Chapter IV. Bakuchi- *Psoralea corylifolia* Linn.

-specific for Leucoderma
Bakuchi - Psoralea corylifolia Linn.

Bakuchi fruits are mainly used for skin afflictions by the Ayurvedic practitioners. It is specially recommended for leprosy and leucoderma, and hence one of its names is 'Kushtanashini'. A few of the relevant references in Ayurvedic texts are given below:

मुख्यविज्ञानचक्रण: पिष्टी गवां नृत्य ||६६॥
कालकुट-बोंगिका वा चावलुगबिका गवां पुत्रे ||
--- --- --- --- --- --- --- ||६७॥
रेडबॉक्स: किशावलना - - - -
(पुरुषविलिच्छा व ६६-६७)

The application prepared of the seeds of radish and bakuchi seeds rubbed in cow's urine; or the plaster prepared of redwood fig, bakuchi seeds, and white flowered leadwort in cow's urine....all these, are curative of leucoderma.

Dhanvantari Nighantu and the Raja Nighantu give the following synonyms of Bakuchi.

प्राच्यानामानि:-
बकुची बोनरी वु बोनरली पुरुषविलिच्छा
बालुबजाकुष्णफलाः तेह पुरुषविलिच्छा नतः ||६६॥
चन्द्रकुलकुलक्षा व दाजिका नता व धाता
पुरुषविलिच्छा काञ्चेशी कुल्न्या कुल्नाशिनी || ६६॥
somaraji, somavalli, suvalli, avalguja, 
krsnapata, putiphata, candrelkha, indulekha, sasilekha 
putikarni, kalamesi, durgandha, kusthanasini, suvalliha, 
sita, sitavari, candri, suprabha, kusthanantri, kamboji, 
pratigandha, valguja, candrabhidha, raji, kalamasi, 
aindavi, kustnadosapaha, kantida, valguja, prabhayukt.

The above Nighantas give the properties of the 
said drug in the following manner:
According to Dhanvantari Nighantu, Bakuchi is cool, bitter, and katu by vipaka (it checks the bowels, it removes skin disease caused by kapha, worms and wounds). It is useful as a rasayana and increases intellect, digestive system and vitality.

According to Raja Nighantu Bakuchi is pungent, bitter and hot and removes worms, leprosy, phlegm, skin disease, poison, itching and eczema.

The earliest mention of the plant appears in Charaka Samhita where its leaves are recommended as a cooked vegetable benefitting 'Kapha pitta' - viz. diseases caused by phlegm and bile. It is only much later that references are found for the use of Bakuchi fruit in clinical conditions of the skin. Susruta describes the fruit of Bakuchi along with others in half-a-dozen preparations for external application in addition to the use of the leaves as a vegetable. Still later Vaghbata in describing the use of the plant adds about ten preparations from the fruit for being taken internally. It has been stated by Ayurvedic scholars that the use of the Bakuchi fruit in
clinical conditions of skin was established in the period of Vagbhata sometime during 300-400 A.D. Later, in Ayurvedic systems of medicine, various preparations from the seed are described both for external application and internal administration. The seed of the fruit is rarely used alone in these preparations.

Cooke (1901) has described about 100 species of the genus of which the indigenous *P. corylifolia* or Bakuchi is a widely distributed weed all over India. He also mentions several other uses of the root, leaves and seeds. Prasad (1944) has dealt with the development of the gynaecium and ovule up to the mature stage of the fruit. Mukerji (1956) in his article "Psoralea and other indigenous drugs used in leucoderma" has reviewed all the previous work on Bakuchi. Chandra (1958) has given in detail the description of the plant, the anatomy of the root and stem as well as its propagation and cultivation. Santapau (1958) mentions the plant as widely occurring round about Khandala near Poona and he records its use as a food by local people.

Dey (1931) advises a simple ointment of oleoresinous extraction of the seed for external application in cases of leucoderma. He has advised only external applications of the extract and has reported good clinical results. Dymock (1935) mentions the medicinal uses of the drug in America also. According to Kirtikar and Basu (1934) there are 7 species of *Psoralea* which are used in medicine in different countries. They describe several medicinal
uses and record personal experiences of an ointment prepared from the powdered seeds of Bakuchiol and Cassia tora with lime for cases of ringworm. Chopra (1948) has described in some detail, pharmacological and clinical work carried out on the seed. He reports clinical trials with an essential oil isolated from the seeds with negative results. But the oleo-resinous extract is found to be more active in the treatment of leucoderma of non-syphilitic origin. Chopra also mentions the work carried out by Sen et al. in 1923, according to which, it is the unsaponifiable material of the seed oil which is clinically active in case of leucoderma and psoriasis.

