



Herbal Drug Nux Vomica Showing Anti-Gastritis Activity

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ABSTRACT

Nux Vomica are button-shaped seeds, not nuts, with a centrally depressed part that is about an inch in diameter and a quarter of an inch thick. The medium-sized tree that supplies this medicine is native to tropical India and nearby islands. They have a mouse- or greenish-colored hue, and their glossy, adpressed hairs give them a silky sheen. They are highly bitter, horny, rough, hard, and albuminous. If they haven't been steamed beforehand, they are difficult to powder. After the albumen is softened by maceration in water, particularly hot water, the seed is transversely sliced, releasing a mass of cartilaginous albumen that is split into two bean-like halves, with the germ located in between. Massive amounts of these seeds are transported; thousands of tonnes are shipped to America, the Continent, and England, in that order. The majority of commercial strychnine and brucine comes from Nux vomica, however St. Ignatius bean produces a higher percentage of each alkaloid. In light of this, it is possible to argue that false reports have been made regarding Nux Vomica's status as a Philippine medicinal product. But St. Ignatius is the Philippine tree. Given that Nux Vomica is poisonous, the European pharmacopoeias only reluctantly included it. Although it was a dispensatory medication long before this period, it was acknowledged in America (1830) before it was made official in England. However, it was recognised as official in two additional Continental European pharmacopoeias including the Pharmacopoeia Borussica in 1799. Nux vomica is used to treat a variety of ailments, including migraines, erectile dysfunction (ED), stomach edoema, constipation, anxiety, and anxiety. However, these claims are not well supported by scientific research.

Nux vomica is also dangerous. Along with other substances that affect the brain and create muscle contractions, it contains strychnine. Death and convulsions may result from this. Even at levels too low to cause symptoms, strychnine can still pose a significant risk. Prolonged usage of strychnine causes small amounts to accumulate in the body, particularly in liver disease patients. In a matter of weeks, this may result in death. Laboratory testing can identify strychnine toxicity.

Keywords: Nux-Vomica, Strychnine and Brucine, Poisonous nature, Medicinal product, Erectile dysfunction (ED), Constipation, Anxiety, Strychnine poisoning

Introduction:

The main ingredient of Nux Vomica is a complex chemical that is a priceless natural cure. By means of chemical reagents it can be separated into pieces, embracing two very poisonous alkaloidal compounds, a glucosid, and acids. These alkaloids are Brucine, Strychnine, and possibly Igasurine (though this is uncertain). Igasuric acid is the primary acid, and Loganin is the name of that glucosid. All of these entities are colourless, and the alkaloids are extremely bitter and energetically toxic. Brucine is a toxin that functions similarly to strychnine, working more slowly and less violently but still with the same degree of certainty.

Each medical school's therapy greatly benefits from the use of Nux Vomica. Initially favoured by the Regular school, who is given credit for its introduction here, it has gained immense recognition from the Homoeopathic and Eclectic schools as well. In the latter, it has been thoroughly examined on its own and is considered one of the most significant of all the Eclectic medicines.

The crystalline alkaloid strychnine (CH N₂O), which is extremely toxic, dissolves somewhat in cold water (1 part in 6700 U.S. P.); the resulting solution is bitter and alkaline. It dissolves in 150 parts 90% alcohol and 7 parts chloroform. Strychnine is a terrible tetanic poison that affects the cerebro-spinal system. However, it kills without causing significant anatomical changes; muscles and nerves are hardly affected, but the brain and spinal cord, stomach and limbs, right side of the heart, and lungs may all become extremely congested. Strychnine has a lethal dosage that is comparable to grain. In fact, records show that grain killed a man in twenty minutes and a two-year-old infant in four hours.



Figure 1: Picture of Nux-Vomica plant, Family: Loganiaceae

Cultivation and Characterization:

The medium-sized tree that supplies this medicine is native to tropical India and nearby islands. The little plant that produces pink-root, *Spigelia Marilandica*, is its closest relative in the United States. The inhabitants of Nux Vomica's natural habitat have long utilised the close-grained, bitter wood of the plant as a tonic, and they continue to do so today. The Indian people esteem the wood of this and allied trees, known by the old name "Lignum Columbrinura," as a remedy for the cobra's venomous bite. The trunk is thick, twisted, and short. The branches are ash brown, the young shoots finely polished.

