

# EVALUATION OF NEUROPROTECTIVE ACTIVITY OF BASELLA RUBRA IN DIABETIC NEUROPATHY IN RATS

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## ABSTRACT:

The present study estimates the neuro defensive effect against the diabetic neuropathy of Basella rubra plantleave extract on rats. Uses various doses like 50 mg, 100 mg and using Diclofenac sodium as a standard dose. Animal induced by STZ and using two types of styles to estimate the diabetic neuropathy, they are Tail Flick and Eddy's hot plate styles. The assembled creatures are allowed to acclimatize in the coops for 30 twinkles before testing. The lower 5 cm bit of the tail was checked and submersed in some pithily filled warm water of 55 o C. After each determination the tail was precisely dried. The response was determined before oral administration of separate treatments which was recorded as zero minute reading. After the administration of Basell rubra plant extract, response was recorded the intervals of 30,60,90 & 120 min, In tail flick system, 50mg/ kg ethanol extract of Basella Rubra shows  $2.88 \pm 0.31, 2.37 \pm 0.67, 3.13 \pm 0.98, 3.22 \pm 0.78$  time and 100mg/ kg  $3.12 \pm 0.45, 3.78 \pm 0.29, 3.4 \pm 0.9, 3.58 \pm 0.31$ . In Eddy's hot plate system 50mg/ kg shows  $3.43 \pm 0.87, 3.34 \pm 0.39, 3.45 \pm 0.37, 3.24 \pm 0.49, 3.45 \pm 0.22$  and 100mg/ kg shows  $3.56 \pm 0.88, 3.55 \pm 0.29, 3.38 \pm 0.82, 3.31 \pm 0.48, 3.85 \pm 0.34$ . Based on above results 100 mg of Basella Rubra extract shows good neuro defensive activity.

Key words: Neuro protective, Basella rubra, Diabetic neuropathy

## INTRODUCTION

Neuropathic pain has immersed as a harmful to patient that occurs by damaging the blood vessels leading to morbidity and mortality. The present review paper aims in furnishing an account of Different herbals extractions that could be employed in treatment of neuropathic pain.( 1). According to a World Health Organization (WHO) harborage, the number of diabetic cases will have doubled from 171 million in 2000 to 366 million in 2030. In

addition, the global diabetes among grown-ups aged than 18 times has risen from 4.7 to 8.5 in the period from 1980 to 2014 (21). This diabetic epidemic is of concern in that it doesn't only detriment cases' health, but also is an profitable burden on society as well as the case. In Basella Rubra aged threat of development of macro- and micro vascular conditions including diabetic nephropathy, retinopathy, neuropathy, and of conditions affecting the cardiovascular system, is the most causes of mortality among diabetic cases. Among the various diabetic complications, diabetic retinopathy (DR) isn't only consider a serious micro vascular complication of diabetes, and the main cause of the vision and blindness worldwide, but also has an fresh neurodegenerative aspect. With the diabetes, the number of people affected by DR is anticipated to rise to 191 million by 2030 (32). Oxidative stress, intermediated substantially by hyperglycemia- convinced generation of free revolutionaries, helps in the development and progression of DM and its complications (4). Diabetic supplemental neuropathy, which is one of the most frequent long- term complications of DM, is frequently accompanied with inferior quality of life (5). This complication occurs in about one- quarter of diabetic cases (6). Painful diabetic neuropathy is associated with symptoms and signs similar as burning, chinking, type of robotic pain, allodynia, and hyperalgesia (7). Therefore, new remedial targets is Basella rubra for the satisfactory treatment of diabetic neuropathic pain (4,6). Abnormal free revolutionaries high situations beget membrane damage leading to decline of antioxidant defense mechanisms causing cell and towel damage (7). The Basella rubra strategy for easing the oxidative damage in DM is grounded on supplementation with certain salutary antioxidants similar as vitamins E and C and flavonoids (8).

