CHAPTER – IV.

Bauhinia purpurea Linn.

Bauhinia purpurea Linn.
Plate No: 4

Flowering twig, Leaf back view, Petal

Habit

Flower

Bauhinia purpurea Linn.

Syn : *Phanera purpurea* (L.) Benth.

Family: Caesalpiniaceae

Hindi: Kachnaar

Eng: Butterfly tree, geranium tree, orchid tree

Densely foliaceous tree, up to 12m tall, bark grey to brown. Leaves bilobed oblong, 5.5-11.5 x 6-12 cm, leaflets connate about half way, 11-13 nerved, plaited below, base subcordate, apex obtuse, margin entire; flowers rose in terminal or axillary panicles or racemes; buds narrow, obovoid, obtuse; calyx 2 cleft above; petals 5, rose or pink, equal, obovate-obtuse, entire; stamens 3 (5); pod oblong, 30-40 x 1.5-2 cm, compressed, narrow at base, apex horned; seeds ovid, flat, beaked.

Phytochemistry:

Leaves were found to contain flavonoids, quercetin, quercitrin, rutin, apigenin, apigenin 7-O-glucoside; bis [3',4'- dihydroxy-6-methoxy-7, 8-furano-5',6'-monomethylallyloxy]-5-C-5-biflavonyl 1 and [4'hydroxy-7-methyl-3-c-α-L-yhamnopyranosyl]-5-C-5-(4'-hydroxy-7-methyl-3-C-α-D glucopyranosyl) -biflavonyl 2 (Wahab *et al.,* 1987; Yadav *et al.,* 2005). Stem was found containing 5,6-dihydroxy-7-methoxyflavone 6-O-beta-D-xylopyranoside (Yadava *et al.,* 2000). Flavonoids of the bark were chrysin and 6, 8-dimethylchrysin. Flowers contained astragalin, isoquercitrin and quercetin also pelargonidin 3-glucd. & 3- triglucd.

Steroids identified from this plant were 6'-(stigmast-5-en-7-one-3-O-beta-glucopyranosidyl) hexadecanoate, together with 3beta-hydroxystigmast-5-en-7-one, and oleanolic acid from bark (Kuo *et al.,* 1998).

Its leaves possess condensed tannin (195.0 mg/g) with protein precipitating capacity (7.438mg BSA/g) and protein perceptible phenolics (64.94 %) (Yadav *et al.*, 2001).

The components of dried seed (g/100g) were: crude protein, 25.6; crude lipid, 14.3; crude fibre, 4.7; total carbohydrates, 51.7; and minerals: sodium, 14.8; potassium 2490.6; calcium, 342.0; magnesium, 76.7; phosphrous, 72.5; iron, 2.6; copper, 0.5; zinc, 1.9; and manganese, 0.2 mg/100g. the amino acid composition of seed protein is : alanine, 6.2; arginine, 7.2; aspartic acid, 11.0; glutamic acid, 12.4; glycine, 4.3; histidine, 2.8; leucine, 12.2; lysine, 5.6; methinone, 1.3; phenylalanine, 6.8; proline, 8.8; serine, 3.3; threonine, 3.9; tyrosine, 5.3, and valine, 6.7 g/100g. The seeds also contained antinutritional factors like free phenols, 2.0; tannins, 2.7; and L-DOPA, 2.2g/100g. Vijayakumari *et al.*, in 1997 reported that, the mature seeds of *Bauhinia purpurea* contained crude protein 271.7 g/kg, crude fibre 58.7 g/kg, crude fat 124.5 g/kg, ash 29.3 g/kg and carbohydrates 515.3 g/kg. Potassium, phosphorus and iron occurred in higher concentrations than in other legumes commonly consumed in India. The globulins and albumins together constituted major storage proteins (82% total protein). The essential amino acid profile of total seed proteins compared well with the FAO/WHO reference pattern except for a deficiency of sulfur-containing amino acids and tryptophan. Compared with the globulins, the albumins appeared to be a rich source of cystine, methionine, threonine, lysine and tryptophan. Seed lipids contained high levels of oleic and linoleic acids, which accounted for 62.6% of total fatty acids recovered. Dry heating and autoclaving significantly reduced the antinutritional compounds. The *in vitro* protein digestibilities of raw, dry-heated and autoclaved seeds were reported to be, 59.5, 72.3 and 78.7%, respectively. The seeds of *B. purpurea* were screened for protein and amino acids which showed 99-209 mg/g of protein and 11-29 mg/g free amino acid (Kadam, 2001).