The fruit is acidulous, yellow, and roughly the size of a tiny orange. It has a delicious white pulp within that many birds and youngsters enjoy. One to five disc-shaped seeds with a strongly poisonous flavour are inserted into this pulp in an erratic, vertical manner.

The leaves are oval in shape, have a lustrous coat, are smooth on both sides, and have an opposite decussate arrangement, where each opposing pair of leaves is at a right angle to the next pair along the stem. The leaves measure roughly 7.6 cm (3 in) in width and 10 cm (4 in) in length.

The flowers are funnel-shaped, tiny, and have a light green hue. They smell bad and blossom during the winter. The fruit has a smooth, firm shell that turns a moderate shade of orange when ripe. It is roughly the size of a large apple. The fruit has white, creamy flesh and a jelly-like pulp that contains five seeds coated in a fuzzy, squishy material.

The seeds resemble a flattened disc that is entirely covered in hairs that extend outward from the centre of the sides. This imparts a distinctive gloss to the seeds. The seeds are extremely tough and have a dark grey, hairy endosperm that contains the tiny, bitter-tasting embryo. The embryo has no smell.



Figure 2: Seedling of Nux-Vomica



Figure 3: Seeds of *Strychnos Nux Vomica*

Incompatibility:

Ultimately, the precipitated bromide of strychnine is administered in a single dosage; alkalies, iodides, and bromides remove the drug from solution. The soluble bromides are particularly hazardous due to their slow transformation. Because of this, Nux-Vomica preparations and alkaloids' solutions shouldn't be combined with the aforementioned ingredients unless special care is made to thoroughly shake the combination before taking a dose.

Strychnine circulates in the blood after being absorbed by it. Although it is removed unaltered in the urine, it is expelled very slowly, which causes it to build up in the system. The fact that this potent, highly poisonous alkaloid is so frequently abused for illicit purposes and that doctors can administer it carelessly, leading to the accumulation of its toxic effects, compels us to give it more attention and to be extra cautious when warning our readers about its misuse.

Herbalism:

Herbal medicine promotes strychnos as a remedy for a variety of illnesses, such as heart disease and cancer. However, there isn't any proof that it works to treat any ailments.[8] Indeed, these seeds contain strychnine. The plant is not advised for usage because it has not been shown to be safe or effective, which is why it is listed on the Commission E list of prohibited herbs. Since strychnine is an extremely toxic substance with no safe ingestion limit, using strychnine seeds for such purposes could be fatal.

Ayurveda, the traditional Indian medical system, defines hudar as a concoction that contains *Strychnos nux-vomica*. The seeds are boiled in milk after being submerged in water for five days, then in milk for two days.

Using proven HPLC techniques and the HPLC-UV approach, one can ascertain the amount of poisonous alkaloids present in raw *Strychnos* seeds used in traditional treatments.



Figure 5: Bark of *Strychnos Nux-Vomica*

Pharmacological activity of *Strychnos Nux-Vomica*:

Different portions of this plant have yielded extracts, fractions, and pure chemicals, all of which have been examined to determine their potential pharmacological effects in both in vitro and in vivo settings. The following section presents the pharmacological actions noted by several authors. These activities include anti-inflammatory, antibacterial, anticancer, gastroprotective, hepatoprotective, antioxidant, antinociceptive, and anti-allergic properties. Furthermore, this summary also includes the pharmacological actions of some of the active ingredients.

- **Hepatoprotective:** Although nux vomica is classified as a poisonous medicine, its processed extract is nonetheless utilised in a number of herbal formulations to treat a variety of conditions, such as jaundice and liver disorders. A recent in vivo investigation using rat liver injury generated by CCl₄ tests showed the hepatoprotective efficacy of processed seed extract. Glutamate pyruvate transaminase (GPT), glutamate oxaloacetate transaminase (GOT), alkaline phosphatase (ALP), bilirubin, and cholesterol were found to be reduced in serum after oral administration of varying doses of processed seed extract for five days. Additionally, glutathione (GSH) was restored, and lipid peroxidation in liver tissue was decreased. Loganin was extracted from the fruit of Nux vomica and demonstrated good hepatoprotective activity in both ex vivo and in vivo models of galactosamine-induced liver injury in a study conducted by Visen et al. Loganin's ability to protect the liver was verified by its ability to mitigate the effects of galactosamine on the viability of hepatocytes, bile volume, and bile contents.
- **Antioxidant:**

