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Research Article

A Review On Siddha Formulation Uppu Chenduram For Anti-H.Pylori And Gastroprotective Action

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ABSTRACT

Helicobacter pylori (H.Pylori) is a gram negative bacterium which is known for gastric diseases such as gastritis, peptic ulcer and carcinoma of stomach. Due to complex treatment modalities for H.Pylori infection, the gastroprotection is unclear. Offlate efforts have been made to transform traditional formulations into scientifically accepted modern industry to deliver healthcare. Hence the traditional texts of Siddha, Ayurvedha and other complementary system of medicine has been explored to unravel the ancient wisdom hidden in these original texts that may provide solution to these intricate research areas. The present literature review on Siddha herbomineral drug Uppuchenduram provides insights to the fact of the possible target action in claiming the traditional indications of this formulation against all kinds of ulcer(Kunmam). The review portrays the chemical constituents present in the herbal ingredient *Pistia stratiotes*, process and preparation of Uppuchenduram and the mode of action against H.Pylori and gastroprotection. The present study exhibits the in depth analysis of Siddha literature of Uppuchenduram associating the rudiments with modern science.

Keywords: *Pistia stratiotes*, H.Pylori, Kunmam, Herbal medicine, Sodium Chloride, Siddha medicine, Peptic ulcer disease.

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INTRODUCTION

Helicobacter pylori (H. pylori) is a common bacterial infection that infects more than 50% of global population.[2] 0 ~ 20% of H. pylori infected individuals will ultimately develop into peptic ulceration, chronic gastritis, or even gastric adenocarcinoma[3]. Therefore the obliteration of H. pylori can offer an effective treatment strategy for gastritis, peptic ulcer disease, and

early lymphoma of mucosal-associated lymphoid tissue (MALT). Further, it can also reduce the risk of gastric cancer at a greater extent[4]. Upon exploring various medicinal plants that can act against H.Pylori infection *Impatiens balsamina* L. (Balsaminaceae) [5], a Taiwanese folk medicinal plant extract has shown anti-H.Pylori activity against multiple strains of H.Pylori . Similarly, the *Persea Americana* Mill. (Lauraceae) [6], a

Mexican traditional medicinal plant extract, *Acacia nilotica* (L.) Delile (Fabaceae) aqueous extract, the *Fagonia arabica* L. (Zygophyllaceae) extract, and the *Casuarina equisetifolia*, *Centaurea solstitialis* (flowers) and leaf hexane fraction of *Aristolochia paucinervis* Pomel, a Moroccan medicinal plant also has shown anti-*H.Pylori* activity.[7-9]

Owing to the background of previous researches on the effectiveness of medicinal plants for *H.Pylori*, In this Present study, we developed an interest to explore on the Siddha formulation Uppu Chenduram in which the chief ingredient of the formulation is *Pistia Stratoidea* an aquatic weed.

Pistia stratoites

Pistia stratiotes belongs to Araceae family commonly called as water lettuce is an aquatic plant found floating in the ponds, streams and water bodies of tropical and subtropical regions of India, Africa and Asia . [10] It has been evaluated for its antidiabetic, antifungal, antimicrobial property, diuretic properties. [11,12] The leaves contain biologically active ingredients such as alkaloids, glycosides, flavonoids and steroids and is rich in vitamin A, C and vitamin B. [13] The plant possess specialized cells called crystal idioblasts which contain a large amount of Ca-oxalate crystals. [15-16] It is also used for the phyto-remediation of waste water for heavy metals such as Fe, Zn, Cu, Cr, and Cd on large-scale. [17] It is also used for quinolone bioremediation of drug contaminated water body [18-19]

MATERIALS AND METHODS

Preparation of Uppuchenduram

5 Palam of Sotruppu (Sodium chloride) is to be taken and grounded with ¼ padi of Agayathamarai extract (*Pistiastratoidea*) .The mixture is made into pellets (villai) .and are tightly packed in the mudpots sealed with clay cloth layers and undergo heating process in well designed pits made out of special fire bricks. and burnt using 10 cow dung cakes. A similar manner of incineration to be carried out by increasing the cow dung cakes at each time upto 20 cakes.

