ANTIMICROBIAL ACTIVITY OF UPAVISHA AND ITS CLINICAL CORRELATION WITH CONTEMPORARY SCIENCE: A REVIEW

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ABSTRACT: In Ayurveda, there are less toxic herbal drugs known as upavisha. Upavisha are mostly used in various diseases with many therapeutically preparations. As per Ayurveda, Upavisha is group of less toxic drug. These drugs are either not having all ten gunas or they have less potent gunas. The properties of these drugs are to cure acute and chronic disease. These groups also have antimicrobial/ anti-infective activity. Ayurvedic formulation having these drugs can be used in various microbial disorders. The classical preparations of all upavisha are indicated in mostly chronic ailments, vatavikara, neuromuscular disorder, gastrointestinal disorder and skin disorder.

INTRODUCTION: Ayurveda has richest source of pioneer health knowledge and treatment as well as preventive and curative. Ayurveda has eight branches. Agad tantra is one of the most important branche of Ayurveda which deals with study of all animal, herbal and other poisonous substances, sign, symptoms and management. The Visha (poison) is divided in two major groups, sthavar visha (vegetative and mineral poison) and jangam visha (animal poison) ¹. Sthavara visha is again divided in to visha and upavisha. The number of visha and upvisha are nine and eleven respectively. According to Acharya Sadananda Sharma upavisha are following;

- Vishatinduk beeja (Nuxvomica)
- Ahiphen (Opium)
- Jaipal (Purging croton)
- Dhatturbeeja (Thorn apple)
- Bhanga (Indian Hemp)
- Gunja (Indian Liquorice)
- Bhallatak (Marking Nut)
- Arka ksheera (Madar)
- S0.nuhi ksheera (Common milk hedge)
- Langali (Malabar Glory Lily)
- Karveera (Indian oleander) ²

Strychnos nuxvomica: The antibacterial activity and antifungal activity of Strychnos nuxvomica extracted from n-butanol, methanol, distilled water were tested against Staphylococcus, aureus, Salmonella and Klebsiella pneumonia. The antifungal activity in same solvent of nux vomica were tested against Aspergillus.
terreus, and Aspergillus flavus. Maximum zone of inhibition, was observed when n-butanol extract of Strychnos-nux vomica was were used against the said bacterial and fungal organism. The aqueous extract of Strychnos nux vomica does not showed any activity on bacteria and fungi. Antibacterial activity of ethylacetate extract of Strychnos nuxvomica, exhibited maximum zone of inhibition against Bacillus, Brochothrix, Clavibacter, Ancylobacter and Brevibacterium were observed.

**Papaver somniferum:**
Antibacterial effects of opiates that had been showed in different studies. Antibacterial and antifungal effects of bupivacaine and morphine are reported, but they are dose dependent.

**Croton tiglium:**
Antibacterial activity of the ethanol extract of C. tiglium show inhibitory activity against (Shalid et al. 2008). Antimicrobial activity of different plant extracts on pathogenic bacteria was studied and reported by other worker. The leaf and seed extract of Croton tiglium possesses antibacterial and antifungal activities against the microorganisms tested. A total of seven microorganisms which consists of four bacteria and three fungi (Staphylococcus aureus, Staphylococcus epidermidis, Escherichia coli, Pseudomonas Aeruginosa, Candida albicans, Trichophyton rubrum and Microsporum canis) were tested.

**Datura metel:**
Several reports have been carried out with antimicrobial activity against bacteria, bacterial pathogens and fungi (Sakthi et al., 2011 and Ali and Shuab, 1996). The different extracts was tested for its antimicrobial activity against one gram (+) bacteria (S. aureus) and three gram (−) bacteria (E. coli, K. pneumoniae and P. aeruginosa) on nutrient agar plates using disc Diffusion method.

**Cannabis sativa:**
The various extracts of C. sativa in were tested and got antibacterial and antifungal activity against two Gram-positive bacteria Bacillus subtilis and Staphylococcus aureus, two Gram-negative bacteria, Escherichia coli and Pseudomonas aeruginosa and two fungi Aspergillus niger, Candida albicans.

**Abrus precatorius:**
The different concentration methanol extracts of Abrus precatorius L. plant shows antimicrobial activity against the tested organisms in the order of Staphylococcus aureus, Vibrio cholera, Yersinia enterocolitica, Salmonella typhi, Bacillus subtilis, Listeria monocytogenes, Klebsiella pneumonia, Bacillus megaterium. In case of fungi activity against tested organisms was in the order of Aspergillus niger, Candida albicans. In case of the maximal antibacterial activity was observed against Klebsiella pneumonia. The antibacterial activity of A. precatorius seed methanolic crude extracts showed maximum antibacterial activity on Klebsilla pneumonia, followed by Staphylococcus aureus, Streptococcus mitis and Micrococcus luteus.

