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Study of anti swine flu prospects of medicinal plants

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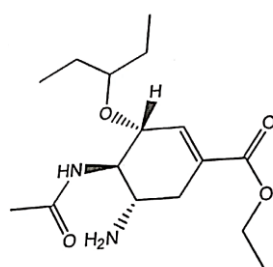
Abstract

The Ayurvedic treatment of swine flu is aimed at treating the symptoms, controlling the virus, and preventing complications by boosting the immune status of the body. Based on authentic literature survey it revealed that, the water extract of plants mixture (*Ocimum basilicum*, *Piper nigrum*, *Aegle marmelos* (*Ocimum basilicum*, *Piper nigrum*, *Aegle marmelos* and *phyllanthus nirurim*) has effects similar to Tamiflu. Moreover, further chemical investigation of these plants may lead to promising natural products active against swine flu in future.

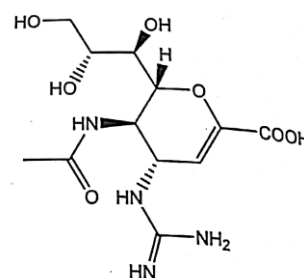
Keywords: Anti-swine flu and medicinal plants

Introduction

Indian plants have been attracting attention in foreign countries. India not only has a host of medicinal plants, but also has a host of do's and don'ts laid down for collecting the required portions-leaves, roots, fruit etc. of these plants. Swine flu is a respiratory disease caused by viruses that usually infect the respiratory tract of pigs, has been declared a pandemic by the World Health Organization. Swine flu viruses have the capacity to mutate so that they are easily transmissible among humans. It affects the upper respiratory tract and its symptoms are similar to that of the Human Influenza Virus. The 2009 outbreak is due to infection with the H1N1 virus and was first observed in Mexico. Symptoms in humans are similar to most influenza infections; fever, cough, nasal secretions, fatigue, headache, and gastrointestinal symptoms like vomiting and diarrhea. Pneumonia and respiratory failure are signs of a more serious swine flu infection. Swine flu cases have been on the rise ever since and as of August 09; over 45,000 people in the US have been affected with a record 436 deaths. The rising toll makes it necessary for people to be educated about the causes, symptoms, and treatment of swine flu. People are opting for swine flu alternative medicines, thus several swine flu natural remedies are gaining popularity now. Ayurveda and swine flu is becoming one of the most sought after topics, since Ayurveda is for its effectiveness against stubborn disease. Oseltamivir (Tamiflu) and zanamivir (Relenza) is the only drug available now which is effective in fighting swine flu the Shikimic acid, a primary precursor used in the synthesis of Tamiflu. At present the sole source of shikimic acid, a plant seed called "*Illicium verum*" popularly known "star anise".



Oseltamivir (Tamiflu)



Zanamivir (Relenza)

There is a simple ayurvedic formula having been found more prominent to keep away swine flu. This formula helps. build our immune system and eventually keeps us ready to fight against swine flu, e.g. Water extracts of mixture of plants viz. *Ocimum basilicum*, *Aegle marmelos*, *Piper nigrum* and *Phyllanthus nirurii*. These plants are rich source of phytochemicals, so their use to treat swine flu may not be denied.

Sweet Basil: *O. basilicum* is important medicinal plant and a culinary herb widely cultivated in many countries. It acts principally on the digestive and nervous systems, easing flatulence,

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stomach cramps, colic and indigestion. It has antipyretic, antibacterial; antiemetic, diuretic, cardio tonic properties with cardiac stimulant. It is taken internally in the treatment of influenza, poor digestion, gastro-enteritis, Insomnia, depression and exhaustion, moreover it is external used to treat loss of smell, insect stings, snake bites and skin infections. The mucilaginous seed is given in the treatment of gonorrhoea, dysentery, chronic diarrhea and antioxidants.