Indication: 1-2 rice pills for all kinds of acidity, Acid peptic disease

SCIENTIFIC ANALYSIS OF INGREDIENTS OF UPPU CHENDURAM

Role of NaCl in the process of UppuChenduram

Presence of large metabolites, poly-saccharides and proteins such as tannins, alkaloids, and polyphenols degrade the quality of DNA thus reducing yield [20]. Previous research studies indicate that NaCl had the potential to be used as a pretreatment of pyrolysis to generate more resources with low cost. Grinding of NaCl with the herbal extract of *pistiastratoidea* would enable the dissociation of sodium ions and also favour its binding with the organic phytoconstituents. In an hypertonic solution containing NaCl, water tends to ooze out from the cell and plant cell crumples leading to plasmolysis. It also provides ionic strength to precipitate

polysaccharides and increases solubility of proteins. [21-22]

Pharmacological actions of the phytoconstituents of Pistia stratoites against H.Pylori

The pharmacological activity of Uppuchenduram owe to the presence of ecofriendly heavy metals and the phytoconstituents that are therapeutically effective. The following are the possible target actions towards its anti-*H.Pylori* and gastroprotective effects.

Role of Zinc and copper ions in H.Pylori infection

Zinc is an essential trace element which plays an important role in DNA and RNA synthesis that is significant for tissue repair. Microbial infections, intestinal inflammation, delayed wound healing, and impaired immune system are found to be associated with Zinc deficiencies, which inturn portrays that it has antibacterial effects. [23] [24] Zinc-carnosine is chelate compound, found to be 3 times more effective than each individual ingredient when used alone for gastritis, gastric ulcers, and dyspepsia.. [25]

In Ecuador, zinc deficiency and gastric cancer are high and its wide spread. The study hypothesized that zinc deficiency would have caused gastric mucosal inflammation due to *H. pylori*. [26] *Helicobacter pylori* (*H. pylori*) secretes the chaperone and serine protease to disrupt the epithelial integrity and barrier function, which cleaves gastric epithelial cell surface proteins. A study reports the identified Zn⁺⁺ and Cu⁺⁺ ions as inhibitors of *H. pylori* HtrA activity. The findings of this study will pave way for protease inhibitors that are novel metal ion-dependent, which might help to fight bacterial infections. [27]

Anthocyanins as antimicrobial agents against H.Pylori:

The most effectively studied virulence factors of *H. pylori* which are involved in the pathogenesis of *H. pylori* are cytotoxin-associated protein A (CagA) and vacuolating cytotoxin A (VacA). [28] A study report that Anthocyanins act as potential antimicrobial agents against *Helicobacter pylori*, where Anthocyanins (Cyanidin-3-O-glucoside) were added to bacterial cultures with *H. Pylori* toxins CagA and VacA. This study postulates that anthocyanin inhibits secretion of CagA and VacA in *H. pylori* via down-regulation of certain proteins which blocks protein synthesis thereby producing the bacteriostatic effect. [29]

Gastroprotective effect of Cyanidin-3-O-glucoside (C3G) and Beta sitosterol:

Effects and associated protective mechanism of C3G (dietary anthocyanin) on *H. Pylori* lipopolysaccharide (LPS)-induced injuries were associated with the deactivation of TLR2- and TLR4-mediated NF-κB signaling.[30] In another study conducted by Li states that, the gastroprotective effect of Anthocyanin C3G removes the peroxides and free radicals and which may offer a potential remedy for the treatment of gastric injuries.[31] Plant phytosterols containing β sitosterol as

major component have been studied to possess gastroprotective effect with anti- peptic ulcer activity. [32] A study conducted by Nnamani states that, β -sitosterol causes gastric protection which is dose based, where the protection is higher with higher doses of β -sitosterol.[33]

Brain-gut axis in *H. Pylori* infection and the role of phytoconstituent orientin:

H. pylori infection increases cytotoxic and proinflammatory effects. In addition *H. pylori* infection may also affect the brain-gut axis causing abnormalities. The brain-gut axis regulates different biological activities which includes environmental stimuli , gastrointestinal functions and and intestinal microbiota. *H. pylori* may have direct neurotoxic effects in the Gut-Brain axis which activates the neurogenic inflammatory processes. In digestive tissue, as *H. pylori* infection is most often associated with decrease in mast cell infiltration in the digestive tract, *H. pylori* may function by activating mast cells, and alter brain-gut axis signal. Further detailed studies may improve the understanding and the pathophysiology of *H. Pylori* infection and its effects with Gut-Brain axis pathway which may help in the development of new therapeutic systems.[34] Neurodegenerative diseases are the incurable conditions developed with aggregation and deposition of misfolded

intracellular and extracellular proteins, leading to progressive central nervous system diseases. Some study states that, orientin at the concentration of less than 20 μ M was not cytotoxic to neuroblastoma cells. In this study, the percentage of apoptotic cells was significantly decreased that concludes this antiapoptotic effect of orientin could have been attributed to the inactivation of caspases 3/7 and caspase-9 activities.[35] In a Study, Orientin was found to improve cognitive impairment of the AD mice and significantly reduced the levels of the oxidative stress biomarkers and ROS. Treatment of orientin for 3 weeks has shown various effects like antidepressants, enhanced central oxidative stress and amplifies serotonin levels.[36,37]

Role of Vitamin-C in *Helicobacter pylori* (*H. pylori*), infection

It has been reported that deficiency of ascorbic acid deficiency has been associated with gastritis. Subjects infected with *H. pylori* have been constantly affirmed to have low Vitamin C levels both in gastric acid and serum. Ascorbic acid supplementation reduced incidences of bleeding from peptic ulcers and gastric cancer. Eradication of *H. pylori* has shown to increase vitamin C levels, though the benefits of ascorbic acid oral intake to increase the effectiveness of *H. pylori*-eradication therapy are controversial.[38]

Table-1. Pharmacological action of Phytoconstituents of *Pistia stratoides*

S.No	Phytoconstituents	Pharmacological action
1.	Zinc and copper ions	Inhibitors of <i>H. pylori</i> HtrA activity Enhances immunity [26] Acts as antibacterial.[27]
2.	Anthocyanins	Inhibits secretion of CagA and VacA in <i>H. pylori</i> producing bacteriostatic effect. [28,29]
3.	β sitosterol	Anti-ulcer activity in peptic ulcer [33]
4.	Orientin	Neuroprotective effect in Gut-brain involvement of <i>H. Pylori</i> infection. [36,37]
5.	Ascorbic acid (Vitamin C)	Reduces the incidences of bleeding in Peptic ulcer [40]

Micronutrients are powerful antioxidants responsible for immune homeostasis and affect infection related morbidity in humans. Trace minerals and vitamins such as zinc (Zn), copper (Cu), iron (Fe), nickel (Ni), etc. are essential cofactors of enzymes and organizers of the mitochondria and its membrane. Deficiencies of micronutrients influence immune homeostasis and thus affect infection-related morbidity and mortality. *H. pylori* infection leads to the deficiencies of several micronutrients by reducing the absorption. Immune functions in the host such as epithelial cell integrity, glycoprotein synthesis, transport mechanisms, glucose mechanisms are all mediated by trace elements and vitamins.[38,39] In addition to this it also act as anti-carcinogens in the prevention of -nitrosamines that play a chief role in the development of gastric carcinoma.[40]

CONCLUSION

The present review highlights the gap area towards establishing a traditional medicine for *H. Pylori* infections and gastroprotective drugs. Moreover, the phytoconstituents, mineral and metal contents of

themost common perennial floating plant *Pistia stratoides* which grows on the surface of lakes, rivers, Ponds and other water bodies have been reviewed with the aid of published literature. The potential therapeutic benefits of these pharmaceutically active ingredients were derived for its possible mode of action against *H. Pylori* and gastroprotection.

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