**Semecarpus anacardium:**
The preformed compounds like saponins also have antifungal properties (Aboaba et al., 2001). Many plants contain non-toxic glycosides that can get hydrolyzed to release phenolics that are toxic to microbial pathogens (Aboaba et al., 2001). The compounds detected may be responsible for the antibacterial activity of the nuts of S. anacardium L.f. Several research works were done on phenolic constituents (Govindachari et al., 1971; Prakasa Rao and Ramachandra Rao, 1973).

An Ayurvedic preparations of S.anacardium called “Bhallatakasava” was shown to have antibacterial activity against tetanus causing micro organism. Alcoholic and oil extracts of S.anacardium dry nuts have antimicrobial activity against Gram-positive and Gram-negative bacteria. Anacardic acid from the nuts exhibited antimicrobial properties. Alcoholic extract of dry nuts showed dose dependant antifungal activity in vitro against Aspergillus fumigatus and Candida albicans. At 400mg/ml concentration, growth of both fungi were inhibited and considerable reduction in size of cells, hyphae, and reduced sporulation was also observed.

**Calotropis procera:** Antibacterial property of Calotropis dry latex, the main target is the bacterial
cytoplasmic membrane. Damage also occurs to the outer membrane in gram-negative bacteria and the cell wall in gram-positive cells. Calotropis latex content is having the antifungal (Aspergillus flavus) property and can kill several fungi.

**Euphorbia nerifolia:**
The methanol extract of plant *Euphorbia nerifolia* possess significant antimicrobial activity in term of antibacterial and antifungal effects (two gram positive bacteria *Staphylococcus aureus* and *Streptococcus aerogenosa* and four gram negative bacteria *Escherichia Coli*, *Pseudomonas aeruginosa*, *Salmonella typhi*, *Proteus vulgaris* and two fungi *Aspergillus niger*, *Candida albicans*). This antimicrobial property against bacteria and fungi surely is due to presence of some antimicrobial substances in stems.

**Gloriosa superb:**
The antibacterial activity results of seeds and tubers extracts of *G. superba* showed excellent effect against the five gram positive and gram negative bacteria. The result of tuber extracts presented maximum zone of inhibition was observed on *B. cereus* in methanol 250 µl concentration followed by *E. coli*, *S. fecalis*, *K. pneumonia*, *S. aureus*, *P. aeruginosa*, *S. cremoris*, *P. vulgaris*, *B. subtilis* and minimum zone of inhibition observed on *S. typhi*. Phytochemicals from root tubers have wide spectrum action against gram-positive and gram-negative bacteria along with antifungal and mutagenic potential.

The maximum inhibitory activity was seen in methanol extracts. In the case of tuber, the high inhibitory activity was seen in methanol extract against *Proteus vulgaris* and *Bacillus sp* and also in flower and seed, maximum inhibition zone obtained in methanol extract against *Pseudomonas aeruginosa* and *Staphylococcus aureus* respectively (Nikhila et al., 2014).

**Nerium indicum (NI)/ Thevetia nerifolia (TN):**
All the extracts displayed broad spectrum of activity against gram +ve bacteria and fungus. The *Nerium indicum* extracts decrease the microbial growth, this suggests that it is, having microbiostatic effects. The results obtained are encouraging as the methanolic, chloroform, hexane extracts have shown considerable antimicrobial activity. The activity of the plant is appreciable considering the importance of microorganisms. An ethnopharmacological screening, plants used in Nepalese traditional medicine were evaluated for antiviral activity.

Methanolic and methanolic-aqueous extracts derived of 23 species were assayed in two *in vitro* viral systems, influenza virus/MDCK cells and herpes simplex virus/Vero cells. *Nerium indicum* showed the highest antiinfluenzaviral activity with 50% inhibitory dose of 10 microg/ml against herpes simplex virus. None of these extracts showed cytotoxic effects. The active phytocomponents of *Thevetia nerifolia* was studied and further the antibacterial activity of the plant extracts was assayed *in vitro* by agar well diffusion method against two gram positive (*Staphylococcus pneumonia*, *Staphylococcus aureus*) & two gram negative (*E. coli*, *Salmonella typhi*) bacterial species found inhibition action.

