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Development of stable thebaine rich lines in opium Poppy (*P. somniferum* L.)

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Alkaloids are defensive compounds produced by a number of medicinal plants as a consequence of self-protection from invaders. Though, solely being a defensive compound for its producer is highly valuable for manufacturing of life saving drugs for human beings. Among the different alkaloid bearing medicinal plants, opium poppy (*Papaver somniferum* L.) is one of the most valuable plant for mankind. For commercial purposes, opium poppy is cultivated in large number of countries in which India is one of the chief opium producing and exporting country in the world. The opium poppy is majorly grown for opium latex and its derivatives i.e. alkaloids (morphine, codeine, thebaine, narcotine, papaverine) but seeds are equally important due to its protein (upto 24%) that is widely used in various preparations in confectionary industries. Among the major alkaloids of opium poppy, morphine is one of the most powerful analgesics but is narcotic in nature while thebaine is a non-narcotic alkaloid, is one among the diverse array of alkaloids produced by opium poppy. Due to extensive utilization of thebaine as starting material for the production of 14-hydroxymorphinans, such as oxycodone, naloxone, naltrexone, naltrexone methonobromide, nalbuphine and nalmefene having the ability to be used as analgesics and narcotic antagonists, the use of this alkaloid in pharmacopeia has been increased about 10 folds. The limited availability of thebaine and its high cost is due to its presence of low amount (0.5-2.0%) in dry opium latex of *P. somniferum* L., which is the sole producer of natural thebaine. So, it is need of the day to enhance the content of natural thebaine in opium poppy plant and to capture increasing global demand of thebaine, this can be achieved by the development of varieties rich in thebaine for commercial cultivation. Seeing, limited availablity of thebaine in world market and its high cost for the use in pharmaceutical industries, planned experiments were conducted at NBRI, Lucknow for the development of a variety having very high thebaine content. From the available germplasm stock, two species of Papaver i.e. *Papaver somniferum* L. (2n=22) and *Papaver setigerum* DC. (2n=44) were hybridized followed by rigorous selection uptill 10th generation in subsequent generations. The selected high thebaine yiedling plants were tested for three consecutive years for stablility performance to select a stable and high thebaine producing plant. For the first time we have been able to develop stabilized high thebaine lines having thebaine upto 10% in comparison to existing varieties having thebaine 1-2% which were validated through HPLC chromatography.

Biography

Sudhir Shukla completed his Ph.D. at the age of 25 in the year 1985 from National Botanical Research Institute, Lucknow and degree was awarded from Avadh University, Faizabad, U.P. Presently he is Principal Scientist and looking after Genetics & Plant Breeding Division of CSIR-NBRI, Lucknow. He has about 32 years research experience in genetic improvement of medicinal, underutilized and oilseed crops. During this journey he had published more than 140 research papers in reputed national and international journals beside nine book chapters and one patent. He has also guided six Ph.D. students.

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