



# Indig Blue-Dye

Indigo blue was rare commodity in Europe during the 19<sup>th</sup> and 20<sup>th</sup> century and to meet its demand the British coerced farmers in India to cultivate planting material for indigo production. In 1987, 7000 sq km area was under indigo cultivation in India. The play *Nildarpana* by Desh Bandhu Mitra is based on indigo slavery and forced cultivation of indigo in India. Subsequently indigo was produced by using synthetic chemicals.

Now the trend all over the world is to use natural dyes and colours which may revive this organic dye. Indigo is used in textile mills, laundries and households to give bluish tinge to white cotton clothes.

Other natural fibres like velvet silk, munga silks are dyed using indigo blue. It has no harmful effects and toxicity to skin. Indigo dye is used for denim cloth for jeans, wool and silk. When ironed the cloth gives a shining finish. In different parts of the country people follow their traditional methods for preparing natural dyes. The realization of hazards caused by synthetic dyes has made the society revert back to traditional raw materials.

Indigo which is among the oldest natural dyes has been used for textile dyeing and printing. India has also been one of the earliest major centre for its processing and production. The *Indigofera tinctoria* variety of Indigo was domesticated in India. It then made its way to the Greeks and Romans who valued it as a luxury product. India was a primary supplier of indigo to Europe as early as the Greco-Roman era.

In the modern era Shri AMM Murugappa Chettiar Research Centre (MCRC), Chennai, has been involved in extracting dyes from natural sources for more than a decade. The dye



pigments from bacteria, indigo blue dye from *Indigofera tictoria*, *Writtia tinctoria*, and *Tephrosia sp.*, red and orange dyes from *Morinda tinctoria* and *Bixa orellana* respectively and brown dye from *Acacia catechu* are the major scientific achievements of the Centre.

For blue natural dye the only viable choice is indigo from plants. The plant is grown in Asia, Africa and East Indies, the Philippines and America. In MCRC process natural indigo is obtained by fermenting the foliage of species of *Indigofera* and a good tech-pack is now available for use. All the processes involved in this package of practice are eco friendly and cost-effective.

The extraction of indigo from the plant consists of mainly 3 stages viz. steeping the plant in water (for fermentation), separation of the aqueous extract and oxidation of this solution with air and separating the precipitate and preparation of marketable dye cake or powder. MCRC has developed a new microbial process which has been found efficient for extraction of indigo dye. A patent has been filed on the technology package. Under CAPART's project more than 100 various Indian organizations have been trained on natural dyes, especially on indigo.

MCRC's indigo extraction technology package consists of:

### Organic Plant Production

Cultivation methods for indigo plant includes crop maintenance and crop protection by biological control and use of residual green matter as green manure and for compost preparation.



### Dye Extraction Techniques

Harvest of plants, microbial fermentation of plants, culturing selected bacteria by simple method, use of netlon soaking set-up, mechanical oxidation, slurry collection, boiling and filtering.

### Technical Know-how

Construction and design of indigo tank (MCRC Model), fabrication and maintenance of indigo agitator and fabrication of netlon soaking set-up.

### Aspects of Indigo Market

Indigo plant, dry leaf, indigo dye and residual matter are sold in the market. For MCRC's indigo dye extraction, initial investment of around Rs. 60,000/- for a unit is required. Minimum 15 acres of land are required to support an extraction unit for 200 working days in a year.

## Economics

Cost of cultivation	Rs. 5000/ per acre
Biomass obtained	4-6 tonnes
Return	5000 kg @ 2/- kg. = Rs. 10,000 per acre
Processing cost	Rs.1/- per kg
Total cost of production Rs. (2+1)	3kg Rs. 15000/-
Sale value received @ Rs. 4/- per kg or Rs. 400 per kg of indigo	Rs. 20,000/-
Sale of residual green matter @ Rs. 0.50 × 5000 kg.	2,500/-
Total sales	22,500/-
Profit	22,500-15,000 = Rs. 7,500/- per acre
Profit per year from 15 acres 7500×15	Rs. 1,12,500/-

## Source of Technology

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**Note:** The author may have used various references in the preparation of this article. For further details please contact him/her.

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