<table>
<thead>
<tr>
<th>TABLE 1: AYURVEDIC PROPERTIES OF UPAVISHA DRUGS</th>
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</thead>
<tbody>
<tr>
<td>S.N.</td>
</tr>
<tr>
<td>1.</td>
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<tr>
<td>2.</td>
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<td>3.</td>
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4. Dhatturbeeja (Datura metel) | Rasa-Tikta, Katu; Guna-Laghu, ruksha, vyvayi, vikashi Virya-usha; Vipaka-Katu; Karma-Madak, Vedanasthapan, Jantughna, Shoolprashaman; Dosha Prabhava-Kapha-Vata Shamak | Seeds

5. Bhanga (Cannabis sativa) | Rasa-Tikta; Guna-Laghu, Tikshna Virya-usha; Vipaka-Katu; Karma-Kushthghna, Vedanasthapan, Keshyya, Garbhanirodhaka; Dosha Prabhava-Kapha-Vata Shamak | Leaves, Latex

6. Gunja (Abrus precatorius) | Rasa-Tikta, Kashaya; Guna-Laghu, Ruksha, Tikshna Virya-usha; Vipaka-Katu; Karma-Kushthghna, Vedanasthapan, Keshyya, Garbhanirodhaka; Dosha Prabhava-Kapha-Vata Shamak | Seeds

7. Bhallatak (Semecarpus anacardium) | Rasa-Katu, Tikta, Kashaya; Guna-Laghu, Snigdha, Tikshnam Virya-usha; Vipaka-Madhur; Karma-Sphotajanam, Sheetprashaman, Vishaghna Dosha Prabhava-Kapha-Vata Shamak | Fruits

8. Arka ksheera (Calotropis procera) | Rasa-Katu, Tikta,; Guna-Laghu, Ruksha, Tikshna Virya-usha; Vipaka-Katu; Karma-Vedanasthapan, Shothaghar, Kushthaghna, Vranashodhana, Jantughna Dosha Prabhava-Kapha-Vata Shamak | Latex


10. Langali (Gloriosa superba) | Rasa-Katu, Tikta,; Guna-Laghu, Tikshna Virya-usha; Vipaka-Katu; Karma-Raktotklesh, Kshobhak, Krimighna, Garbhapat Dosha Prabhava-Kapha-Vata Shamak | Tuber (Root)


### TABLE 2: CHEMICAL COMPOSITION OF EACH DRUG OF UPAVISHA

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Drugs</th>
<th>Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Vishatinduk (Strychnos nuxvomica)</td>
<td>Strychnine, Brucine</td>
</tr>
<tr>
<td>2.</td>
<td>Ahiphen (Papaver somniferum)</td>
<td>Morphine, Codeine, Thebaine, Papaverine, Noscapine</td>
</tr>
<tr>
<td>3.</td>
<td>Jaipal (Croton tiglium)</td>
<td>Crotin (toxalbumen), Crotonside (glycoside)</td>
</tr>
<tr>
<td>4.</td>
<td>Dhatturbeeja (Datura metel)</td>
<td>Scopolamine, Hyoscyamine, Atropine, Meteolodine</td>
</tr>
<tr>
<td>5.</td>
<td>Bhanga (Cannabis sativa)</td>
<td>Tetrahydrocannabinol, Cannabidiol, Cannabinol, β-caryophyllene (Some of the 483 compounds identified are unique to Cannabis)</td>
</tr>
<tr>
<td>6.</td>
<td>Gunja (Abrus precatorius)</td>
<td>Abrin, Abrine, abralin</td>
</tr>
<tr>
<td>7.</td>
<td>Bhallatak (Semecarpus anacardium)</td>
<td>Semecarpol, Bhilawano1</td>
</tr>
<tr>
<td>8.</td>
<td>Arka ksheera (Calotropis procera)</td>
<td>Calotropin, Calotoxin, Uscharin, Gigantin</td>
</tr>
<tr>
<td>9.</td>
<td>Snuhi ksheera (Euphorbia nerifolia)</td>
<td>Neriifolione, Neriifoliene, atriterpene</td>
</tr>
<tr>
<td>10.</td>
<td>Langali (Gloriosa superba)</td>
<td>Colchicine, Gloriosine</td>
</tr>
<tr>
<td>11.</td>
<td>Karveera (Nerium indicum)</td>
<td>Neriodorin, Neriodorein, Karabin, Scopoletin, Scopolin</td>
</tr>
</tbody>
</table>

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TABLE 3: AYURVEDIC MEDICINAL PROPERTIES OF EACH CONSTITUENTS OF UPAVISHA