The earliest attempt at isolating specific chemical compounds from Bakuchiol fruit was by Jois et al. (1933). They report the isolation of a crystalline compound melting at 163°C which they named as Psoralen. Jois and Manjunath (1934) report the isolation of another crystalline compound "Isopsoralen" both of which are identified to be furocoumarins. Kesadri and Venkataram (1937) describe a method for the separation of a fixed oil, a phytosterol, psoralen and isopsoralen from the seed. Rangaswamy and Kesadri (1943) describe another method of separation of psoralen-isopsoralen. They also describe a preparation from the seeds for external application. They recommend triturations of the seed with coconut oil which according to them dissolves about 2.7% of the psoralen and isopsoralen mixture. Chakravarti et al. (1948) have reported the isolation of one more substance called
psoralidin from the pericarp of the fruit. Chakraborty et al. (1957) studied 17 natural coumarin derivatives of which psoralen is the most effective antifungal agent. Mukerji (1963) has studied the toxic effect of psoralen isopsoralen mixture on albino rats and has reported that the drug produces hypertrophy of liver, kidneys and spleen in the animals. Misra et al. (1961) report the production of fluorescent products by irradiation of psoralen with ultra violet light which may be the responsible agent for accelerating melanin formation in vitiligo. During the last 20 to 25 years, quite a number of papers have been published in other countries, on natural coumarins in view of the interest they have created because of their properties of absorption of ultraviolet light and of stimulating melanin formation on human skin. The natural coumarins and furocoumarins have also been found to be toxic to fish (Spath 1938).

Gokhale (1962) has pointed out the variable clinical results of the use of the traditional preparations from Bakuchhi both for local application and for oral administration.

From the above brief review, the work carried out on Bakuchhi fruits may be briefly summarized as follows:

1. Ayurvedic systems of medicine have used the plant as "Kusntanashini" - a cure for skin troubles.
2. Later clinical studies have established that it is a specific for skin ailments and helps in repigmentation.
3. The active principles responsible for the above clinical action are the furocoumarins - psoralen-isopsoralen and possibly a few others.

4. The samples of the fruit from different sources vary in their efficacy as shown by clinical results.

5. An essential oil and a fixed oil have also been shown to be present in the fruit.

6. Furocoumarins from other sources have been found to be poisonous to fish.

In the present investigation the following have been carried out:

1. Plant characteristics.

2. Detailed microscopy of the fruit.

3. Chemistry - Phytochemistry - proximate analysis - Isolation of furocoumarins, variation in yield of furocoumarins in different samples.

4. Biological - curative tests on vitiligo patients, Toxicity to mice and fish.
The plant occurs as a weed and is widely distributed round about Poona from where the material was collected. The plant flowers during October-November and the fruits were collected during December to February. On an average, each mature plant yields 5 to 10 g. of the fruit. For purposes of comparative study, samples of the fruits were obtained from the drug shops of Ahmednagar, Bombay, Rajasthan and Poona.

Botany: Psoralea corylifolia Linn.
(Syn. Trifolium unifolium)
Family - Papilionaceae
Local names: Sanskrit: Aval guja, Bakuchi, Somaraji; Hindi: Babachi; Marathi: Bavachya; Punjabi: Babchi; Kannada: Bavanchi; Telugu: Bavanji; Tamil: Karpokarishi; Bengali: Bavachi; Assam: Pha co.

Plant characteristics: (fig.10) The plant is an erect annual about 0.6 to 1.2 m. high, stem and branches striated vertically with a few spread out white hairs; leaves simple about 3.8 to 7.5 cm. by 2.5 to 5 cm., broadly elliptic, incisodentate, rounded and mucronate at the apex; stipules lanceolate, persistent. Flowers in dense axillary solitary 10-30 flowered racemes; pedicels short; calyx 3 to 4 mm. long hairy outside; corolla bluish purple nearly twice as long as the calyx.

Fruit: (fig.11) Fresh fruits are dark brown in colour with a fragrant odour and a bitter taste. The fruit is oblong and
fig. 10 Bakuchi plant (*Psoralea corylifolia* Linn.)

fig. 11 Bakuchi fruits
is an indehiscent one-seeded pod. The length varies from 2 to 5 mm. and the breadth varies from 1.5 to 3 mm. The pericarp on its external surface shows well marked deep wrinkles. The pericarp is inseparable from the testa. The fruit has a persistent calyx.

