

ANTIMICROBIAL AGENTS USED IN ANCIENT INDIA

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Infectious diseases are marked as number three killers, next to cancer and heart diseases.¹ The discovery of penicillin marked the beginning of the present day antibiotic therapy. Since then a large number of antibiotics have emerged both natural as well as synthetic. Considering the enormous quantity of antibiotics used, the situation would have been that there are no infectious diseases. But it is not true; the problems of infectious diseases are on the increase. One of the major hindrance is the development of resistance towards these drugs. Many strains of *Pseudomonas*, *Proteus*, etc. remain resistant to the existing antibiotics and are greatest health hazards under various situations.

Another point of consideration is the cost factor and the availability of the drugs. Most of these antibiotics are beyond the reach of a common man, especially in the poor and developing countries. This point is of prime importance in case of animals where cost-benefit ratio is of prime consideration.

The third consideration is the faith of the people. A majority of the people especially in the country-side still have faith in the old formulations which cannot be and should not be discarded outright. In the olden times the higher plants and their products had been used with variable efficacy as mentioned in old literature like *Suśruta Saṃhitā*. Our present day antibiotics may not be far different from those as they too are the products of lower plants.

Taking into consideration the above points, it would be worthwhile to have a deep look at the methods used in the ancient times and their perspectives with the present day medicine. There is no doubt that the methods used earlier would have lacked rationalism because the experimental procedures were not so developed as is today. Just to give an example, we know the existence of strains in bacteria and they differ in their susceptibility to various drugs. This thing was not known to the ancient people and hence their results must have differed under different situations. Thus, if with our present day knowledge we explore the various products from higher plants in different formulations, many of them would definitely emerge to be of great therapeutic value in human and veterinary medicine.

Keeping these factors in view the present note has been compiled to include various antimicrobial agents used in ancient times in India. A list of different agents used against various animal infections has been given in Table I with their vernacular names in parenthesis wherever possible.²

The table lists only the plants whose products were used at different times against various infections. But the details of the method of application, mode of action, *etc.* are not available for most of them. It is, however, implied that this can serve as a base data and we can look forward to their application on more scientific basis in the light of the present day knowledge. However, some literature is available on the practical application of some of these preparations being used effectively.

Hirachandra³ used some indigenous medicines during rinderpest and Foot and Mouth Disease (FMD) outbreaks and claimed them to be quite successful besides being cheap. He used decoction of *babul* bark for washing the mouth and *neem* oil mixed with camphor for dressing of ulcers in FMD. A mixture of country tar, kerosene and burnt blue stone was used for killing maggots and healing of foot lesions. Vinegar was used in rinderpest outbreaks.

Rabies has been claimed to have been treated with indigenous drugs.⁴ It was emphasized that the treatment should start as early as possible, before the appearance of symptoms. Locally, enough bleeding was ascertained. The wound was then covered with a paste of fruits, roots, bark, flowers and leaves of *śiriṣa* (*Mimosa shirissa*) mixed with equal quantity of *ghee*. Internally, purgatives and emetics were administered to clear the bowels and stomach. Milk of *Calatropis gigantea* was used as emetic. After this the patient was given *Dhatura alba* and powdered root of *śarapunkha* with plenty of powdered rice in the form of a paste. The patient was kept in a dry and cool room. If after the digestion of the above paste the patient becomes mad and behaves like a rabid animal, this would show that he had infection. He is then bathed with cold water and given enough curd, sugarcane juice and other cooling things to drink. Gradually the patient becomes calm and is considered to be cured.

Another substance is asafoetida which has considerable applications. In *Subrta* it is known as 'hing' which means to overpower all other odours. It has been used for external applications in wounds where it acted as an antiseptic and prevented the transmission of infection.⁵ It has also been used against ring worms. The mode of applications had been in the form of aqueous, alcoholic or glycerinated solutions, as well as ointments.

Another substance of vegetable origin, garlic (*Allium sativum*), has attracted considerable interest in the recent past both in our country and in other parts of the

TABLE 1

Different plants whose products were used against various infectious diseases of animals

Disease	Plants
1. Anthrax :	<i>Bannaya veromicarfolia</i> <i>Buettneria herbacea</i> <i>Clerodendrum infortunatum (Urni)</i> <i>Coix lachryma (Sanksu)</i> <i>Colocasia antiquorum (Kachalu)</i> <i>Curcuma longa (Haldi)</i> <i>Gmelina arborea (Gambhari)</i> <i>Melia azadirachta (Neem)</i> <i>Oroxylum indicum (Arlu)</i> <i>Phyllanthus emblica (Amla)</i> <i>Semecarpus anacardium</i> <i>Shorea robusta (Sal)</i> <i>Tamarindus indica (Imlı)</i> <i>Zingiber cassumunr (Banada)</i>
2. Black Quarter :	<i>Vitis tomentosa</i>
3. Foot and Mouth Disease :	<i>Anthocephalus cadamba (Kadamba)</i> <i>(A. indicus)</i> <i>Fimbristylis remoutchi (Bilangri)</i> <i>Helianthus annuus (Surjamukhi)</i> <i>Shorea robusta (Sal)</i>
4. Hemorrhagic Septicemia :	<i>Amorphophalus campanulatus (Zami Kand)</i> <i>Bauhenia purpurea (Khairwal)</i> <i>Calatropis gigantea (Ak)</i> <i>Dolichoo lablab (Sem)</i> <i>Gmelina arborea (Gambhari)</i> <i>Musa paradisiaca (Kela)</i> <i>Ochna sanctum (Tulsi)</i> <i>Scindapeus officinalis (Gajapipal)</i> <i>Semecarpus anacardium (Bela)</i> <i>Yucca gloriosa</i>
5. Rabies :	<i>Adiantum carcinnum</i> <i>Alaugiam lamarckii (Akola)</i> <i>Andrographis paniculata (Kiryal)</i> <i>Antidesma diandrum (Amasi)</i> <i>Calatropis gigantea (Ak)</i> <i>Cariisa caradas (Karunda)</i> <i>C. fomentosa</i> <i>Cissamyelos peseira (Akandi)</i> <i>Carpus igeciosa</i> <i>Croton oblongitolium</i> <i>Dioscorea daemona</i>

TABLE I (Contd.)

