Management of Dengue by Using Combined Therapy of Kiwi, Dragon Fruit and Papaya Leaves

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Abstract: The purpose of study is combine effect of Kiwi fruit, Carica Papaya leaves and Dragon fruit for Dengue(fever). Dengue is mosquito borne disease caused by Dengue virus. All the symptoms of disease are due to low platelets count that may become very low if not managed. The combined use of Kiwi fruit, Carica Papaya leaves and Dragon fruit helps in reducing platelet aggregation. Kiwi fruit due to its immune boost function increases white blood cells that are found to be decreased in dengue fever that is leukopenia. The Case study was done, and it is concluded that combined therapy of Carica Papaya leaves and Kiwi fruit and Dragon fruit exhibited marked therapeutic effect on febrile condition of Dengue along with other associated symptoms. Then before and after comparing the blood reports of platelet counts show the result of patient's recovery by the students-t test.

Keywords: Dengue virus, Medicinal plant, Dragon fruit, Kiwi fruit, Platelet count, Papaya leaf extract, Combined therapy, Thrombocytopenia, DHF, DSS, albopictusmay, WHO.

1.INTRODUCTION

Dengue is the most important mosquito-borne arboviral disease of humans in many tropical and sub-tropical areas in terms of both morbidity and mortality. Dengue is considered a major global threat by the World Health Organization (WHO).[4] Since the end of World War II, the incidence of dengue disease has increased greatly. In the past 50 years, its incidence of dengue has increased 30 times with significant outbreaks occurring in five of the World Health Organization (WHO) regions. At present, dengue is endemic outbreak disease in 112 countries in the world. Dengue fever is characterized by sudden onset of high fever, chills, severe headache (mostly frontal or retro-ocular), skin rash and general malaise.[5] Two distinct clinical entities, dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS), have been poorer outcomes, with mortality rates approaching 5% (1). Since last 30 years, dengue fever has dramatically expanded its geographical range and shortened its epidemic cycle in many places.[7]

1. MOSQUITO VECTORS IN DENGUE INFECTIONS:

Mosquitoes belonging to the genus aedes play an important part in transmission of dengue whereas the most important vector is A aegypti, but A polynesiensis and A albopictusmay act as vectors depending on the geographic location. For instance, A albopictus is the common dengue causing mosquito in India, Thailand, Singapore, and Mexico regions. After biting an infected human, dengue viruses enter an adult female mosquito and replicates in its midgut. Then it reaches the haemocoel and haemolymph, and gains access to different tissues of that mosquito. After viral replication in the salivary glands of mosquito, the infected mosquito can transmit the virus to another human through biting. Ultrastructural studies show viral particles within the salivary glands, foregut, midgut nervous system, epidermal cells, ovary and internal body wall lining cells of the mosquito. In contrast, they are absent from the hindgut, muscle and malphigian tubules.[5,6]

2. ETIOLOGY

The proposed etiologists for dengue virus infection are:

- Viral replication, primarily in macrophages.
- Chemical-mediated and immunological mechanism induced by host–viral interaction.

CLASSIFICATON:

The WHO classifies DF into two groups:

1. Uncomplicated.
2. Severe.

DIAGNOSIS:

1. Leucopenia
2. Thrombocytopenia
3. Metabolic acidosis
4. Virus segregation in cell cultures
5. Herbal plants

DEVELOPMENTAL PHASES OF DENGUE FEVER:

The three phases of dengue includes

1. Febrile phase
2. Critical phase
3. Recovery phase

Classification	Name
Kingdom	Plantae
Division	Magnoliopyta
Class	Magnoliopsida
Subclass	Magnoliidae
Order	Ericales
Superorder	Asteranae
Family	Actinidiaceae
Genus	Actinidia
Species	Deliciosa

PREVENTION AND CONTROL:

Primarily the dengue infection can be controlled by the control of dengue vectors which can be aimed against the immature aquatic stages (larvae and pupae) or the adult mosquitoes. Direct vector control measures include, use of insecticides to kill the mosquitoes or mosquito entry can be used as indirect vector control methods (WHO, 2009 and Kuehn, 2014). For space-spraying and larviciding require trained personnel in contrast, the reduction in potential larval development sites can prevent them from biting by employing repellents. Environmental modification or sanitation improvements that reduce potential larval development sites or house improvements that prevent can be achieved with householders. Some of the community-based efforts like empowering of affected and other communities through education and advocacy can mobilize and mount effective control operations (WHO, 2009).