**Microscopy of the fruit:** Both hand and microtome sections of the fruit have been employed. Sections of the fruit have also been studied at different stages of maturity.

The first stage (A) is just after fertilization with flower still seen on the fruit in a fading condition. The second stage (B) is attained in 15 to 20 days and marked by a well developed green fruit with persistent calyx. The final mature stage is reached in another 9 to 12 days and is indicated by the development of a dark brown colour and a fragrant odour. Thus the entire development of the fruit usually takes about a month. The fruit is big in the second stage and shrinks to a somewhat smaller size when mature. The fully mature seed is first described and its differences from the earlier stages are pointed out.

The T.S. of the mature fruit consists of three broad regions - the pericarp, the testa and the cotyledons.

1. **The pericarp:** The epidermis (fig.12, 13) shows a convoluted appearance with masses of brownish black material spread at intervals over and inside the epidermal cells, possibly resins in character. Discrete glandular structures (fig.13) resembling the shape of an urn, are seen. (fig.13).
figures of Bakuchi (Psoralea corylifolia Linn.)

**fig. 12** T.S. of fruit X 17 (diagramatic) showing p-palisade tissue of the testa, p-pericarp, c-region of cotyledons and t-ethylereal oil glands.

**fig. 13** T.S. of the fruit X 157 (part enlarged) showing p-pericarp, p-parenchyma, t-ethylereal oil glands, p-palisade tissue and s-sclerenchyma.

**fig. 14** T.S. of pericarp X 70 (5 stage) showing the urn shaped oil glands, opening to the exterior with an orifice ---

**fig. 15** T.S. of the cotyledon region of the fresh seed (5 stage) X 157 showing parenchymatous cells containing s.g.-starch grains and o.g.-oil globules.
These are more conspicuous in sections of premature fruit. They are in the pericarp just below the epidermal cells, separated by three or four layers of parenchyma. The glands seem to open to the exterior by a small orifice in the fresh sections of stage A and B (fig. 14). These glands often numbering about 25 to 40 in a single section are separated from each other by a layer of two of parenchyma. The glands in the premature stages show greenish brown masses inside them, which disappear by treatment with glacial acetic acid. Osmic acid turns them black indicating the presence of ethereal oil in these glands of the pericarp. Their length-wise diameters vary from 93 to 208 μ and the breadth-wise diameters vary from 64 to 240 μ. The rest of the pericarp consists of parenchymatous cells which are round to polygonal. Running through the parenchyma at regular intervals are the vascular strands which are cut in various planes. (fig. 13 v.s.).

(2) Testa: The seed coat consists of three distinct layers. The outermost is the epidermis being a layer of prismatic cells, walls of which are lignified almost obliterating the lumen (fig. 13 p). The length of these cells is approximately 10 times their breadth. A layer or two heavily lignified sclerenchymatous cells (sclerides) follow the first layer of the testa. Below this are four to five layers of tangentially elongated parenchyma which constitute the third layer of the testa.
(3) Cotyledons: These constitute the bulk of the seed. Sections of the fruit in premature stages disclose thinly scattered starch granules, as evidenced by the iodine test. (fig. 13, 15). These granules are seen both in the intercellular as well as intracellular spaces of the parenchyma more often at the periphery of the cell than in the centre. Some of the parenchymatous cells of the cotyledons in the sections of premature fruit possess a granular or honeycomb appearance. These are not stained by iodine or osmic acid and do not disappear when treated with glacial acetic acid. In the sections of the fully mature seed, the starch completely disappears and the intercellular granular structures are seen to be modified into fat globules as confirmed by Sudan III. There was no evidence of any essential oil in the cotyledons.

The honeycombed intracellular structure, the development of oil globule and the gradual disappearance of starch escape observation in microtome sections. They could be studied in hand sections only. Attempts were made by staining to detect the presence of free coumarins. But they could not be found.

The above studies show that:

1. The essential oil is restricted to the pericarp and the fixed oil to the cotyledons.

2. Fat is developed at the expense of the starch.

3. The furcocoumarins are not present as such in the seed.
Mukerji (1956), Prasad (1944) as well as Chandra (1958) have described the microscopy of the fruit. But somehow, none of them have mentioned anything about the segregation of the essential oils in the pericarp and the fixed oil in the cotyledons as also the presence of starch granules in the premature stages.