Black pepper: Black pepper having been known and valued since ancient times for both its flavour and its medicinal uses. Black pepper finds extensive use in the Ayurvedic system of medicine. Black pepper oil is used as nerve tonic, in fevers, gonorrhoea, paralytic and arthritic disorders. It is used as antibacterial, antidiarrheal and cholera. Externally it is used for skin diseases. In India it had been used as a medicine for variety of ailments from paralysis to toothache. According to Ayurveda it is useful in treatment of asthma, chronic indigestion, colon toxins, obesity, sinus congestion, fever, intermittent fever, cold extremities, colic pain, piles, worms and sore throat.

It is also prescribed for dyspepsia, flatulence, and various gastric ailments. Moreover, alkaloids and amides isolated from *Piper nigrum* displayed good insecticidal and larvicidal activity.

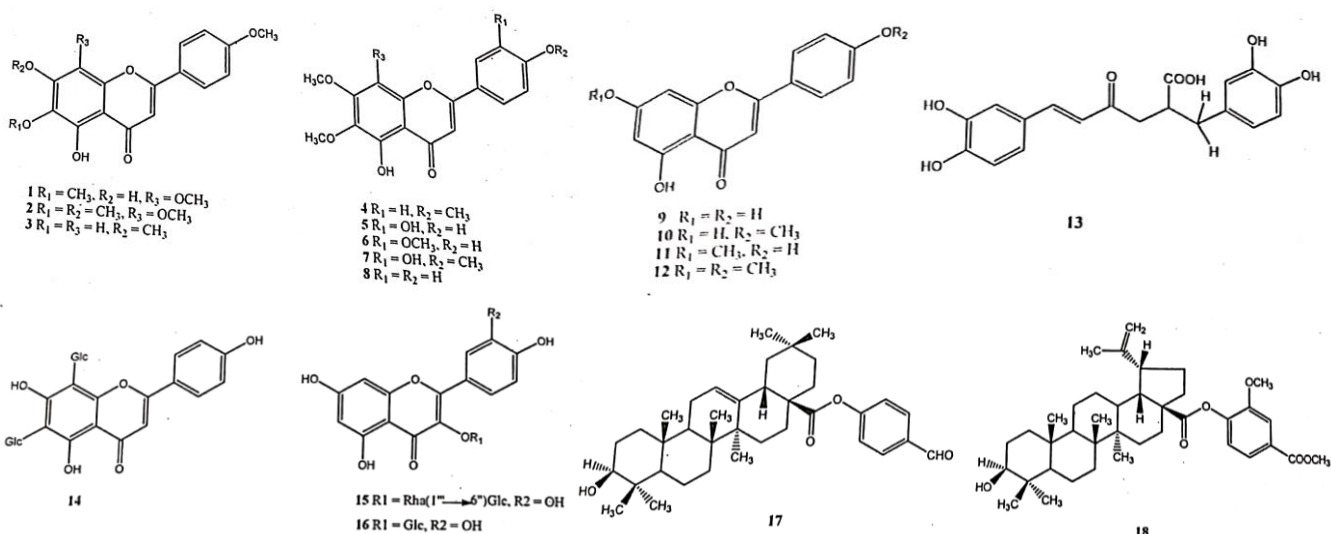
Bael: Bael is a very good source of protein which is 5.12 % of the edible portion. Bael leaves, fruits and root can be used as tonic and coolant with antibiotic and Hepatoprotective properties. Fresh half-ripe Bael fruit is mildly astringent and is used for dysentery and diarrhea. Bael leaves are extremely useful for treating Diabetes, jaundice, cholera and asthma.

Bael Fruits are very useful in chronic diarrhea and dysentery, particularly in the case of patients having diarrhea, alternating with the spells of constipation. In Indian Ayurvedic concept the oil is useful in removing the burning sensation in the soles, amoebic dysentery, griping pain in the loins a constipation and myocardial infection.

Bahupatra: Phyllanthus is an herbal medicine with anti-viral effect. It is used for support in treatment of hepatitis, jaundice, gonorrhoea, frequent menstruation, diabetes and HIV. It has also been used Anti-babesial, anti-plasmodial and antioxidant Entire plant (root, stem and leaf area) are having its medicinal value and the whole plant is used in Ayurvedic formulations. Research shows that this herb acts primarily on the liver. This action in the liver confirms its historical use as a remedy for jaundice.