PLANT PROFILE:

1. Kiwi:

Fig 1. Kiwi Fruit

Kiwifruit is botanically known as Actinidia deliciosa. This species was first found along the border of the Yangtse River valley in China and later, in 1847 and 1904, the first plants were send for England and America, respectively

Taxonomical Classification:

Botanical Name: Actinidia deliciosa

Synonyms: Chinese gooseberries, woody vine, green kiwi.

Pharmacological activity kiwi fruit:

Antibacterial activity :-

The kiwi fruit, which has antimicrobial properties, were tested as potential alternatives to conventional antibacterial agents causing necrotizing fasciitis, pharyngitis, sore throat, and streptococcal toxic shock syndrome.

Antitumor activity :-

Kiwifruit or its extracts have the ability to: permanent DNA damage, potentially lowering the chance of cancer development, or exerting direct cytotoxic effects by decreasing the viability of many cells.

Antioxidant effect:-

Kiwifruits ability to act as antioxidants is linked to their ability to improve health.

Anti-inflammatory activity:-

Numerous situations and elements, including inflammation, infection, UV exposure, and drug consumption, can boost cellular ROS generation and start a series of inflammatory processes. Excessive ROS induced oxidative damage to vital biomolecules in the human body, which leads to degenerative conditions.

Antidiabetic effect:-

Chronic hyperglycaemia and/or hyperinsulinemia are caused by insulin resistance, which is characterised by a diminished capacity of cells or tissues to physiological insulin concentrations. Obesity, metabolic syndrome and type 2 diabetes (T2D) mellitus are all conditions influenced by these factors.

Health Benefits of Kiwi:

The vitamin, fiber, and antioxidants can provide essential health benefits. The flesh is rich with vitamins that stimulate immunity and reduce the risk of disease. kiwis can help stimulate regular and healthy digestion can provide other health benefits like. This tart fruit can support heart health, digestive health, and Immunity.

2. Carica papaya:-

Fig 2. Carica Papaya

The papaya tree belongs to a small family - Caricaceae having four genera in the world. The genus Carica Linn. is represented by four species in India, of which Carica Papaya Linn. is the most widely cultivated and best-known species. Papaya contains broad spectrum of phytochemicalsincluding, polysaccharides, vitamins, minerals, enzymes, proteins, alkaloids, glycosides, fats and oils, lectins, saponins, flavonoids, sterols, etc. (Table 1) [1,2,3].

Botanical Aspect:

Classification	Name
Kingdom	Plantae
Sub Kingdom	Tracheobionta
Class	Magnoliopsida
Sub Class	Dilleniidae
Super Division	Supermatophyta
Phyllum	Steptopophyta
Order	Brassicales
Family	Caricaceae
Genus	Carica
Botanical Name	Carica papaya Linn.

Morphology:

Plant parts	Constituents
Fruits	Protein, fat, fibre, carbohydrates, minerals: calcium, phosphorous, iron, vitamin C, thiamine, riboflavin, niacin, and carotene, amino acids, citric and malic acids
Juice	N-butyric, n-hexanoic and n- octanoic acids, lipids; myristic, palmitic, stearic, linoleic, linolenic and cis vaccenic and oleic acids.
Seeds	Fatty acids, crude protein, crude fibre, papaya oil.

Table 3. Chemical composition of various parts of Papaya plant

Pharmacological activity of Carica Papaya:-

Anti-inflammatory activity:-

Carica papaya, as noted above, is a tropical plant containing a wide range of bioactive secondary metabolites (e.g. alkaloids, phenolics, flavonoids, carotenoids,tannins, saponins, etc.) and proteolytic enzymes (papain and chymopapain).

Antimicrobial activity:-

The seed of papaya has antimicrobial activity against Trichomonas vaginalis trophozoites.The report suggests the use of papaya seed in urinogenital disorder like trichomoniasis with care to avoid toxicity. and Klebsiella pneumoniae by the agar cup plate method.

Antimalarial activity :-

The petroleum ether extract of the rind of raw papaya fruit exhibits significant antimalarial activity.

