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Dr. Siva Rami Reddy E
Faculty of Homoeopathy,
Tantia University,
Sri Ganganagar, Rajasthan,
India

A complete review on *Lathyrus sativus*

Dr. Siva Rami Reddy E

Abstract
Grass pea (*Lathyrus sativus* L.) is a Neolithic plant that has survived millennia of cultivation and has spread over three continents. It is a robust legume crop that is considered one of the most resilient to climate changes and to be survival food during drought triggered famines. Additionally, recent research has exposed the potential of grass pea as a health promoting nutraceutical.

Keywords: *Lathyrus sativus* and pharmacological

Introduction
Grass pea (*Lathyrus sativus*) is one of the oldest cultivated crops with a long history of domestication. In archaeological excavations in Turkey and Iraq, seeds of *Lathyrus* species had been found as collected or cultivated items. Similarly, seeds from 2500 bc were identified in the oldest excavations in India and already in the Balkan in 8000 BC. According to the legend, grass pea was brought to Ethiopia (Abyssinia) by the queen of Sheba after visiting King Salomon in the tenth century BC [1]. The origin of the name *Lathyrus* is from the Greek word "lathyros" that hints at something exciting, referring to the aphrodisiacal qualities ascribed to grass pea. Although the term "lathyrism" used to designate a disease caused by overconsumption of grass pea was coined by Cantani of Naples only in 1873, the history of lathyrism dates back to ancient times. In the funeral offerings found in the Egyptian pyramids, various legume seeds were present, including grass pea. Apparently, grass pea was considered a special food to be offered to kings, in contrast to the present-day reputation of being the survival food of the poorest of the poor. Ancient civilizations in the Middle East and the Americas included grain legumes and cereals in diets with well-balanced composition in essential amino acids [2-5].

Botanical description
Botanical Name - *Lathyrus sativus* L. Synonym - Grass pea, Chickling pea, Khesari, Teora, Kasari (bengali) Origin - South Europe and Western Asia. Lathyrus is considered as drought-tolerant hardy crop, and is grown in low-rainfall regions under rainfed conditions, during winter when lentil and chickpea are not expected to give good yields. The crop has unique tolerance ability against stress environmental conditions not only drought but also for water logging. In addition to use as dal and chapatti, it is usually grown as fodder crop. Lathyrus leaves about 36-48 kg/ha nitrogen economy for the succeeding crop. Nutritive value of lathrus is Protein - 31.9% Fat - 0.9% Carbohydrate - 53.9% Ash - 3.2%. The earliest data about the presence of *Lathyrus cicera/sativus* in prehistoric Spain come from the early Neolithic site of Cova de les Cendres (Alicante) and from the middle Neolithic site Cueva del Toro. *Lathyrus sativus* was reported as being cultivated for human consumption. Later, Dantfn Cereceda (1934) produced the first detailed account of food in Spain. The most thorough description of a species of Lathyrus comes from Alonso de Herrera (1513), an academic from the university of Salamanca, who wrote in the 16th century. His masterpiece, Agricultura General was first published in 1513 as a treatise of agriculture. In chapter 24, on vetches, he described the so called cicercula or cicercha as cultivated in Italy [6-7].

Correspondence
Dr. Siva Rami Reddy E
Faculty of Homoeopathy,
Tantia University,
Sri Ganganagar, Rajasthan,
India

(A) Flower in stage (B) Fruiting stage

(C) Mature Fruit Stage (D) seeds of *Lathyrus sativus*

Fig 1: Different stages of *Lathyrus sativus*

Pharmacological effects of ginkgo biloba

Beta-oxalyl-diamino-propionic acid described in short as β-ODAP or as BOAA (betaoxalyl- amino-alanine) is a neurotoxic secondary metabolite present in the legume *Lathyrus sativus.* The neurotoxic non-protein amino acid causes irreversible spastic paraparesis (paralysis) of the legs known as neurolathyrism, when it is consumed as a major portion of the diet over a three-to-four month period. Neurolathyrism, characterized by nervous disorders such as hyper-irritability, muscular rigidity, weakness and paralysis of the leg muscles and convulsions leaves the patients crippled for life [8].