Phytochemicals isolated from *Ocimum basilicum*

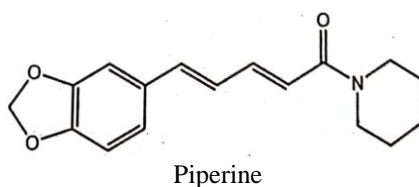
Sacred basil contains a volatile oil consisting of about 70% eugenol as well as methyl eugenol and caryophyllene. Other constituents with likely pharmacological activity include the triterpenoid ursolic acid, rosmarinic acid, alkaloids, saponins, flavonoids (including apigenin and luteolin and glycosides), phenylpropane glucosides and tannins. *O. basilicum* green is also a rich source of anthocyanins and an abundant source of acylated and glycosylated anthocyanins. Aroma compounds are also extracted from *O. basilicum* and used in a wide variety of products such as cosmetics and natural flavors its constituents also used for inhibitory activity against HIV-1 reverse transcriptase.

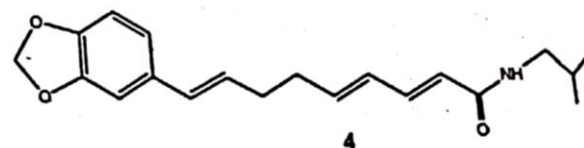
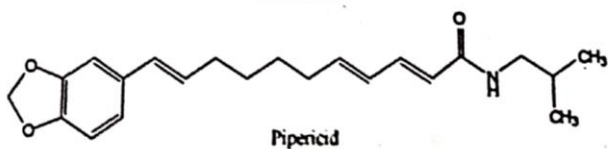
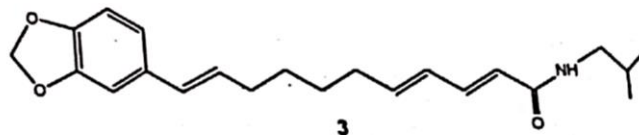
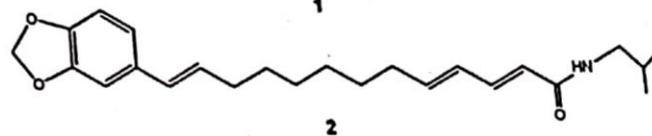
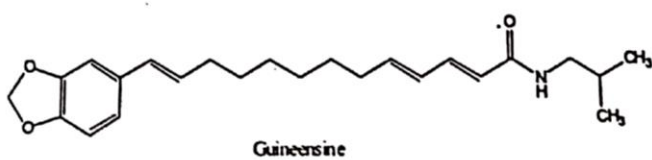
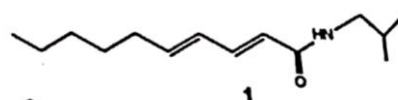
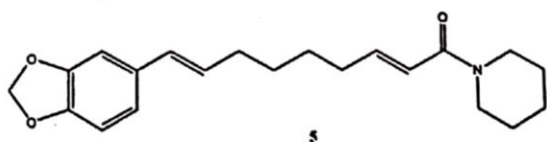
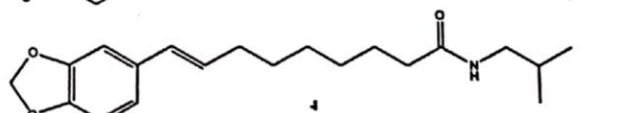
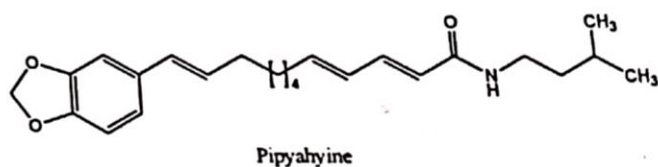