Disease	Plants
	<i>Dregea volubilis</i>
	<i>Liliosogyne pinnabrida</i>
	<i>Holaorhena antidyenterica</i>
	<i>Lchnocaspis frutescens (Kali dudhi)</i>
	<i>Lagerstroemia parviflora</i>
	<i>Mucuna pruriens</i>
	<i>Musa paradisiaca</i>
	<i>Nyctanthes arborescens</i>
	<i>Ochna basilicum (Babuni tulsi)</i>
	<i>O. canum (Kala tulsi)</i>
	<i>O. sanctum (Tulsi)</i>
	<i>Tragia involucrata</i>
	<i>Sesbania aegyptica (Jayanti)</i>
	<i>Vitex alata</i>
	<i>Woodfordia floribunda</i>
	<i>Zingiber officinalis (Adrak)</i>
6. Rinderpest :	<i>Acacia arabica (Babul)</i>
	<i>A. farnesiana (Lalfira)</i>
	<i>Amorphophalus campanulata</i>
	<i>Angelica glauca</i>
	<i>Anogessus latizolia (Dhaura)</i>
	<i>Anthocephalus cadamba (Kadamba)</i>
	<i>Asparagus racemosus (Stamar)</i>
	<i>Ahlyasia mollis</i>
	<i>A. scarabaeoides</i>
	<i>Brassia latifolia</i>
	<i>Bauchinia purpura</i>
	<i>B. vahlii (Maljan)</i>
	<i>Boswellin serrata (Salai)</i>
	<i>Bussera serrata</i>
	<i>Olerodendrum serratum (Barangi)</i>
	<i>Ouscuta chinensis</i>
	<i>Diospyros embryopteris (Kala Tendu)</i>
	<i>D. tomentosa (Tendu)</i>

world for the treatment of various ailments. It has also found application as an antimicrobial agent against various bacterial, fungal and other infection.⁶⁻⁸

In addition to these, there has been a serious attempt these days for the screening of antiviral drugs of vegetable origin. Preparations which have been used in diseases now known to be of viral origin, call for preliminary screening through modern techniques of extraction of the active ingredients and their use in virus infected cell cultures.

A group of workers in Central Drug Research Institute, Lucknow^{9,10} have tested more than about 300 plants in various forms for various medicinal activities, particularly antibacterial (A.B.), antifungal (A.F.), antiviral (A.V.) and anti-cancer (A.C.) activities. Some of the plants with pronounced activity, as found by them, are listed in Table II.

TABLE II

Indigenous plants tested for various therapeutic activities

Name of the plant	Activity
<i>Acacia catechu</i>	A.V.
<i>Adhatoda vasical</i>	A.V.
<i>Aegle marmelos</i>	A.V.
<i>Ajuga bracteosa</i>	A.C.
<i>Albizia lebbek</i>	A.C.
<i>Alstonia barbadensis</i>	A.C.
<i>Amoora wallichii</i>	A.V.
<i>Argemone mexicana</i> (Pili Kateli)	A.V.
<i>Asparagus racemosus</i> (Ashi Karua)	A.C.
<i>Atropa belladonna</i>	A.V.
<i>Annona squamosa</i> (Sharifa)	A.C.
<i>Arnebia bonilis</i> (Rathjot)	A.B., A.F.
<i>Bauhinia racemosa</i> (Van raja)	A.C.
<i>Barberis certistata</i> (Rasout)	A.C.
<i>Barberis lycium</i> (Haldi)	A.B., A.C.
<i>Bergenia lignata</i>	A.C.
<i>Boswellia serrata</i> (Salai)	A.C.
<i>Caesalpinia boulducells</i>	A.V.
<i>Calamus rotang</i> (Bettu)	A.C.
<i>Calatropis gigantea</i> (Rui)	A.C.
<i>Capparis logispina</i> (Chimar)	A.V.
<i>Cassi auriculata</i>	A.V.
<i>Cassi frmulai</i> (Amaltas)	A.V., A.C.
<i>Cyodon dactylon</i> (Amb)	A.V.
<i>Cyperus niveus</i> (Motha)	A.V.
<i>Diospyro speregrina</i> (Tendu)	A.V.
<i>Eclipta alba</i> (Bhangra) A.	A.V.
<i>Embelica officinalis</i> (Amla)	A.V.
<i>Malloxus phillipineesis</i> (Rohini)	A.B., A.C.

These authors used either the whole plants or their various parts for testing purposes and confirmed the activities indicated in the table. They also found that some of the activities found in crude extract were lost on fractionation.

Berberis aristata (Rasout) has been used in many eye diseases for over 3000 years. However, it has of late found use in the form of an extract under the name 'Berberine' for various infections of viral, fungal and bacterial origin.¹¹⁻¹³ In animals too it has been found effective as anti-chlamydial agent in *in vitro* studies.¹⁴

Considering the above documented reports and the large amount of literature available on our indigenous medicines it would be very useful to explore these on scientific lines. Some of them could prove to be very cheap and very effective in treatment of various infectious diseases. There appears to be considerable prospects in our old heritage and we need not uproot it but we should give it a fair trial, within the frame work of our present day knowledge on scientific lines.

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