Antifungal activity :-

The latex of papaya and Fluconazole has synergistic action on the inhibition of Candida albicans growth.

3. Dragon fruit

Fig 3. Dragon Fruit

Hylocereus undatus is a fruit plant indigenous to tropical and subtropical America. It produces fruits known as

dragon fruit and Pitaya.The fruit has an oval shape, and the pulp has a sweet and sour taste. The seeds are very small and black-colored.

Pharmacological effects:-

Antioxidant effect :

Hylocereus. polyrhizus is rich in betalains and other bioactive compounds such as vitamins and phenolic compounds that exert relevant antioxidant properties and, for these reasons, are related to the prevention of several human diseases. The oil results from the seeds, and the peel is also an essential source of antioxidant compounds.

Anti-Inflammatory Effects :-

Besides the antioxidant actions, dragon fruit can also exert anti-inflammatory actions.

Antimicrobial Effects :-

In a study to investigate the antimicrobial effect of red pitaya peels, Temak et al. found that the extract has efficient in vivo and in vitro effects against several microorganisms, such as Escherichi coli and P. aeruginosa.

Anti-Cancer Effects :-

Some studies have shown the anti-cancer potential of dragon fruit. Divakaran et alaimed to evaluate the ability of this fruit to produce nanoparticles and found they can significantly inhibit the growth of MCF-7 breast cancer cells. The anti- cancer activities promoted by pitaya are related to several bioactive compounds such as phenolic acids, flavonoids, and betacyanin.

Anti-Diabetic Effects:-

Many studies have demonstrated that the consumption of red pitaya can reduceglycemia in humans. In a systematic review and meta-analysis, Poolsup et al. found that dragon fruit can be used to prevent diabetes.

Literature Survey:

1. Efficiency of combined Therapy of Carica Papaya and kiwi fruit in Dengu fever: A single case study (Amit Ashok Velhal)

The purpose of study is combined effect of Carica Papaya leaves extract and Kiwi fruit for dengu fever.Dengue is a mosquito bound disease caused by Dengue viruses.

2.Anti-inflammatory and immune modulatory properties of Carica papaya (Saurabh Pandey, Petal J Cabol P, Nicholas Show, and Amitha K, Hewavitharana).

Inflammatory conditions activate immune defence machanism and under persistent stimuli chronic inflammation may occur.

Review on Nutritional, Medicinal and Pharmacological properties of Papaya (Carica Papaya Linn) (K.L.krishna,M Paridhavi and Jagurti A Patel).

Papaya is a common man's fruit which is reasonably priced and has a ligh nutritive value it is a low in calories and rich in natural vitamins and minerals.

3.Carica papays L. Leaf: A systematic scoping review on biological safety and heart drug interactions. (X.Y Lim, J.S.W Chan, N Japuri). Indications for C.papaya leaf. Dengue: fresh Carica Papaya leaf juice in sufficient quantity for 8 hour's aparts.

A review of production and processing of Kiwi fruit. (Gurool, Wani S.M, and Wani S.A).

Kiwi fruit is well known for its flavour and vit.C content. It is a climateric fruit and is very sensitive to Ethylene. Kiwi fruit belong to family Actindiaceae and genus Actinidia.

4.The review on kiwi fruit (Kunal Kishor Pawar)

Characteristics of Kiwi fruit like stem, leaves, root's,barks, etc

Phytochemistry, Nutritional and Medicinal value of kiwi fruit (Riksha Bakhtawar).

Phytochemistry of Kiwi. Phytochemicals in Roots. Phytochemicals in Peels. Photochemicals in Pulp.

5.Anti-inflammatory, Anti-oxidant and other health effects of Dragan fruit and potential delivery system for its bioactive compond.(Daniela Franceschi Nishikito).

Pharmacological effects of Dragan fruit and their constituents and various parts of Dragan.

Material and Methods:

1. Collection: -
   The parts of medication of herbal plant's like Kiwi fruits, Carica Papaya leaves and Dragon fruit are collected.
2. Preparation: -
   All the fruits are collected and washing them. Papaya leaves also collect and wash it into pure water.
3. Weighing: -
   The Kiwi fruit, Carica Papaya and Dragons are the

weighing.