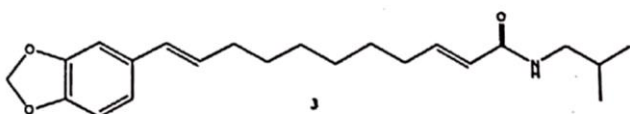
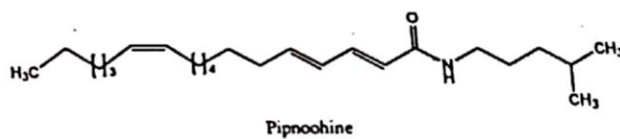
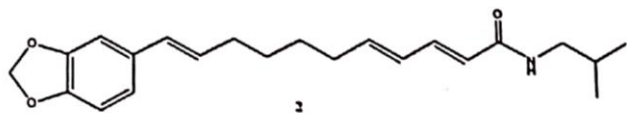
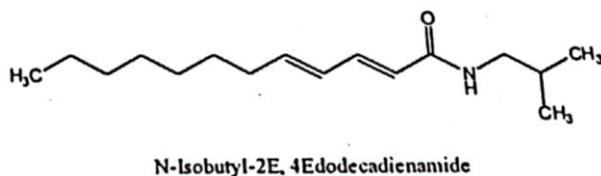
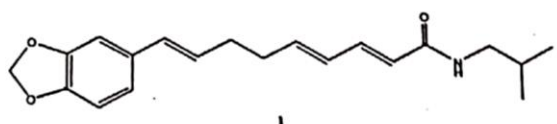
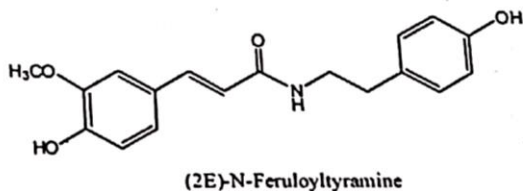
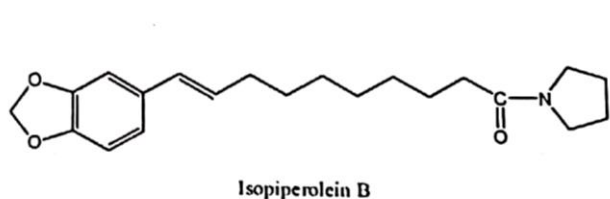
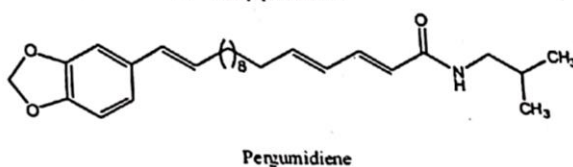
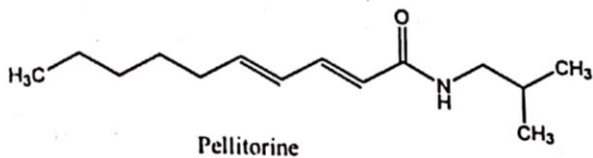
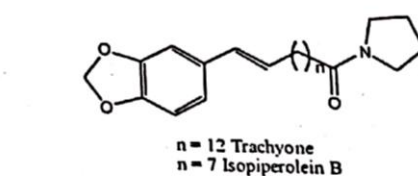
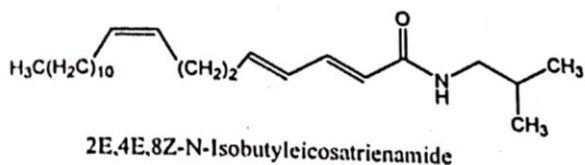


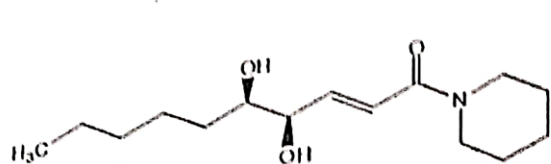
Phytochemicals isolated from *Piper nigrum*

Several alkaloidal and non-alkaloidal constituents have been reported from this plant. Previously phytochemical studies have revealed 600 constituents classified in various structural categories, such as terpenes, steroids, lignins, flavones and alkaloids/ amide. The major constituent is

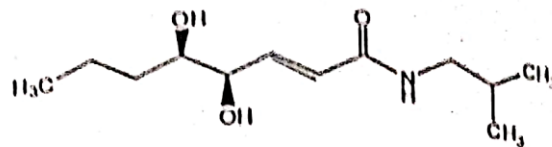
piperine, which is responsible for the pungency of the fruit, and displayed a variety of pharmacological activities, e.g. antifungal, antidiarrhoeal, anti-inflammatory, as well as 5-lipoxygenase and cyclooxygenase-1 inhibitory, ACAT inhibition, and Melanocyte proliferation activities.



