GENERAL INTRODUCTION

India presents extreme variety in its meteorological and climatic conditions, its topographical features as well as flora. Besides, the country as a whole is in fact an epitome of almost all the climates, seasons and soils of the world, receptive to all types of vegetation including plants containing active medicinal principles. Three-fourths of the drugs used in the pharmacopoeias of different countries grow here in a state of nature and others can be cultivated. It is for these reasons that the Indian medicinal plants have drawn the attention of scientists all over the world.

The records about the use of medicinal plants in India can be traced back to 4500 B.C., when sporadic mention of plants was made in Rigveda. Later, in the Atharvaveda, it is seen that plants have been used as charms and amulets for the cure of various diseases. The real foundation of the ancient medicinal science was, however, laid probably between 2500 and 900 B.C., with the development of the science of Ayurveda. A large number of plants have been mentioned for their medicinal properties and uses in the Ayurvedic literature, including Charaka Samihita, Susruta Samihita and Nighantus. These plants were described by their local or common names. The identify of a large number of plants has
been in doubt due to the lack of proper description and illustration; therefore, many of these are riddles even today.

As mentioned by Biswas (1956) and Chakravarty (1975) the systematic study of Indian medicinal plants was first started in the early part of the nineteenth century. Fleming's 'Catalogue of Indian Medicinal Plants and Drugs' was published in 1810. It was followed by Ainslie's 'Materia Medica of Hindustan' in 1813. Royle (1839) published 'Vegetable Resources of India'. This was followed in 1841 by O'Shaughnnessy's The Bengal Dispensatory and Pharmacopoeia which was the first book of its kind, dealing with the properties and uses of medicinal herbs. Drury (1858-69) also published an account of Useful Plants of India. Another 'Pharmacopoeia of India' was published by Waring (1868), which ushered in a new epoch towards the understanding of indigenous medicinal plants. Since a number of drugs were not incorporated in Waring's work, Sheriff (1869) published his 'Supplement to the Pharmacopoeia of India'. Translation of the Sanskrit Materia Medica by Dutta in 1877 brought to light the drugs used by the ancient Hindu physicians. 'Vegetable Materia Medica of Western India' (Dymock, 1883) and 'Pharmacographia Indica' (Dymock et al., 1890-93) are more consolidated works in this field. The most elaborate and significant work, was however, produced by
Watt (1889-96) under the title 'Economic Products of India'. The more recent and important publications in this field include Dey's 'Indigenous Drugs of India' (1896) and Kirtikar and Basu's *Indian Medicinal Plants* compiled in 4 volumes in 1935. Nadkarni (1927) in his *Indian Materia Medica* compiled much information about medicinal plants from Ayurvedic Materia Medica and other sources. A revised edition of Nadkarni's work has recently been published (two volumes) by his son (Nadkarni, 1976). Chopra et al. (1958) published 'Indigenous Drugs of India' which could be considered a significant landmark of the present century.

Lastly, 'Wealth of India' published in eleven volumes (Anonymous, 1948-76) under the auspices of the Council of Scientific and Industrial Research, is a fine example of our attainments after independence. The publication of 'Medicinal Plants of India' by the Indian Council of Medical Research (Satyavati et al., 1976) also includes some important and recent information about the plants.

Besides, frequent surveys and collections of medicinal plants have also been carried out recently in different parts of India by various workers including Ahuja (1965), Srivastava et al. (1980); Singh et al. (1980) and Kapoor and Kapoor (1980).

The practical knowledge of the medicinal uses of plants may be obtained either by a thorough survey of literature and/
or by field studies among primitive people. Obviously, on account of its great fundamental and applied importance, the study of plants amongst the primitive people is now receiving much attention from botanists and other research workers throughout the world. A number of organisations are turning 'back to nature', particularly towards the study of 'traditional medical-lore'. Traditional medical-lore is that which has stood ravages of time and has evolved out of the rich experiences of sages, saints, savants and scholars. Besides, the aboriginals have also learnt about the traditional treatment of diseases by the method of trial and error and, more often than not, at the heavy cost of human life. The term aboriginal or primitive refers to the indigenous people of the region with little or not technological development, no written language, having a distinct culture of their own and living in small, and economically isolated groups (Jain, 1967). These primitive people still prefer to live in perfect dependence on nature and solve their problems following their own traditional methods. Such studies constitute the science of 'Ethnobotany' which deals with the study of interrelationships between the primitive people and plants (De, 1968).