Sr. No.	Drug's	Weight
1	Kiwi fruit	2
2	Papaya leaves extract	30 ml
3	Dragon fruit	1

Procedure: -

In the 1st step, Testing the blood of patients and reporting them. Then give the one Kiwi fruit and half fruit of Dragon to eat after some time gives the papaya leaf juice of 1glass.After the 1 hour's again check the blood and reporting it. Then comparison between the before and after taking it and shows the results.

Evaluation:

Kiwi:-

- Health Benefits: Kiwi is rich in vitamin C, vitamin K, potassium, and dietary fiber. It's known for its antioxidant properties and can boost immune function and improve digestive health.
- Taste: Kiwi has a sweet-tart flavor with a juicy texture. The green flesh contains tiny black seeds, adding a slight crunch.

Uses: Kiwi is often eaten fresh, added to use as a topping for desserts like pavlova, or blended into smoothies.

Papaya:-

- Health Benefits: Papaya is a great source of vitamins A, C, E, and B9 (folate), and also contains dietary fiber and antioxidants. It can aid digestion thanks to the enzyme papain and may have anti-inflammatory properties.
- Taste: Papaya has a sweet, slightly musky flavor, and a soft, buttery texture when ripe.
- Uses: Papaya can be eaten fresh, blended into smoothies, used in fruit salads, or even in savory dishes like salsas and curries. Green (unripe) papaya is used in Southeast Asian cuisine, like Thai papaya salad.

Dragon Fruit:-

- Health Benefits: Dragon fruit is high in vitamin C, antioxidants, and dietary fiber. It may support gut health due to its prebiotic effects and is low in calories.
- Taste: Dragon fruit has a mildly sweet taste, often compared to a cross between a kiwi and a pear. It has a refreshing, crunchy texture, with small black seeds dispersed throughout the flesh.

Uses: Dragon fruit is often eaten fresh, added to fruit salads, blended into smoothies, or used as a decorative topping for desserts. It can also be used in savory dishes for a pop of color.

Result:

Grade	Fever grade	Head ache Grade	Body ache Grade
4	High (102-104 degree F)	Severe requires Medicine	Severe hamper routine work
3	Moderate (100-102 degree F)	Moderate	Moderate
2	Low (99-100 degree F)	Mild	Mild
1	Very low (up to 99 degree F)	Occasional	Occasional
0	No fever 0	No headache	No Body aches

Table 2: Assessment Criteria and Observation

Grade	TLC Grade	Platelet count Grade
4	2500-3000 cells/cumm	Less than 50000 cells/cumm
3	3000-3500 cells/cumm	50000--65000 cells/cumm
2	3500-4000cells/cumm	65000-80000 cells/cumm
1	4000—4500 cells/cumm	80000--95000cells/cumm
0	More than 5000 cells/cumm	More than 95000 cells/cumm

Table 3: Haematological Profile

Sr. No.	Characteristic	BT	AT
1	Fever	4	1
2	Headache	4	0
3	Bodyache	4	2
4	TLC	4	0
5	Platelet count	3	0

Table 4: Effect of Therapy (based on grading)

Table 6: Properties of Drugs Uses.

Properties	Kiwi, (*Actinidia deliciosa*)	Carica Papaya, *(Earandakarkati)*	Dragon, *(Selenicereus undatus)*
Ras	*Madhur,Katu, Tikta*	*Katu, Tikta*	*pitahaya, pitaya, and strawberrypear*
Guna	*Laghu,Ruksha*	*Laghu, Ruksha*	*Laghu, Ruksha*
Veerya	*Ushna*	*Ushna*	*Ushna*
Vipak	*Katu*	*Katu*	*Katu*
Karma	*Pachan, Kapha Vata shamak*	*Pachan, Kapha Vata shamaka*	*Pachan , Kapha Vata, Shamka*

SUMMARY AND CONCLUSION

It can be concluded from the case that combined therapy of *Kiwi, Carica Papaya and Dragon* exhibited marked therapeutic effect on febrile condition of Dengue along with other associated symptoms. Other than this the drugs also corrected Leukopenia as well as Thrombocytopenia within 5 days. No side effects were seen during the admission but further study is needed to study the effect of above extracts in other febrile condition also and secondarily. The study should be done on more no. of patients and for a longer duration to remark other benefits. Then we comparing the reports of blood testing samples of the patients before and after the giving the fruits and extracts.

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