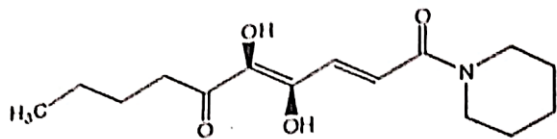




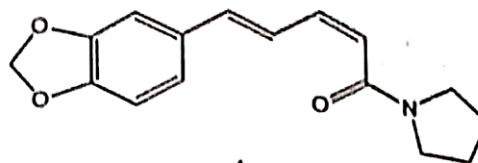
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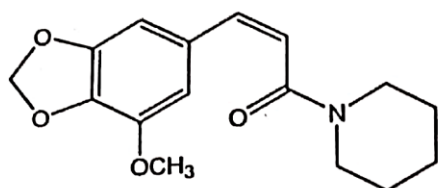
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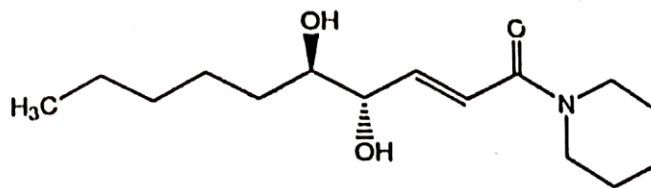
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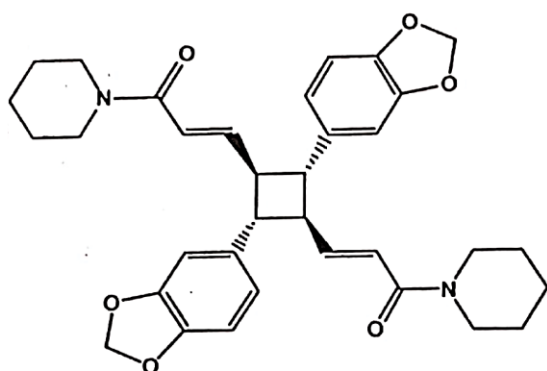
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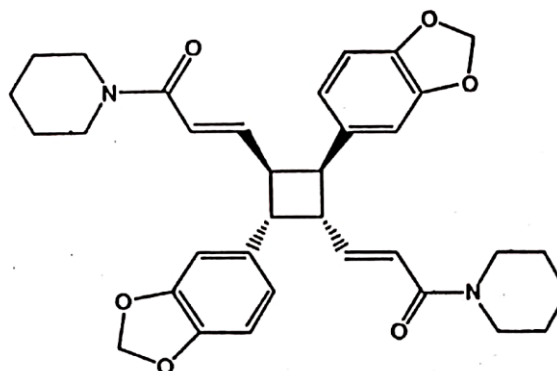
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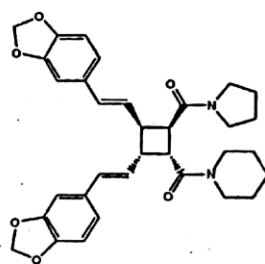
6



Dipiperamide A



Dipiperamide B



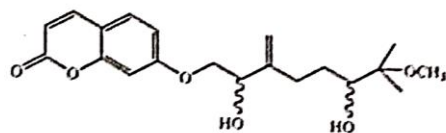
Dipiperamide C

Phytochemical isolated from *Aegle marmelos*

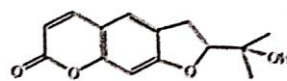
The *in vitro* antiviral activity of a series of compounds in samples extracted from various parts of *Aegle marmelos* corr. has been evaluated for their efficacy against human coxsackievirus B1–B6. The inhibitory concentrations (IC_{50}) for leaves (L_1 and L_2) stem and stem bark (S_1 , S_2 , S_3 and S_4) fruit (F_1 and F_2) root and root bark (R_1 and R_2) and pure compound, the marmelide were 1000 $\mu\text{g/ml}$ (for L_1 and L_2), 1000 $\mu\text{g/ml}$ (for S_1 , S_2 , S_3 and S_4), 1000 $\mu\text{g/ml}$ (for F_1) and