Chemistry:

The air-dried fruit and seed material was coarsely powdered for chemical analysis. Table 14 gives the results of phytochemical tests of the fruit. Table 15 gives the proximate analysis of the fruits and seeds. In the next Table (16) are given the percentage results of extractives of the fruit by the usual solvents.

Table 14. Phytochemical tests of the fruits of Bakuchi

<table>
<thead>
<tr>
<th>Test for</th>
<th>Reagent</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkaloids (alcoholic extract)</td>
<td>Mayer's reagent, Tannic acid, Picric acid, Wagner's reagent</td>
<td>Negative</td>
</tr>
<tr>
<td>Tannins (water infusion)</td>
<td>Ferric chloride</td>
<td>Negative</td>
</tr>
<tr>
<td>Reducing substances</td>
<td>Benedict's qualitative</td>
<td>Positive</td>
</tr>
<tr>
<td>Glycosides, sugar and saponins etc. (water infusion)</td>
<td>Haemolytic test 2- human blood suspension</td>
<td>Negative</td>
</tr>
<tr>
<td>Saponins (water infusion)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starch (microchemical test)</td>
<td>Iodine</td>
<td></td>
</tr>
<tr>
<td>Proteins (water infusion)</td>
<td>Millon's reagent, nitric acid, sulphanilic acid</td>
<td>Positive</td>
</tr>
</tbody>
</table>
Table 15 Proximate analysis of the fruit and seeds of Bakuchi

<table>
<thead>
<tr>
<th></th>
<th>Whole fruit</th>
<th>Seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture</td>
<td>7.4</td>
<td>10.3</td>
</tr>
<tr>
<td>Ether extractives</td>
<td>16.4</td>
<td>4.6</td>
</tr>
<tr>
<td>Crude proteins</td>
<td>23.2</td>
<td>27.6</td>
</tr>
<tr>
<td>(N x 6.25)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crude fibre</td>
<td>13.1</td>
<td>9.9</td>
</tr>
<tr>
<td>Ash</td>
<td>6.4</td>
<td>5.2</td>
</tr>
<tr>
<td>Carbohydrate (by difference)</td>
<td>34.5</td>
<td>42.4</td>
</tr>
</tbody>
</table>

*Acid insoluble ash 0.6 0.7

Table 16 Percentage extractives of the fruit of Bakuchi

<table>
<thead>
<tr>
<th>Readings</th>
<th>Water</th>
<th>Petrol</th>
<th>Ether</th>
<th>Sulphuric</th>
<th>Alcohol</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>40-63°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>17.4</td>
<td>12.5</td>
<td>23.9</td>
<td></td>
<td>26.4</td>
</tr>
<tr>
<td>Variation</td>
<td>16.6-19.3</td>
<td>12.1-12.9</td>
<td>13.1-29.0</td>
<td>25.6-27.2</td>
<td></td>
</tr>
</tbody>
</table>

Isolation of psoralen-isopimpinellin mixture

The method of isolation of the mixture of coumarins from Bakuchi adopted by previous workers is in general, to repeatedly extract the fruit with pet. ether and other fat solvents. The solvent is recovered from the extract leaving a residual oil. This oil deposits a solid material
on keeping for sometime. This solid material contains the psoralen-isopsoralen mixture which is purified by crystallization from alcohol, chloroform, hot-water etc.

Method followed: The fruit is not easily reduced to a fine powder due to the presence of resinous material in the pericarp. Therefore, the pericarp was first removed by treating the whole fruit with alkali. By this processes the pericarp is loosened and on rubbing the treated fruit, the pericarp and seed are easily separated. About 50 to 60% of the fruit is obtained as clean seed. The seeds are yellow to brownish in colour measuring 3 to 4 mm. in length and 2 to 3 mm. in breadth. The seeds when air dried could easily be powdered. Its analysis is given in Table 15.

The powder is extracted with 95% alcohol in a percolator. Complete extraction requires about a week. When the alcohol is recovered from the extract, the residue contains an oily matter and a solid. The oil is filtered off and the solid residue is treated with boiling water and filtered. The filtrate on standing gives a crop of crystals. The residue on repeatedly treating with boiling water and filtering gives further crops of crystals for 5 to 8 times. The crystals obtained in the first few crystallization had a melting point varying 112-116°C indicating that they were mixtures of psoralen-isopsoralen. (Ref. Jois and Manjunath, 1934). The crystals obtained in the last crops (7 and 8) of crystallization had melting points of 160-162°C indicating the crystal to be
those of pure psoralen (Jois et al., 1933).