In India, the diversified ethnic culture distributed along a vast area and the old history of rituals and observances related to the plant world provide a fruitful ground for ethnobotanical investigations. A number of folk
medicines preserved with the tribals and rural people living in deep virgin forests, offer considerable scope for such studies. According to Chakravarty (1975), a large number of indigenous herbal drugs are used as family cures all over India, especially by the rural folks. These plants with recorded medicinal properties may include more than two thousand species. As rightly pointed out by Schultes (1960), the urgent need is now to find out ways and means to salvage some of the ethnobotanical lore before it becomes forever entombed with the culture that gave it birth. Thus, considering the importance of ethnobotanical investigations, a number of ethnobotanical surveys have been carried out in different parts of the country by various workers including Ahluwalia (1952), Gupta (1960, 1962), Jain and Tarafder (1963, 1970), Jain (1963a, b, c, 1965), Shah and Joshi (1971), Jain et al. (1973), Maheshwari et al. (1980), Tiwari et al. (1980a, b), Rao and Neogi (1980), Kharkongor and Joseph (1981) and Patel et al. (1981).

However, so far, there appears to be no systematic study of ethnomedicinal plants of Bundelkhand region, although several localities in this area, being rich in medicinal herbs and inhabited by various tribes and other people secluded from urbanisation and from impact of modern technological development, provide good scope for such
studies. Hence a survey of some of these localities was carried out, and the information regarding the use of medicinal plants was obtained by personal interviews with the tribal people, forest dwellers and other local inhabitants.

It is being increasingly realized that such ethnobotanical studies would be more meaningful if the data so obtained are subjected to detailed experimental evaluation. Besides drawing the attention of plant chemists and pharmacologists for various analytical studies, these attempts are also likely to yield more valuable natural drugs including various chemotherapeutic agents.

The chemical substances used for the treatment of infectious diseases or diseases caused by the proliferation of malignant cells are commonly termed as chemotherapeutants. These substances are prepared in the chemical laboratory or obtained from microorganisms and some plants and animals. In general, the naturally occurring substances are distinguished from synthetic compounds by the name antibiotics. Some antibiotics are prepared synthetically but most of them are produced commercially by biosynthesis.

According to Waksman (1945), antibiotics usually include those chemical substances of microbial origin which in small

*Minor Research Project on Survey of Medicinal Plants of Bundelkhand region, financed by the University Grants Commission 1977 Code No. 7659.*
amounts exert antimicrobial activity. However, in recent years antimicrobial agents derived from higher plants are also considered antibiotics (George and Pandalai, 1949; Cavallito, 1951; Karel and Roach, 1951; Nickell, 1959; Dansi and Rava, 1965; Ionescu, 1970; Dixit and Tripathi, 1982). Although the antibiotic drugs of microbial origin are extremely valuable, due to the growing fear of emergence of resistant strains of pathogenic microorganisms, allergic reactions and many side-effects caused by these microbial metabolites, the importance of natural antimicrobial agents from higher plants is gaining increased recognition from modern scientists. Thus the higher plants now represent the most potentially useful area for newer avenue of approach in the search for more efficacious 'antibiotics'. Obviously, therefore, a number of workers have carried out screening of Indian medicinal plants for their antibiotic activity (George and Pandalai, 1949; Joshi and Magar, 1952; Bhatnagar et al., 1961; Dhar et al., 1968 and Bhakuni et al., 1969).

With a view to further elucidating the importance of ethnomedical plants of the Bundelkhand region, 'in vitro' evaluation for their antimicrobial activity was considered appropriate and desirable.

As such, in view of the considerations outlined above, the present work, entitled 'Studies on Some Medicinal Plants
of Bundelkhand Region with Special Reference to Their
Antimicrobial Activity' was undertaken, in which attention
was focussed mainly on the following aspects:-

(i) collection of information about the local medicinal
uses of plants based on personal interviews with the
local inhabitants including tribals of the area under
study;

(ii) collection, identification and preservation of the
authentic plant samples;

(iii) in vitro studies of plant extracts for their
antimicrobial activity against certain human
pathogens; and

(iv) preliminary phytochemical analysis and antimicrobial
activity of different fractionates and chemical
constituents of some selected plant samples.