## MATERIALS AND METHODS

### Tail Flick Method

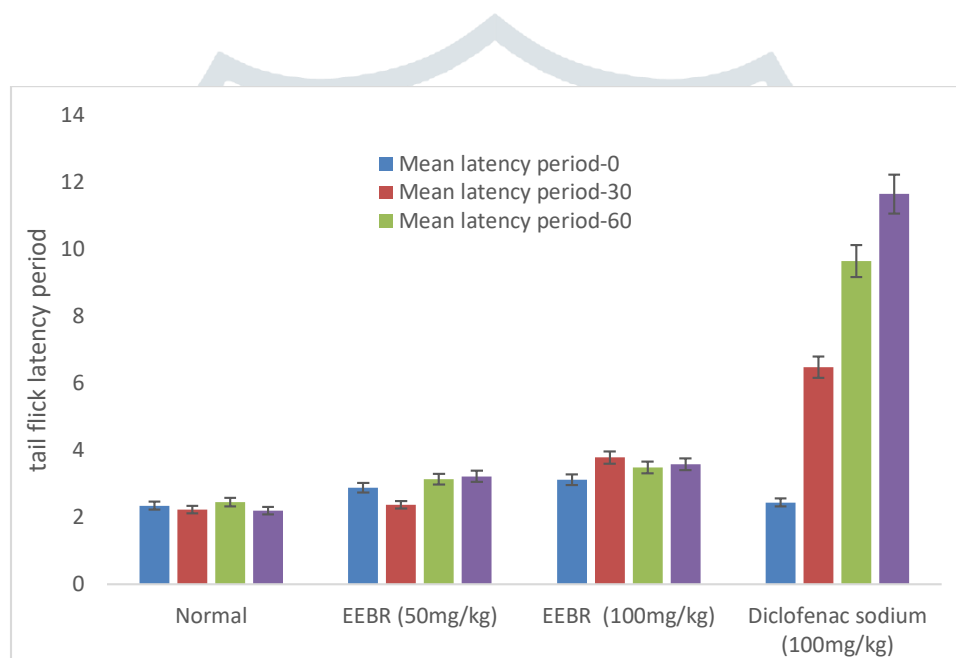
The grouped Animals allowed acclimatizing in the coops for 30 minutes before testing. The lower 5 cm portion of the tail was marked and immersed in a mug of lately filled warm water of exactly 55<sup>0</sup> C. Within a many seconds the rat acts by withdrawing the tail. The action time was recorded by a stop watch. After each determination the tail was precisely dried. The action was determined before oral administration of Basella Rubra separate treatment which was recorded as zero minute. After the extract was administering the action time was recorded at an interval of 30, 60, 90, 120 and 150 minutes. The cut off time of the absorption is 15 seconds. The mean action time was recorded for each group and compared with the value of standard drug. The noceptive threshold was estimated using the tail- film test. The intensity of the ray was acclimated to beget a mean control action time of 4 – 6 s. The cut- off time was acclimated at 15 seconds in order to avoid towel damage. The tail- flick quiescence for each rat was estimated the times, and the mean value was considered to be the birth quiescence. A drenching tail- flick quiescence presents hyperalgesia as a marker of neuropathy. The noception threshold was measured once a week for all groups during the entire experimental period

## Eddy's hot plate method Thermal hypoalgesia

The animals individually placed on the hot plate maintained at 55°C, one hour after their respective treatments. The reaction time was noted as the time at which animals acted to the pain stimulus either by paw licking or jumping response, whichever appear the first. The cut off time for the action was 15 seconds . The test was carried before the Basella rubra treatment and at 30, 60 and 90 min after administration.

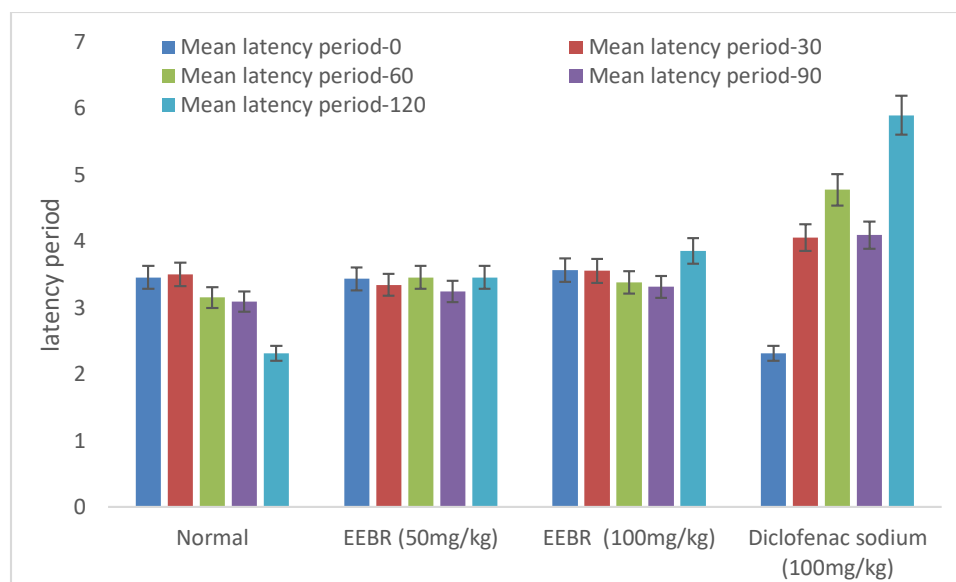
## RESULTS & DISCUSSION:

### DIABETIC NEUROPATHY SCREENING BY TAIL FLICK RESPONSE



**Diabetic Neuropathy screening by tail flick response**

## DIABETIC NEUROPATHY SCREENING BY THERMAL HYPOALGESIA RESPONSE



**Diabetic Neuropathy screening by Thermal hypoalgesia response**

### DISCUSSION

Streptozotocin causes selective destruction of cells of islets of pancreas and brings an increase in blood glucose levels. It is evident from the present investigation that streptozotocin administration at the dose of 60 mg/kg albino rats. [9]. At present the treatment of diabetes mainly involves a sustained reduction in hyperglycemia by the use of biguanides, thiazolidinediones, sulfonylureas and D- phenylalanine derivatives, meglitinides and alpha glucoside inhibitors in addition to insulin. However, due to untoward side effects the efficacy of these compounds are debatable and there is a demand for new compounds for the treatment of diabetes. Hence, plants have been suggested as a rich, as yet unexplored source of potentially useful antidiabetic drugs. Aqueous leaves extract of *B. rubra* treated diabetic rats showed the predominant exocrine pancreatic tissue composed of acini with draining ductules. The endocrine component was found as scattered nodules within the substance of the exocrine pancreas.

*B. rubra* brings back the blood glucose and body weight to normal in diabetes-induced rats. After treatment with *B. rubra*, liver section of diabetic rats hepatocytes, portal tracts and central veins appeared normal. In the pancreas no insulinitis was observed. From the above results it is shown that it has (*B. rubra*) hypoglycemic activity. Hypoglycemic action of the herbal plant (*B. rubra*) in diabetic rats may be possible through the insulinomimetic action or by other mechanism such as stimulation of glucose uptake by peripheral tissue, inhibition of endogenous glucose production, or activation of gluconeogenesis in liver and muscle. It may prevent the hepatic injury and pancreas and suppressing the oxidative stress associated with diabetes. Although the exact chemical compounds responsible for the

hypoglycemic effects of *B. rubra* still remain speculative, experimental evidence obtained from this study indicates that *B. rubra* possess hypoglycemic property, which also is confirmed by histopathological examination.

The Methanolic extract of leaves of *Basella rubra* L. exhibited significant potential antidiabetic activity in alloxan-induced Diabetic rats. The number of functionally intact  $\beta$ -cells in the islet organ is of decisive importance in the development course and outcome of DM[10].

The hypoglycemic effect of aqueous leaf extract of *Basella rubra* with that of streptozotocin (STZ) in two months old male albino rats was studied. After a month of proper treatment all the experimented rats were scarified and the antidiabetic properties was analysed. The results reported that the rats treated with *Basella rubra* pulp significantly brought back the blood glucose level. [11]. The antioxidant properties of plant leaf extract was studied and reported that the levels of liver enzymatic antioxidants such as catalase, superoxide dismutase, glutathione peroxidases and non enzymatic antioxidants like vitamin C, vitamin E and reduced glutathione significantly increased in the animals treated with the *Basella rubra* pulp. Thus the findings suggested that the plant has hypoglycemic and antioxidant properties.[12]. The STZ induced diabetic rats are divided into four groups of six animals each. Group I served as Non diabetic control, Group II - Diabetic control, Group III Non-diabetic rats treated with *Basella rubra*, Group IV Diabetic rats treated with *Basella rubra*. The Aqueous extract of *Basella rubra* produced a significant antihyperglycemic (decrease in blood glucose level) effect.[13]. Glucose levels were found to be significantly increased after STZ administration, and there after decreased by administration of *Basella rubra*. [14]. Decrease in serum glucose may be due to the regeneration of beta cells of the pancreas, which were destroyed by STZ.

In above results 100mg ethanol extract of *Basella rubra* shows good analgesic activity against diabetic neuropathy pain in tail flick method and thermal hypoalgesia method.

## CONCLUSION

Conclusion of this study showed that the leaf extract of *Basella rubra* has neuroprotective effects, as confirmed by through tail flick and hot plate methods in a rat model of diabetes. The extract had a significant analgesic effect on the induction of thermal hyperalgesia in STZ-induced diabetic animals.

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