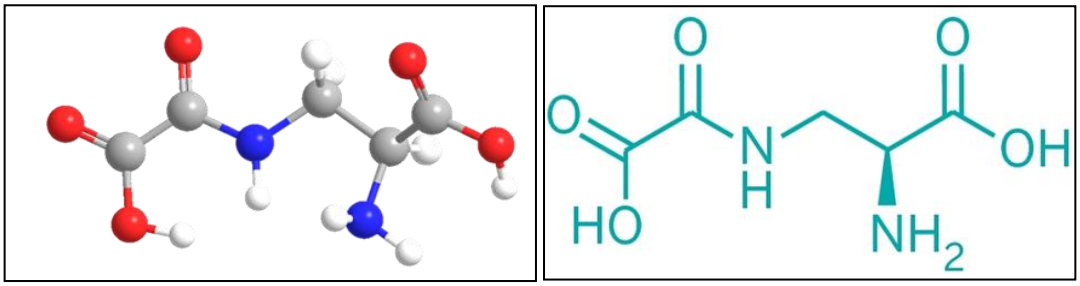

Fig 2: Chemical structure of *Lathyrus sativus*

Pharmacological activity

Grass Pea Genetic Improvement

Variation and association of morphological and biochemical characters in grass pea have been studied by Wuletaw and Bekele in 2003 using 50 grass pea landrace populations from Ethiopia, selected based on origin in terms of administrative regions and different altitude classes. This study revealed significant variation in ODAP content both within and amongst populations. According to studies conducted at Debre Zeit Agricultural Research Center, the ODAP content of this variety is 0.08%, which is five times lower than that of the local variety. Mehta and Santha in 2008 were saying that the instability of the low ODAP content has been indicated as a major bottleneck of this cultivar.

The ODAP content of the genotypes at various locations in Ethiopia ranged from 0.051% to 0.392% at Debre Zeit, 0.163–0.328% at Alem Tena, 0.098–0.327% at Denbi and 0.075–0.344% at Akaki. The highest and lowest mean ODAP contents (%) were obtained at Alem Tena and Debre Zeit, respectively. Fikre *et al* in 2008 showed that the ODAP content of the officially released grass pea variety Wasie has increased from <0.08% to >0.2% when tested in some lowland areas. Zambre *et al*. (2002) produced a prolific regeneration protocol for grass pea [9].

For instance zinc deficiency, which is even aggravated by ODAP being a carrier for zincions by Lambein *et al*. in 1994, has been shown to induce oxidative stress and apoptotic death in neurons by Mackenzie *et al*. in 2007. Mishra *et al*. in 2009 has been described that manganese, which is abundantly present in Ethiopian soils, may potentiate the neurotoxicity of grass pea seeds or ODAP by altering the blood–brain barrier permeability. Manganese overexposure is also found to correlate with increased susceptibility to other neurodegenerative diseases such as Parkinson's disease by Roth and Garrick in 2003. Nunn *et al*. in 1994, found a significant decrease of methionine in the serum of volunteers after ingesting a single meal of

grass pea. This amino acid is a crucial precursor for glutathione, responsible for the protection of cells (including motor neurons) against oxidative stress. Excitotoxicity mediated through activation of glutamate receptors by Ross *et al*. in 1989, more specifically α-amino-3- hydroxy-5-methyl-4-isoxazolepropionic acid (AMPA) receptors by Kusama Eguchi *et al* in 1996, mitochondrial by Sriram *et al*. in 1998 as well as enzymatic dysfunctions by Pai and Ravindranath in 1993, have been proposed to explain at least part of its neurotoxicity by Getahun *et al*. in 2005 and V.G. Narsinghani, S.M. Kumar *et al* A three year study performed under condition of natural infection detected promising lines with no visible symptoms of downy mildew [10].

Conclusion

The above study showed that *Lathyrus sativus* can be use for childrens as a vaccination to prevent recurrent infections/disease etc., Need to do more research on *Lathyrus sativus* for knowing pharmacological activity. So, we came to conclusion that *Lathyrus sativus* will act as a preventive medicine and genetic improvement medicine.

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