500 $\mu\text{g/ml}$ (for F_2) 250 $\mu\text{g/ml}$ (for R_1) and 500 $\mu\text{g/ml}$ (for R_2) and 62.5 $\mu\text{g/ml}$ for marmelide, respectively by plaque inhibition assay at 96hrs in compared to Ribavirin, a standard antiviral drug (2000 $\mu\text{g/ml}$ for the same viruses at the same time period).

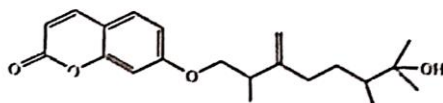
Several coumarins, alkaloids, flavonoids, lignan-glucosides, triterpenoids, sterols, carbohydrates, anthraquinones, lactones and volatile oils have been isolated and are well documented in literature.



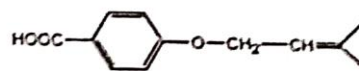
Marmesin



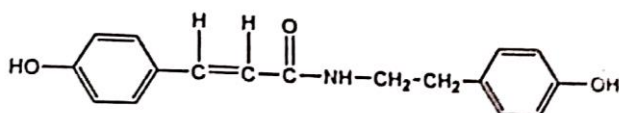
Rutaretin



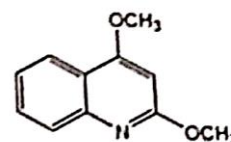
Praecaltin



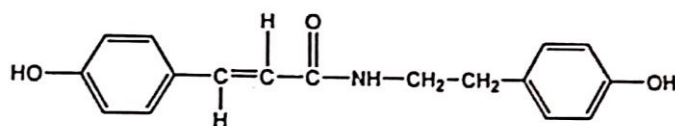
Valeric acid



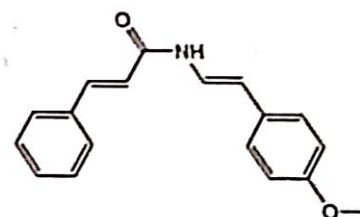
N-cis-Coumaryltyramine



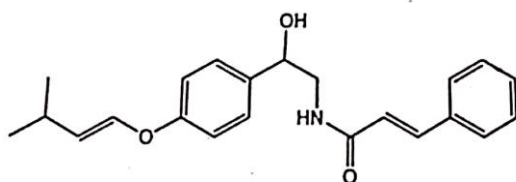
Montanine



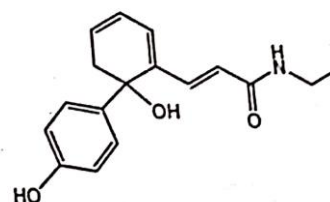
N-trans-Coumaryltyramine



N-4-methoxystyryl cinnamide



N-hydroxy-2-(4(3', 3'-dimethylallyloxy)-phenyl) ethyl cinnamide

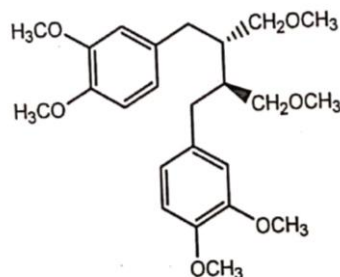


N-2-hydroxy-2-(4-hydroxyphenyl) ethyl cinnamide

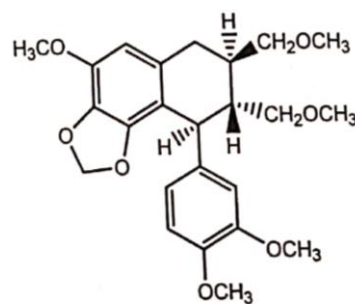
Phytochemicals isolated for *Phyllanthus niruri*