It was Tripathi and Chaurasia who first documented the antioxidant properties of nux vomica seeds. The ethanol extract of nux vomica dosage dependently prevented the FeSO₄ -induced lipid peroxidation by the chelation of Fe⁺⁺/Fe⁺⁺⁺ ions not by tapping the hydroxyl radicals. In subsequent investigations, scientists found that the methanol extract of seeds exhibited strong antioxidant activity by decreasing lipid peroxidation and raising antioxidant enzyme levels in the liver of rats given alloxan-induced diabetes, such as super oxide dismutase (SOD) and catalase. The presence of antioxidant components such loganin, uvaol, secoxyloganin, maltol, lupeol, hydroxybenzoic acid, and caffeic acid may explain the nux vomica seed extract's antioxidant activity.

- **Gastroprotective:**

Different kinds of nux vomica seed extract are frequently used clinically as a significant cure for gastritis, gastric ulcers, atony, and relaxation of the stomach and bowels in both Ayurvedic and homoeopathic medicine. Even at dilutions greater than Avogadro's number, a recent study using a highly diluted form of nux vomica seeds extract made in ethanol was found to inhibit the up-regulation of HB-EGF gene expression in KATO-III cells caused by *Helicobacter pylori*.

- **Anti-snake Venom:**
- Chatterjee et al. assessed the nux vomica seed extract's ability to repel snake venom. The extract from nux vomica seeds was found to be an efficient means of neutralising the fatal, cardiotoxicity, neurotoxicity, and defibrinogenation caused by the venom of *Daboia russelii* and *Naja kaouthia*, respectively, at low dosages.

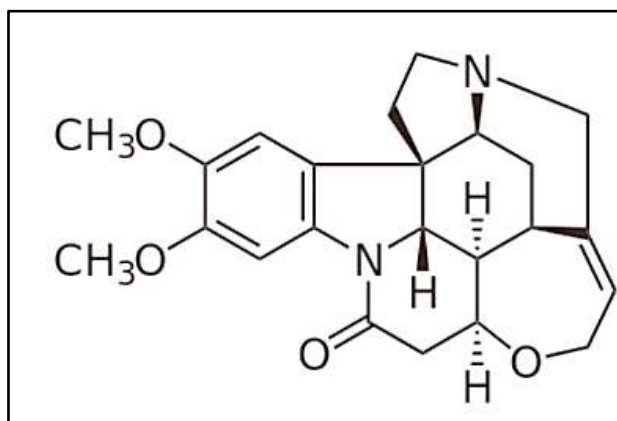


Figure 6: Chemical structure of *Strychnos Nux-Vomica*.

Pharmaceutical Preparations:

The alkaloids are sometimes prescribed in solution, and have long been made into pill, tablet or pellet form. Of the solutions, Hall's Solution of Strychnine is an old preparation occasionally used at present, especially by physicians inexperienced in the qualities of modern pharmacy as applied to the drug as a whole. The sugared preparations carrying Strychnine and Brucine in tab. et, pill and pellet form are simply mechanically divided alkaloidal doses, there being little if any distinction other than in name and no choice as concerns results. A tablet of one-sixteenth grain Strychnine is the same as a pellet or a pill of the same strength. Both types are inexpensive and simple to eradicate, neither demands more expertise than other comparable mechanical treatment forms, and none has any discernible advantages over the other. Such medications have a reasonable assurance for the amount of alkaloids they contain, and they are effective and helpful when strychnine is suitable for the intended use.

Clinical research has shown that modest doses of strychnine, when paired with quinine, iron, and phosphoric acid, exhibit distinct tonic properties not found in any of the elements by themselves. Stated differently, they reinforce one another. It is important to remember this. should keep in mind when either substance's tonic qualities are sought, particularly when neither one works alone to provide the intended result. This is partially consistent with the observation that the natural medication combination that produces strychnine has advantages over that alkaloid; nevertheless, the combination scenario that is being discussed presents a novel combination involving external chemicals. Variations on the above formula are called Aitkin's Syrup, Easton's Syrup, and the Eclectic "Compound Tonic Mixture," the latter of which is much sought after and will be covered in a special Drug Treatise. If natural Nux Vomica solutions didn't contain iron compounds, they would definitely be significantly superior to strychnine in all of these formulations.

