CHAPTER 1

INTRODUCTION
A dye is most commonly an organic compound which may be used to impart colour to a substance. It may be used for the colouring of animal, vegetable or synthetic fibers and similar products. The dye may form a chemical union with the substance being dyed or it may become associated with it in an intimate physical union. Dyes which are more or less soluble in water or may be made so by a simple chemical reaction (such as reduction) are generally used for dyeing and printing of fibers and related materials. The insoluble coloring matters are called pigments.

Although the synthetic dyes dominate the field now, before their development, natural dyes and mineral pigments were used for the coloring of textiles. Man’s earliest use of colour was limited to natural dyes. There is no doubt that chance, coupled with trial and error, taught man to utilize the colours found in hundreds of forms of plant life, a few most highly prized colouring materials, and some metallic salts were used as mordants (Kirk and Othmer, 1954).
The knowledge of dyes and dyeing was passed through word of mouth and so there is not much literature to guide in this direction. With the advent of synthetic dyes in the later half of nineteenth century the use of natural dyes was slowly discontinued and with this, the prized knowledge of natural dyes was lost into oblivion.

Natural dyes were pushed back with the advent of synthetic dyes because of some poor characteristics. Mainly, all natural dyes used were not extremely fast towards washing and light. The colour range was limited and the quantity of raw material required was huge because they were traded and available in raw form (unextracted). Moreover, the dye extraction procedure and application procedures were elaborate and time consuming. Also, the exact reproducibility of colourshade was not certain.

Owing to these limitations, the use of natural dyes was pushed back and synthetic dyes gained importance. Extensive use of synthetic dyes and other synthetic products has brought about environment problems.

The popular perception is that industrial practices, particularly in chemical industry is responsible for declining standards in our global environment altering the natural balance within the world. This in turn, led to returning to a traditional or more natural way of life. Biological farming, natural foods
and the belief that all things natural are good for us. As a part of this trend, there is now a hobby for using natural colouring matters to dye textiles.

International workshops have been organized on natural dyes. In India also one such workshop was held as a part of UNDP programme of technical co-operation among developing countries. During these workshops it was concluded that there is a great potential for the revival of the use of natural dyes in certain areas.

Today, the protection of environment has become a challenge for the chemical industry world wide and the water pollution caused by synthetic dyes in particular, the control of effluent continue to be a problem. Although most attention has been paid to modifying synthetic dyeing process, the need to realise the importance and explore the technology of natural dyes is more urgent.

In India National Handloom Development Corporation (NHDC) is playing a leading role in the revival of the use of natural dyes. The Small Industrial Development Bank of India (SIDBI) has extended financial support to NHDC to take up two research based projects for the revival of natural dyes. The project on standardization of application procedures of natural
dyes has been initiated in association with National Research Laboratory For Conservation of Cultural Property (NRLCCP) Lucknow, and the Indian Lac Research Institute (ILRI), Ranchi for promotion of lac dye.

Standardization of application techniques of natural dyes on different fibers which include determination of dye presence, percentage evaluation of fastness properties, development of shade cards and cost analysis, are the most important aspects which need indepth research.

In order to develop lac dyes ICRI obtain primary raw material of lac from shellac lac factories and convert the same into the technical grade lac dyes. It is expected to give a much needed boost to the ailing lac industry, located in the border belt of Bihar and West Bengal. The findings of these two projects will be disseminated amongst entrepreneurs, weaving groups and concerned organizations. Promotion of natural dyes is expected to have a manifold effect including employment generation in rural and tribal belts. Earning levels of lakhs of dyes engaged in the handloom sector are likely to improve, value addition in goods produced at known handloom clusters like Panipat, Bhadohi, Varanasi, Erode, Hubli, Nagpur and increase in the foreign exchange earning of this sector in particular and the garment industry as a whole are the other expected benefits.
A national programme is being developed by SIDBI in association with NHDC for propagating the use of natural dyes. Already, eight dyes derived from a natural resource have been developed and it is planned to extend this range up to thirty.

Eco-friendly trend has been fueled by increased public awareness about environment issues over the past decade and more businesses both large and small have started exploring the use of natural dyes as a possible means of producing an ecologically sound product which would also appeal to the green minded consumer.

Natural dyes are biodegradable also, unlike the synthetic dyes these do not pose a problem of pollution for the waste which remains after the dyeing process. These are easily absorbed by the soil. Natural dyes are favourable to ecology unlike the coal tar dyes, as plants, shrubs, trees constitute the main source.

Toxicological reasons also favour the use of natural dyes, for it is argued that natural dyes exhibit a low toxicity and allergic reactions than do synthetic dyes. They are also supposed to be non-carcinogenic.

Also, the creative potential, soft lustrous colour of natural dyes make them a persuasive possibility in our lives today.
Natural dyes have automatically harmonizing colours, rare colour ideas and are more challenging because of the element of chance (Chavan, 1995).

The prevailing trend of the dye industry prompted the investigator to study a few dyes for their colourfastness properties and apply them for block printing. The main objectives of the study were:

1. Extraction of dye solution from majeetha, turmeric and onion peels.

2. Application of extracted dye from majeetha, turmeric and onion peels on cotton fabric under following conditions:
   i. Pre-mordanting
      a) Mordanting for 30 minutes
      b) Mordanting for 8 hours (over night)
   ii. Mordanting and dyeing together.

3. Evaluation of dye properties through colourfastness tests.

4. Application of extracted dye from majeetha, turmeric and onion peels for block printing.
Limitation of the Study

1. The study was limited to only 100% cotton fabric.

2. Only three different dyes were studied using size mordants, Aluminium potassium sulphate salt, aluminium acetate, cupric sulphate, lead acetate, tannic acid, stannous chloride.

3. Commercially available binder (Binder SLN) was used for block printing.