Root, stem and leaves contain following main constituents. *P. niruri* has been reported to inhibit hepatitis B virus polymerase activity and decreases episomal hepatitis B virus DNA content, suppressing viral release into the culture medium. Fifty nine percent of those infected with chronic viral hepatitis B lost one of the major blood markers of HBV infection (e.g. hepatitis B surface antigen) after using *Phyllanthus* for thirty days. However, some of identified active constituents from *P. amarus* the phyllanthin, hypophyllanthine. The plant leaves of *Phyllanthus* sp. contain

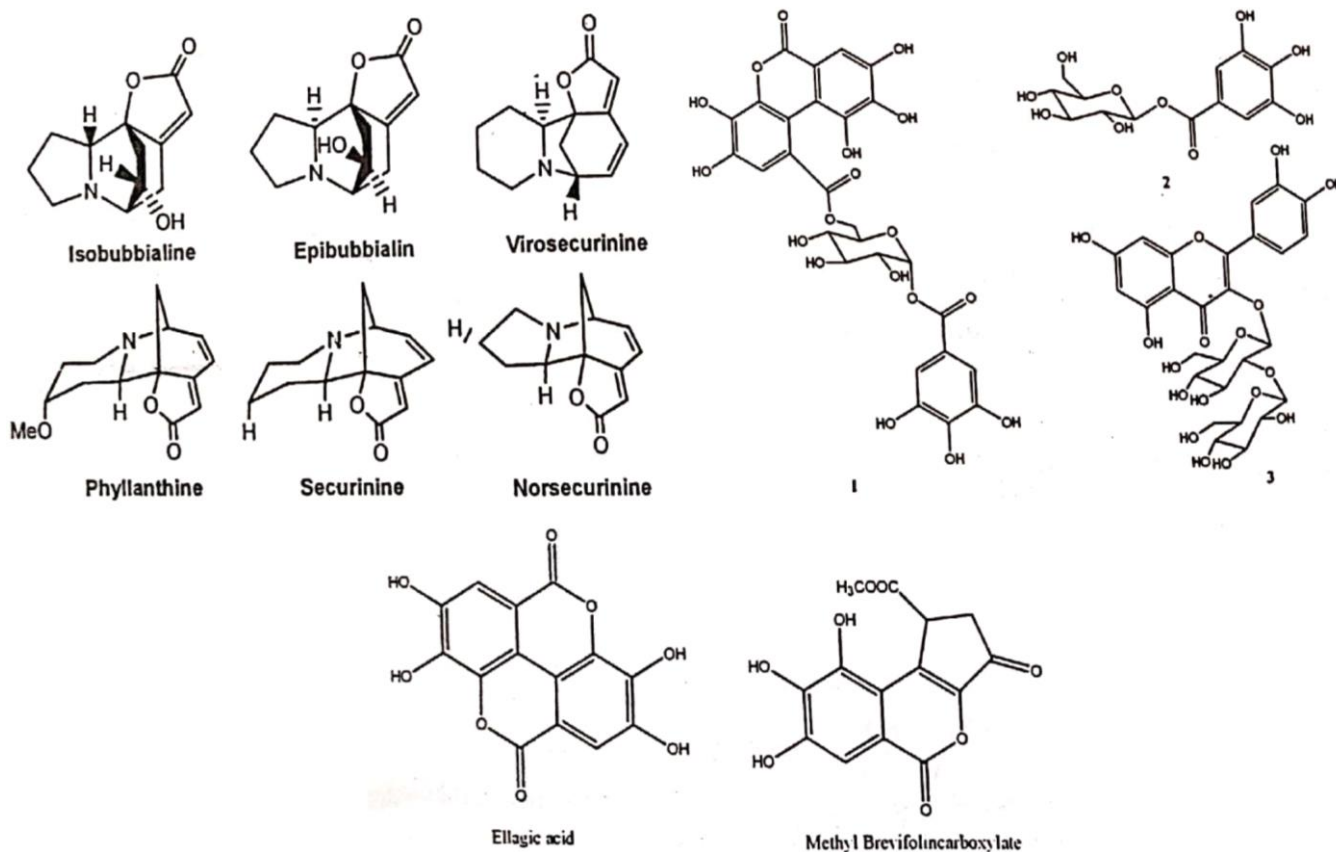
securinega-type alkaloids some which have shown potent antimalarial, antibacterial activity and also cause apoptosis in leukemia cells. Significant number of bio-active flavonoids viz. quercetin, astralgin, quercetrin, isoquercitrin and rutin has been reported from different plant parts of *P. urinaria*, *P. niruri* and *P. amarus*. A flavonoid ellagic acid was isolated from leaves of *P. urinaria* exhibited a unique anti-HBV function. Ellagic acid does not inhibit either HBV polymerase activity, HBV replication or block HBsAg secretion. Rather, ellagic acid blocks effectively HBeAg secretion in HepG2 2.2.15 cells (IC₅₀= 0.07 mg/till).