Laxatives include combinations of strychnine and belladonna, strychnine, aloes, and belladonna, and similar concoctions that are taken as pills and tablets; nevertheless, they should only be used under a doctor's careful supervision. This also holds true for all forms and salts of strychnine, including compounded and simple forms that come in tablets, pills, and pellet form. They are all cumulative and energetic toxins."



Figure7: Marketed product of Nux-Vomica

Extraction of *Strychnos Nux-Vomica*:

- Nux Vomica Extract: This is a dried extract that is combined with milk sugar to create a pulverulent consistency. It is exceedingly bitter, pale in colour, and according to the U.S. P. assay procedure, yields 15 percent mixed alkaloids. It is mostly used to create tinctures and in tablet form.

Nux Vomica Fluid Extract: Made straight from the medicine, this is a more concentrated version than the Tincture. Using the U. S. P. test method, 100 cubic centimetres provides 1.5 grammes of mixed alkaloids. Although it is a great medicinal preparation, it is not perfect since its manufacturing technique is too labor-intensive to allow for economical small-scale manipulation. Manipulating a little amount involves significant expense and loss because time is a crucial factor in the drug's depletion and the method requires a significant amount of alcohol. This holds true for the solid extract as well. While less attractive in appearance than the Tincture, the Nux Vomica Fluid Extract has an extremely harsh taste.

All of these authorised medicinal compounds should be used with the same cautions as strychnine because they are all toxic in overdoses.

Toxicology:

After receiving a lethal dose of strychnine, the patient starts to experience anxiety due to a feeling of impending suffocation approximately an hour later. Then, the tetanic convulsions start violently, affecting almost every muscle in the body at once. The force of the contractions causes the limbs to flail, the fists to clench, the head to jerk forward and then bend backward, and the entire body to become perfectly stiff. The temperature may rise due to the quick pulse. Both vision and hearing are keen. After a minute or two of convulsions, the patient experiences muscle relaxation, weariness, and perspiration all over. There is a brief interval before the convulsions quickly return and the muscles relax once more. The seizures now happen quickly. The patient is in the opisthotonos position, resting on his head and heels, due to a worsening of the condition and the forceful contractions of his back muscles. The gaze is fixed, the face gets angry, the chest is rigid, and the abdominal muscles are as stiff as a board. A risus sardonicus is produced by the facial muscles contracting, however the jaw muscles are not impacted until the very end. To the very end, consciousness is retained. The convulsions will automatically start with the least sound or even bright light, and the patient may be jolted out of bed. Finally, suffocation and tiredness cause him to pass away. Half a grain is the smallest known amount of strychnine that can kill an adult.

Discussion

Just as particular ipecac was used to treat gastrointestinal tract irritation, Nux is used to treat atony. The symptoms include sallow complexion, fullness in the stomach and intestines, inactivity or a propensity towards costiveness, constipation, and a pale or coated tongue. It frequently stops nausea and

vomiting, but not when there are signs of inflammation. It stops diarrhoea, including persistent diarrhoea that results from an atonic state, and it appears that there is a power shortage. When combined with muriatic acid, it works better than any and all pepsin formulations for dyspepsia or chronic gastritis. It will provide relief from colic when the cause is indigestion and the pain is in the umbilical area, either by itself or in combination with a particular colostrum. Typically, we recommend five to twenty drops of the combination in four ounces of water, or a teaspoonful, every one to four hours, depending on the patient's age and the desired outcome.

Conclusion

Derived from *Strychnos Nux-Vomica* seeds, *Nux Vomica* has strong constituents such as brucine and strychnine that have both medicinal and toxicological properties. It is used in herbalism, homoeopathy, and allopathy despite its toxicity. The wood of this tree, which is grown in tropical India, has long been used as a tonic. Due to their special qualities, the seeds have a wide range of pharmacological effects, including hepatoprotective and possibly anti-snake venom uses. Because they are poisonous, pharmaceutical preparations such as Hall's Solution of Strychnine should be used with caution. Despite being toxic, strychnine works well as a tonic when combined with quinine, iron, and phosphoric acid. Studies on toxicology point to serious repercussions, such as sudden tetanic seizures. The ongoing interest *Nux Vomica* has shown in both conventional and alternative medicine is indicative of the delicate balance that exists between the potential advantages of natural therapies and their inherent hazards.

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