

**GOVERNMENT OF INDIA  
HEALTH AND FAMILY WELFARE  
LOK SABHA**

STARRED QUESTION NO:357  
ANSWERED ON:03.12.2010  
SUBSTANCES OF MEDICINAL USE  
Patel Shri Bal Kumar

**Will the Minister of HEALTH AND FAMILY WELFARE be pleased to state:**

- (a) whether India is dependent on other countries for various substances used in medicines, such as Shikimic acid, an important compound of Tamiflu and extracted from Anise plants grown extensively in China, while the same can be sourced from indigenous plants;
- (b) if so, the details thereof;
- (c) whether the Government proposes to explore alternative sources of imported medicinal substances including Shikimic acid from indigenous plants;
- (d) if so, the details thereof; and
- (e) the steps taken/proposed to be taken in this regard?

**Answer**

THE MINISTER OF HEALTH AND FAMILY WELFARE (SHRI GHULAM NABIAZAD)

(a)to(e): A statement is laid on the Table of the House.

STATEMENT REFERRED TO IN REPLY TO LOK SABHA STARRED QUESTION NO. 357 FOR 3RD DECEMBER, 2010

As per information furnished by Department of Pharmaceuticals, Ministry of Chemicals & Fertilizers, India is more or less self sufficient in various substances used for medicines. However, import takes place because of cost factor in some cases. As far as Shikimic Acid is concerned, Indian Council of Medical Research (ICMR) has informed that the plant *Illicium griffithii* found in Arunachal Pradesh, Manipur, Meghalaya and Nagaland, contains Shikimic acid. The plant has been found to be an ideal source of Shikimic Acid, which can be used as the starting material for synthesizing (16 steps synthesis) the drug Tamiflu which particularly is used in modern medicine for Bird flu or HI NI Swine flu. Earlier the imported plant, popularly known as Chinese Star Anise (*Illicium verum*) was used in this country for the same purpose. However, the industry engaged in the Tamiflu drug synthesis has now already started using *Illicium griffithii*.

ICMR had initiated steps for indigenous production of Shikimic acid, the raw material for the manufacture of Oseltamiver, an anti-viral drug used in the treatment of HI NI Swine flu in India by exploring various options of Research and Development to develop production technology for manufacture of the compound.

(A) The following sources of production of Shikimic acid were identified:

- # Microbial fermentation process for production of Shikimic acid
  - # Identification of Indian Plants and optimization of extraction process
  - # The plant tissue/hairy root culture for the production of Shikimic acid
  - # Using recombinant E coli as host
  - # Development of enzymatic biotransformation process for conversion of Quinate to Shikimic acid
- (B) Following projects have also been sanctioned by ICMR for the purpose:

- (i) Hairy Root Cultivation for Mass Scale Production of Shikimic Acid
- (ii) Production of Shikimic Acid: A Protocol Candidate for Developing Drug Formulation for Swine and Avian Flu
- (iii) Ascertaining the Commercial Potential of the Method for Domestic production of Shikimic Acid
- (iv) Evaluation of plant and Microbial Sources for production of Shikimic Acid

Further, Department of Bio-Technology (DBT) has supported a project focusing on identification of high yielding and alternate sources of few important metabolites from plant sources.

In addition to above, Government has also set up the National Medicinal Plants Board in November, 2000, for overall development of

medicinal plants sector. National Medicinal Plants Board is implementing following Schemes during 11th Plan:

(i) Central Sector Scheme for Conservation, Development and Sustainable Management of Medicinal Plants

(ii) Centrally Sponsored Scheme of National Mission on Medicinal Plants

Steps have already been taken under the Schemes for resource augmentation in forest areas and cultivation of identified species of medicinal plants.