Phyllanthine



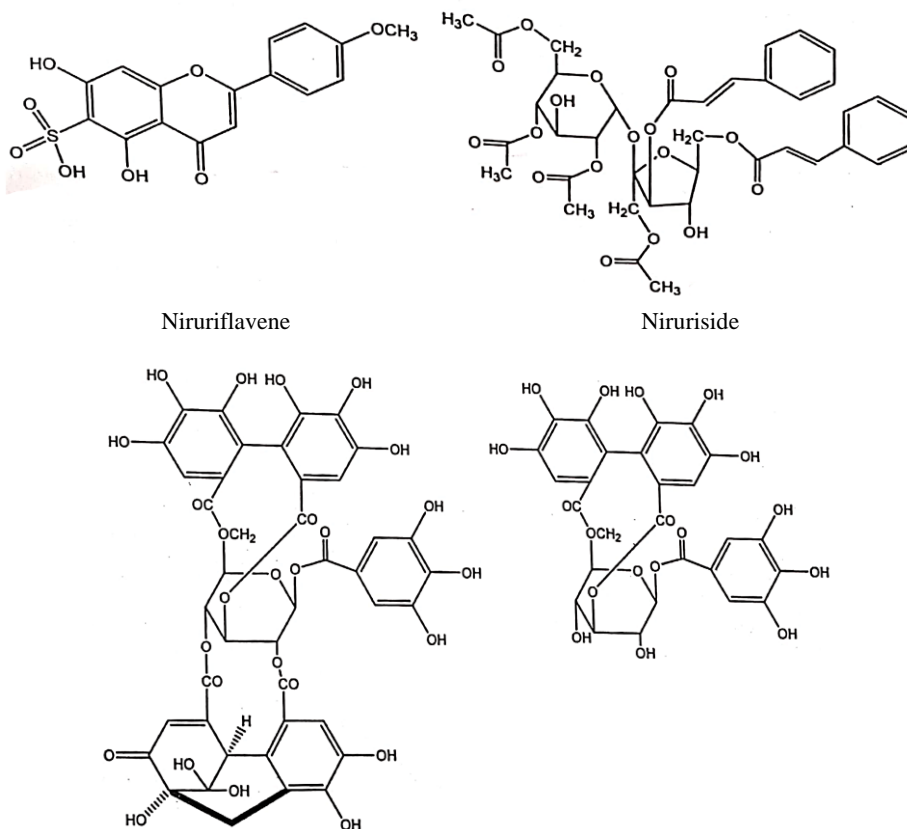
Hypophyllanthine



Conclusion

The chemical investigation of these plants may lead to promising-natural products active against swine flu in future. Tami flu possesses mainly two functional groups; an amino and amide. Phytochemicals reported from ayurvedic recipe invariably possess similar functionalities. It is likely that due

to this reason water extract of plants' mixture have effects similar to Tami flu. Also, during the process of decoction many molecules are treated together innocently. Producing artifact possessing that similar effect cannot be ruled out. But this is to be substantiated.



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