The yield of the mixture by the above method works out to 0.35% on the decorticated seed or 0.186% on the air-dry fruit. The yield of pure psoralen crystals is about 0.26% on the decorticated seed. Attempts at separating the pure psoralen and isopsoralen from the mixed crop of crystals by fractional crystallization or by chromatographic separation were made, but without success. The crystals in the mixture are colourless needle shaped and 1 to 5 cm. in length. Pure psoralen crystals are broom shaped.

The oil obtained in the above processes was clarified by redissolving and filtration. The yield was 13.33% on the decorticated seed. It had the following constants (Table 17). Similar constants obtained by Seshadri and Venkata Rao (1937) of the oil obtained by extraction with petroleum ether are also given for comparison.

<table>
<thead>
<tr>
<th>Constants of oil</th>
<th>Author's</th>
<th>Seshadri &amp; Venkata Rao's</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sp. gravity</td>
<td>at 21°C</td>
<td>0.9296</td>
</tr>
<tr>
<td>Ref. Index</td>
<td>at 18°C</td>
<td>1.4775</td>
</tr>
<tr>
<td>Saponification value</td>
<td>238</td>
<td></td>
</tr>
<tr>
<td>Iodine value</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>Unsaponifiable matter</td>
<td>2.55</td>
<td></td>
</tr>
</tbody>
</table>
The main differences are the higher saponification, and iodine values and the higher unsaponifiable matter in our sample. This is due possibly to the different methods of preparation and different samples of Bakuchi.

**Variations of psoralen-isopsoralen content from different samples of Bakuchi** - Using identical methods of isolation the yields of psoralen-isopsoralen were determined from samples obtained from different parts of India. The results are tabulated below:

**Table 18 Psoralen-isopsoralen content of Bakuchi samples**

<table>
<thead>
<tr>
<th></th>
<th>Poona market</th>
<th>Ahmednagar market</th>
<th>Bombay market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poona (fresh collection)*</td>
<td>.35</td>
<td>.37</td>
<td>.33</td>
</tr>
<tr>
<td>(fr)</td>
<td>.80</td>
<td>.33</td>
<td>.33</td>
</tr>
</tbody>
</table>

*collected personally during different seasons

The wide variation in the psoralen-isopsoralen mixture contents of different samples may be noted. Freshly collected samples are 10-20 times richer than the bazaar samples. Even in the freshly collected samples there is variation - sample 2 is twice as rich as sample 1.

The variation probably explains the different in efficacy of preparations from Bakuchi referred by Gokhale (1962).

Further study of the bazaar samples showed them to be adulterated with the seeds of *Cassia tora*, a weed
fig. 16 Seeds of Canna tona (left) and Bakuchi fruits (right) enlarged
growing along with the Bakuchi.

The \textit{C. tora} can easily be identified by their glossy appearance, oval shape as contrasted with the dull opaque appearance and bean shaped fruits of Bakuchi (fig. 16). Probably the bazaar samples are very old which also explain their lower contents of the coumarins.

\textbf{Biological properties}

As already stated, Bakuchi is recommended both for external application and internal administration. The Ayurvedic physicians use a method of preparing a kind of ointment from Bakuchi using edible oils. Accordingly Bakuchi fruits were triturated with an oil and the preparation sent to the Sasoon Hospital for being tried on Vitiligo patients. The preparation, contains all the constituents - essential oils, fixed oil, psoralen and isopsoralen etc. of the fruit. The results of these trials have been published by Dr. B. B. Ghokale, M.D., Hon.Dermatologist, Sasoon Hospital, Poona (1962).

According to him 24 cases of Vitiligo were treated by local application of the oily preparation of Bakuchi sent by this laboratory. The patients were asked to apply the preparation only once a day. There was no other supplement to the treatment. There were 6 males and 18 females whose age varied between 5 to 63 years. The time of treatment varied from 1 month to 14 months. Only three discontinued during the period of treatment. In most of the
remaining cases there was good pigmentation. Complete cure could be effected in the case of patients of lower age groups and those of the earlier stages of the disease. Thus the claim made by the ancient authors of the curative property of the whole fruit of Bakuchi against leucoderma seems to be substantiated. It still remains to be investigated as to whether the curative property is to be ascribed to any one or more of the components or the mixture of all the components - essential oil, fatty oil, psoralen and isopsoralen etc.

Since it has been mentioned that Bakuchi is effective for other skin infections the antifungal and antibacterial properties were investigated. As described in the section on Chitrak the same methods were employed - diffusion method using the bacteria, E. coli and S. aureus and the fungi Candida albicans and Aspergillus niger. Neither the whole fruit nor the isolated furocoumarins had any trace of either antifungal or antibacterial property.