Uses:

In traditional medicine, this drug is extensively used in glandular diseases and as an antidote to poison. Bark is the officinal part. It is light, cool, astringent, anthelmintic, acrid and overcomes vitiated *pitta* and *kapha*. It cures ulcers, swellings, leprosy, cough, menstrual disorders, glandular diseases and prolapsed of rectum. The drug is also

reported to be useful in dysentery, diarrhoea, piles and worms (Kurup *et al.*, 1979; Sharma, 1983). It is also used in dropsy, anasarca, pain, rheum, thigh swelling, deer-epilepsy, convuls., delirium febris, datura intoxication, blackness of lip or tongue, animal bite (tiger, crocodile, snake, lizard, etc.), haemor., septicaemia, rinderpest, stupefication. Ext. of stems and branches rubbed on fractured parts and also given for drinking to set right bones (Asolkar *et al.*, 1992).

The hydroalcoholic extract of the leaves exhibited hypoglycaemic activity (Wahab *et al.*,1987). The ethanolic extract of the leaf showed significant antidiarrhoeal properties. (Mukherjee et al., 1998). Hot water extract of the stem and leaf of *B. purpurea* showed antiviral activity but it was not much active than the *B. veriegata* and *Desmodium caudatum* in suppressing both adenoviruses and herpes simplex viruses. (Chiang-Lienchai *et al.*, 2003).

The bark extract of *B. purpurea* (2.5 mg/kg) increased serum Tri-iodo thyronine (T_3) and thyroxine (T_4) concentractions significantly. It also increased hepatic glucose-6-phosphatase activity and antiperoxidative effects also, as indicated either by a decrease in hepatic lipid peroxidation (LPO) and by an increase in the activity of antioxidant enzymes (Panda *et al.*, 1999).

Results:

Pharmacognosy

Micromorphology:

Leaves were amphistomatic bearing anisocytic and paracytic stomata. Trichomes were present on both the sides but on the upper part the trichomes was very rare. The average size of the epidermal cell was 21.7 x 22.4 µm on the lower surface and 17.8 x 23.4 µm on the upper surface. The size of the stomata on the lower surface was 11.2 x 9.9 µm and on the upper surface was 10.5 x 10.5 µm. (Fig 4)

Stomatal complex:

Stomatal Index/mm^2 was 23.8, Stomatal Frequency/mm^2 was 10.6, Trichome index/mm^2 was 47, Trichome frequency/mm^2 was 3.2, Palisade ratio was 5.1/mm^2,

Vein Islet number/mm^2 was 9 and Vein Termination number/mm^2 was 35 respectively.

Anatomy:

Multicellular multiseriate trichomes with blunt end were found in the margins of the leaves. The vascular bundle of leaf was surrounded with sclerenchyma patches. The vascular bundle is separated from the sclerenchyma by 2-3 layers of parenchyma cells on the upper and lower end, which formed a continuous arc towards the adaxial side. The palisade was double layered and was finely packed with chloroplasts. The spongy cells were compactly arranged. Trichomes were present on both sides which contained simple starch grains. The size of the cells were: upper epidermal cells 9.24x9.9 μm; lower epidermal cells 8.5x9.2 μm; collenchymas cells 13.2x15.2 μm; sclerides 21.1x16.5 μm; trachieds 15.2x13.2 μm; xylem vessels 25.08x34.3 μm; crystals 22.4x25.08 μm; trichomes 221.1x13.2 μm; starch grains 6.6x4.1 μm (Fig 1)

The base of the leaf contained multicellular trichomes with simple starch grains, sphaeraphides and tannin cells on the hypodermis. The size of the cells were: Trichomes 148.5x12.54 μm; epidermal cells 11.8x14.5 μm; parenchyma cells 40.9x29.04 μm; sclereids 11.88x17.8 μm; trachieds 15.18x9.9 μm; xylem vessels 32.3x23.7 μm; crystals 27.06x26.4 μm; starch grains 7.26x4.1 μm (Fig 2).