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Drugs</th>
<th>P.V. Sharma</th>
<th>Uses in Nighantus</th>
<th>Ayurvedic Formulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Vishatinduk</td>
<td>Aakshepar</td>
<td>Kushthagdna, Kanudghna, Vatarogahara, Arshoghna</td>
<td>Agniundivati, Navjivan ras, Lakshmivillas ras, Krimimadagar ras,</td>
</tr>
<tr>
<td>2.</td>
<td>Ahiphen</td>
<td>Madakari</td>
<td>Agnivivardhananam, Kantivyrala, Grahi, Shleshmaghnam</td>
<td>Ahiphenasava, Nidrodaya vati, Dugdhavati, Karpur ras,</td>
</tr>
<tr>
<td>4.</td>
<td>Dhattur-beeja</td>
<td>Shoolahar</td>
<td>Kantikari, Twagdosahar, Kanudghna, Jwarahar,</td>
<td>Unmadagejankasharas, Sootsekharras, Kankasav,</td>
</tr>
<tr>
<td>5.</td>
<td>Bhang</td>
<td>Madakari</td>
<td>Mohahar, Deepan, Nidaroga,</td>
<td>Jatiphalad Choorna, Madhanand modak</td>
</tr>
<tr>
<td>6.</td>
<td>Gunja</td>
<td>Upvisha</td>
<td>Indraluptahara, Kanudghna, Kushthagdna,</td>
<td>Gunjabhadra ras,</td>
</tr>
<tr>
<td>7.</td>
<td>Bhallatak</td>
<td>Kushthagdna</td>
<td>Kriminashan, Dulmahar, Arshoghna</td>
<td>Bhallatak tail, Amritballalata Yoga, Tila arushkar Yoga,</td>
</tr>
<tr>
<td>8.</td>
<td>Arka ksheera</td>
<td>Tiksnavirechana</td>
<td>Kriminashan, Dulmahar, Arshoghna</td>
<td>Arka vati, Arka Lavana,</td>
</tr>
<tr>
<td>9.</td>
<td>Snuhi ksheera</td>
<td>Tiksnavirechana</td>
<td>Unmaad,Meha, Kushthagdna, Arsha, Visha-dushivishahar</td>
<td>Snuhyadi Tail</td>
</tr>
<tr>
<td>10.</td>
<td>Langali</td>
<td>Garbhashaya-sankochak</td>
<td>Krimiganah, Kushthagdna, Shoshhar</td>
<td>Kasisadi Taila, Langali rasayan</td>
</tr>
<tr>
<td>11.</td>
<td>Karveera</td>
<td>Hridya</td>
<td>Krimiganah, Kanudghna, Chakshushya,</td>
<td>Karveeradya Taila, Karveer yoga</td>
</tr>
</tbody>
</table>

TABLE 4: MEDICINAL PROPERTIES OF EACH CONSTITUENTS OF UPAVISHA

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Drugs</th>
<th>Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Vishatinduk</td>
<td>Identification of targets for suppression of inflammation and cancer. Pharmacologically Strychnos nux-vomica showed anticancer, antimicrobial, antiinflammatory, antioxidant, and anti feederent activity. Their specific effects on gastrointestinal problem, nervous system, blood glucose level, bones cells and cardiovascular systems have been also investigated.</td>
</tr>
<tr>
<td>2.</td>
<td>Ahiphen</td>
<td>It beneficial in migraine, malaria, dysmenorrhea, cystitis, menorrhagia and other painful conditions. Seed oil, free from narcotic principles is useful in diarrhoea and dysentery.</td>
</tr>
<tr>
<td>3.</td>
<td>Jaipal</td>
<td>Seed oil have anti leukemic action. Antinociceptive and Smooth Muscle Relaxant Activity of Seed.</td>
</tr>
<tr>
<td>4.</td>
<td>Dhattur-beeja</td>
<td>Seed were used to treat vertigo, epilepsy and hydrophobia. It also cures Cholera, chronic diarrhoea, intermittent fever.</td>
</tr>
<tr>
<td>5.</td>
<td>Bhang</td>
<td>The seeds are used in various diseases like alopecia, edema, helminthes, skin diseases, itching, urinary disorders and also used in treatment of ulcer and diarrhea.</td>
</tr>
<tr>
<td>6.</td>
<td>Gunja</td>
<td>It beneficial in Sciatic neuralgia, early stage of rheumatoid arthritis and spondylitis.</td>
</tr>
<tr>
<td>7.</td>
<td>Bhallatak</td>
<td>The latex is used for treating ringworm, guinea worm blisters, scorpion stings, venereal sores and ophthalmic disorders; also used as alaxative.</td>
</tr>
<tr>
<td>8.</td>
<td>Arka ksheera</td>
<td>It havin Anti-inflammatory and analgesic effect and also used in the treatment of</td>
</tr>
</tbody>
</table>
CONCLUSION: By this all review work, It is concluded that Upvisha Varg herbs having good efficacy of Anti-bacterial, Antifungal and Antivirus properties. So, these all drugs having good capacity to treat infectious diseases by indigenous method. There is a vast area of research for developing new combinations for infectious disease.

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