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## Abstract

$\beta$ -Carboline belongs to the class of indole alkaloids and comprises of pyridine ring fused to an indole skeleton. The discovery of  $\beta$ -carboline has made a massive impact in miscellaneous biomedical fields through exploitation of its ring moiety. Indeed, the spectrum of biological activities displayed by this natural compound is remarkable in diversity. This review focuses on the exceptional abilities of  $\beta$ -carbolines extracted from different parts of *Peganum harmala* in the treatment of various diseases, predominantly from its seeds.

## Occurrence of $\beta$ -Carboline

$\beta$ -Carboline was originally isolated from wild Syrian rue (*Peganum harmala* L. family *Zygophyllaceae*), a perennial, glabrous plant which grows spontaneously in semi-arid conditions, steppe areas and sandy soils. The plant is well-known in Iran and is widely distributed and used as a medicinal plant in Central Asia, North Africa and Middle East. The seeds and roots contained the highest levels of alkaloids with low levels in stems and leaves, and absence in flowers.



white flowers



round seed capsules carrying more than 50 seeds

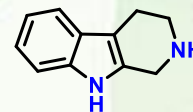


short creeping roots

It is a shrub, 0.3-0.8 m tall

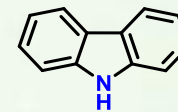
## Biological Significance of $\beta$ -Carboline and Its Derivatives

### Tryptoline



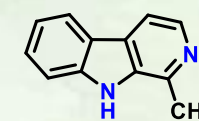
Treats mental/mood problems such as depression, relieve anxiety and tension.

### $\beta$ -Carboline



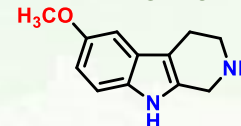
Exhibits significant activities against several human tumor cell lines.

### Harmane



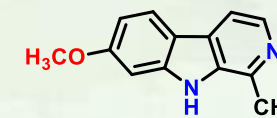
Exhibits potent antimicrobial activity, also having low cytotoxicity.

### Pinoline



Free radical scavenger, displays antioxidant properties.

### Harmine



Decreases systemic arterial blood pressure and total peripheral vascular resistance.



## Conclusion

It is evident that  $\beta$ -carbolines extracted from *P. harmala* demonstrate diverse biological functions including antitumor activity, antioxidant activity, antimicrobial activity, cardiovascular effect and therapeutic effect that are useful to treat various diseases.

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