*[54]
5	*Piper nigrum*	Antidiarrhoeal effect through its antisecretory and antimotility effect[55]. Alkaloid,volatile oil,mono and polysaccharides,resins have good antibacterial activity[56] Morphological changes of mycobacterial cells occurs when exposed to the ethylacetate fraction of *P. nigrum* [57] Anti bactrical activity against Methicillin-resistant staphylococcus aureus[58] Immunomodulatory activity[59] Hepatoprotectiveactivity[60] Hypocholesterolemic,Antidiabetic,Antioxidant and Antilipidperoxidative activity[61] Piperine employed in respiratory diseases such as tuberculosis,AsthmaAnd pneumonia etc[62]	Prashant B. Shamkuwar [55] Pavithra *et al.*[56] Popi Patilaya *et al.*[57] Inshad *et al.*[58] Majdalawieh AF *et al.*[59] Koul *et al.*[60] Agbor *et al.*[61] Sampath *et al.*[62]
6	*Cyper rotundus*	Anticonvulsant , Anti-arthritic activity and antioxidant effect[63] Antidiarrhoeal effect through lowering intestinal secretions and antispasmodic effect by inhibiting the intestinal motility[64] Effective against E.coli, S.aureus and shows good antimicrobial activity against B.subtilis,	Mohsen khali li *et al.*[63] Prashant B. Shamkuwar *et al.*[64] Anupam Bisht *et al.*[65]

		inhibitory against Aspergillus flavus, Fusarium oxysporum and inhibit spore formation in Fusarium fumigatus[65] β-caryophyllene oxide and isoaromadendrene oxide enhanced anti-dysmenorrhea effect[66] Anti oxidant activity[67]	 Yun CHEN Xiaoyi Wang[66] K R Nagulendran *et al.*[67]
7	*Santalum album*	Antiviral activity against HSV-1 & 2[68] Antibacterial activity against Bacillus anthracis (+), Bacillus mycoides(+), Bacillus pumilis(+), E.coli(-), Micrococcus glutamicus(+),Sarcina lutea (+), Salmonella paratyphi(-), Staphyllococcus albus (+), Xanthomonas campestris (-), Xanthomonas malvacearum (-) and Staphylococcus aureus.[69,70] Antifungal activity against Microsporum canis, Trichophyton mentagrophytes ,T. Rubrum[71] Antioxidant activity[72]	Benencia F *et al.*[68] Chourasia OP *et al*,[69] Shankaranaryana KH *et al.*[70] Chaumont JP *et al.*[71] Scartezzini P *et al.*[72]
8	*Mollugo cerviana*	Antibacterial activity against Bacillus subtilis and Escherichia coli[73] Anti inflammatory activity[74] Methanolic extract of Mollugo cerviana significant hepato protective activity[75]	Parvathammaal *et al.*[73] Amritpal Singh *et al.*[74] R. Valarmathi *et al.*[75]
9	*Trichosanthus cucumerina*	Antimicrobial activty[76]. Anti diabetic effect[77], Lowering the blood glucose level in albino rats[78], Cytotoxic activity against cancer cell lines of Breast CA,Lung CA and colon CA[79], Anti-inflammatory effect against carrageenin induced mouse's hind paw oedema [80]	Seema Parveen *et al.*[76] Arawwawala M *et al.*[77] Kar A *et al.*[78] Kongtun S *et al.*[79] Kolte RM *et al.*[80]

CONCLUSION:

In future more interest must be given to the clinical documentation. Based on this literature survey the NK can be used for preventative as well as curative for any type of fevers. As per the order of State Government of Tamil Nadu, the primary and tertiary health centres provide NK for Dengue fever which yields good results. These results must reach globally to combat such outbreaks.

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