In T.S of the petiole the hypodermis was found to contain calcium oxalate crystals and tannin cells. Three vascular bundles were arranged two on the upper side and one on the lower side in a V shape and sclerenchyma cells were seen enveloping the vascular bundle. The size of the cells were: epidermal cells 9.24 x 14.5 μm; collenchymas cells 19.14 x 25.08 μm; chlorenchyma cells 21.7 x 21.1 μm; sclereids 18.4 x 13.8 μm; xylem vessels 30.3 x 27.7 μm; trachieds 14.5 x 10.5 μm; crystals 25.1 x 26.4 μm (Fig 3).

Leaf powder contained single spiral trachieds, fragments of palisade tissues, stomata, vein fibers, tannin cells and rosettes of calcium oxalate crystals, chlorenchyma, fragments of trichomes, parenchyma cells containing starch grains and calcium oxalate crystals (Fig 5).

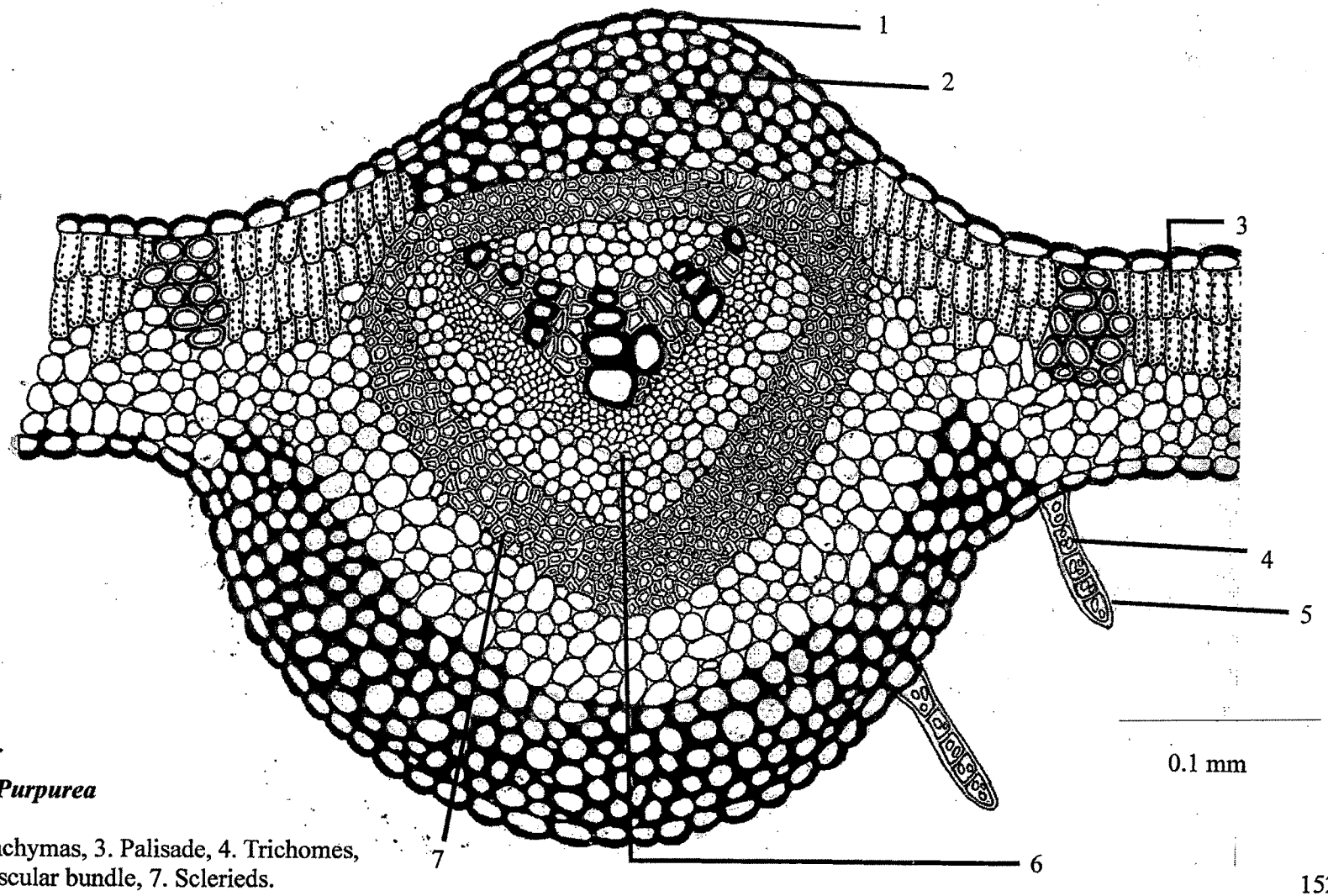


Fig 1: T. S of leaf *B. Purpurea*

1.Epidermis, 2. Collenchymas, 3. Palisade, 4. Trichomes,
5. Starch grains, 6. Vascular bundle, 7. Sclerieds.