As regards the internal administration as a cure for leucoderma it was not possible to have any clinical trials. However in order to see if it had any toxic effect a few feeding trials were conducted on mice. Four groups of five mice each were daily fed with 50 mg, 100 mg. and 200 mg. of the Bakuchi seed powder for a period of 30 days. The powder was incorporated in the food. The animals ate without any nausea. Weights were recorded periodically and at the end the animals were sacrificed. With 50 mg. dose, the weights of the animals were not affected, whereas with the other two groups with higher doses
there was an initial depression in weight during the first 5 to 10 days and thereafter the animals made up. In all the groups, the animals did not show any externally visible abnormalities, such as loss of fur, lethargy, drowsiness etc. Dissections also did not show any abnormalities of the principal organs. Thus the seed administration had no ill-effects. Mukerji (1956) reports that the powdered seeds have been internally used in several centres by the Ayurvedic physicians and no ill-effects have been noticed. However, Mukherji (1960) finds that a mixture of psoralen-isopsoralen administered a daily dose of 2.5 mg. per 75 g. weights of rats for 60 days did show toxic effects. There was no gain in the weights of the animals and their spleen were found to increase. Hypertrophy of liver and kidneys were also noticed.

Fast (1955) states that administration of powdered seeds of Bakuchi proved estrogenic. Therefore the animals in the toxicity experiment were allowed to mate and their fertility observed. It was found that some of the animals which had received the Bakuchi powdered seed did not conceive at all; some did conceive but the progeny died after birth. In the latter the litter consisted of only 4 to 5 progeny as against 10 to 12 in normal animals. These are only preliminary observations and need further elaborate experimentation for confirmation.

Fish: Furocoumarins are known to be toxic to fish. This was tested using a local variety of fresh water fish. Different concentrations of solution of the isolated psoralen
and isopsoralen mixture were used. Fish were placed in these solutions. A dose of .001% had no effect. Concentration of .002% and above were found to be toxic. Inversion took place in 20-60 minutes and death in about 2 hrs. At .004% concentration, inversion took place in 2 mts. and death in 6 mts.

Extracts of the fruits or seeds also gave similar results. 25 g. of the fruit boiled with water, and made up to 1000 ml. when tested with fish, brought about an inversion of the fish in 40-50 mts. and death another half-an-hour later. Using seeds in similar proportion i.e. 25 g. boiled in 1000 ml. of water, the fish showed inversion in 10-20 mts. and death in 30-40 mts. Attempts to use the fish for standardization of the psoralen content were not successful as there was no strict proportionality.
Summary

1. According to Ayurvedic literature the fruits of Bakuchi - *Psoralea corylifolia* are specific against skin diseases particularly leucoderma. Relevant stanzas giving the synonyms and therapeutic properties are cited.

2. Recent literature on Bakuchi is reviewed. Two furocoumarins psoralen and isopsoralen have been isolated from Bakuchi. An essential and a fixed oil are present in the fruit.

3. After describing the plant characteristics, a detailed microscopy of the fruit is given. These studies show that the essential oil is restricted to the pericarp and the fixed oil to the cotyledons. Fats seem to develop at the expense of starch. Free furocoumarins cannot be detected.

4. Pericarp free seeds have been prepared by treating the fruit with alkali and the furocoumarins psoralen-isopsoralen have been prepared from the seeds by extraction with alcohol, the yield being about 3.2 percent on air dry fruit.

It has been shown that there is wide variation between samples of Bakuchi in their yields of furocoumarins. Further market samples are found to be adulterated with *Cassia tora* seeds. It is suggested that the adulteration and the variation between samples explain the differences in curative efficacy of different Bakuchi fruit samples.
5. A kind of ointment prepared by triturating the Bakuchiol fruits with an edible oil has been tried as an external application on vitiligo patients through the local hospital authorities. It is reported that there was successful pigmentation in most cases, thus confirming the claims of the ancient physicians that Bakuchiol is effective against leucoderma.

6. Neither the fruit nor the seed nor the isolated furocoumarins had any significant antifungal and or antibacterial effect.

7. Feeding small quantities of Bakuchiol seed powder continuously for thirty days did not show any toxic effect on mice.

8. But it seems to have some effect on female mice. Their fertility seems to be impaired.

9. The furocoumarins as well as the extracts of the fruit and seed have been shown to be poisonous to fish.