

Herbal approach in neurological disease depression and its animal model

Mangi lal^{1*}, Ajeet pal Singh², Amit Chawla³, Amar pal Singh⁴, Rajesh Kumar⁵, Rani Payal⁶

¹Department of pharmacology, St. Soldier Institute of pharmacy, Lidhran Campus, Behind NIT (R.E.C.), Jalandhar-Amritsar by pass, NH-1, Jalandhar-144011, Punjab, India

²Department of pharmacology, St. Soldier Institute of pharmacy, Lidhran Campus, Behind NIT (R.E.C.), Jalandhar-Amritsar by pass, NH-1, Jalandhar-144011, Punjab, India

³ professor cum principal, Department of pharmacy, Maa Saraswati institute of pharmaceutical sciences, Abohar

⁴Department of pharmacology, St. Soldier Institute of pharmacy, Lidhran Campus, Behind NIT (R.E.C.), Jalandhar-Amritsar by pass, NH-1, Jalandhar-144011, Punjab, India

⁵Department of pharmaceuticals, St. Soldier Institute of pharmacy, Lidhran Campus, Behind NIT (R.E.C.), Jalandhar-Amritsar by pass, NH-1, Jalandhar-144011, Punjab, India

⁶Seth GL Bihani SD College of Technical Education, Sriganganagar (Raj.)

Abstract:

The brain, as the central organ of the central nervous system (CNS), regulates complex processes including cognition, emotion, and physiological control. It comprises the cerebrum, cerebellum, and brainstem, supported structurally and functionally by specialized neuronal and glial cells. The blood-brain barrier (BBB) plays a crucial role in maintaining a stable environment by restricting the entry of harmful substances while allowing essential molecules to pass. Despite these protective mechanisms, the brain remains susceptible to various disorders including neurodegenerative and neuropsychiatric diseases, such as Alzheimer's, Parkinson's, depression, and schizophrenia. These disorders arise from multifactorial origins involving protein misfolding, genetic predisposition, oxidative stress, and environmental toxins. Depression, in particular, correlates with structural and biochemical brain alterations such as hippocampal atrophy and neurotransmitter imbalance. Animal models have been instrumental in elucidating the pathophysiology of depression and facilitating the development of therapeutic agents. Increasing evidence suggests that herbal therapies can modulate neurochemical pathways and offer safer alternatives to synthetic antidepressants. Among these, *Ferula asafoetida* (asafoetida) has drawn scientific interest due to its bioactive sulfur compounds with neuroprotective, anti-inflammatory, and antidepressant properties. This review integrates the anatomical, functional, and pathological aspects of the brain with recent insights into depression research and highlights the potential of asafoetida as a promising plant-based therapeutic agent for managing depressive disorders.