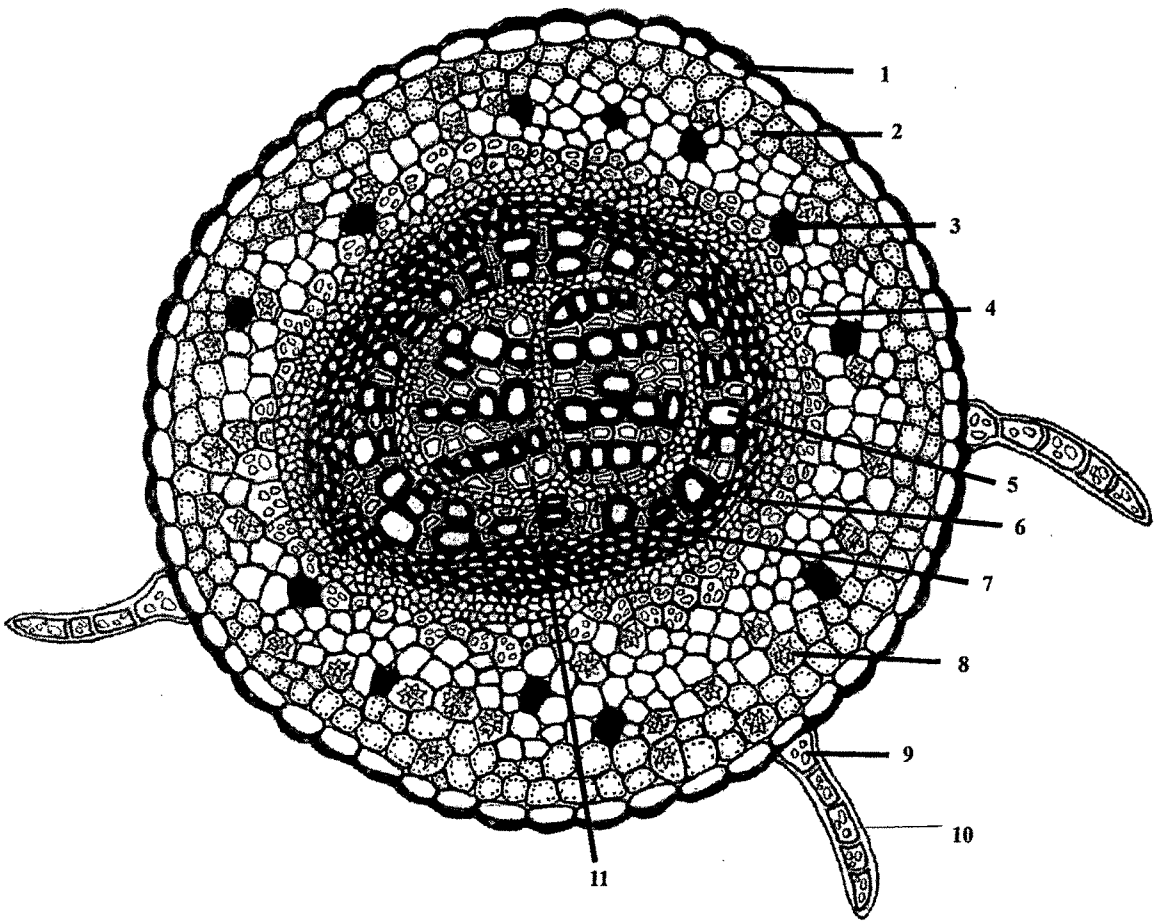


Fig 2. T. S of leaf base *B. purpurea*:
1. Epidermis, 2. Chlorenchyma, 3. Tannin cells, 4. Starch grains, 5. Xylem. 6. Thin walled phloem, 7. Thick walled phloem, 8. Sphaeraphides, 9. Trichomes containing starch grains, 10. Multicellular multiseriate trichomes, 11. Medullary rays

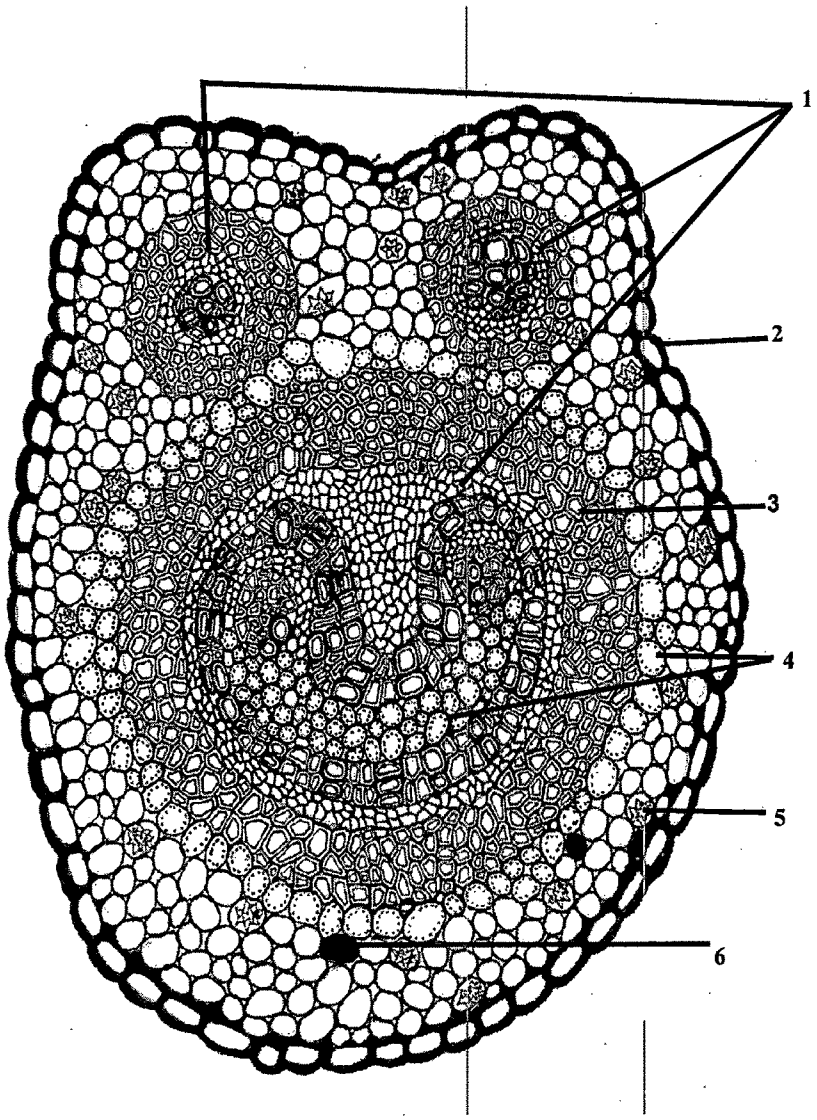


Fig. 3 T. S of Petiole *Bauhinia purpurea*:
1. Vascular bundle, 2. Epidermis, 3. Scleriedes, 4. Chlorenchyma, 5. Calcium oxalate crystals, 6. Tannin cells

Fig 4. Epidermal Layer

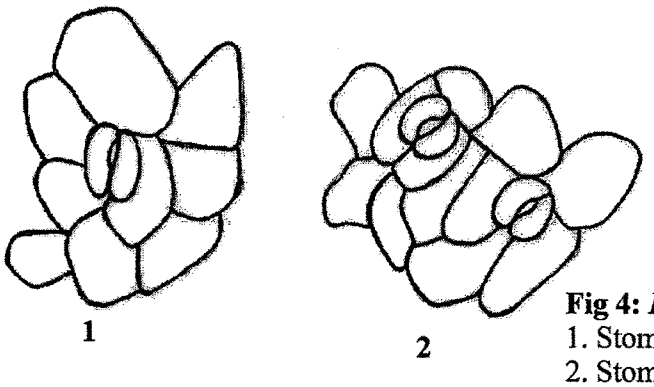


Fig 4: *Bauhinia purpurea*
1. Stomata of upper epidermal layer,
2. Stomata of lower epidermal layer

Fig. 5 Powder characters

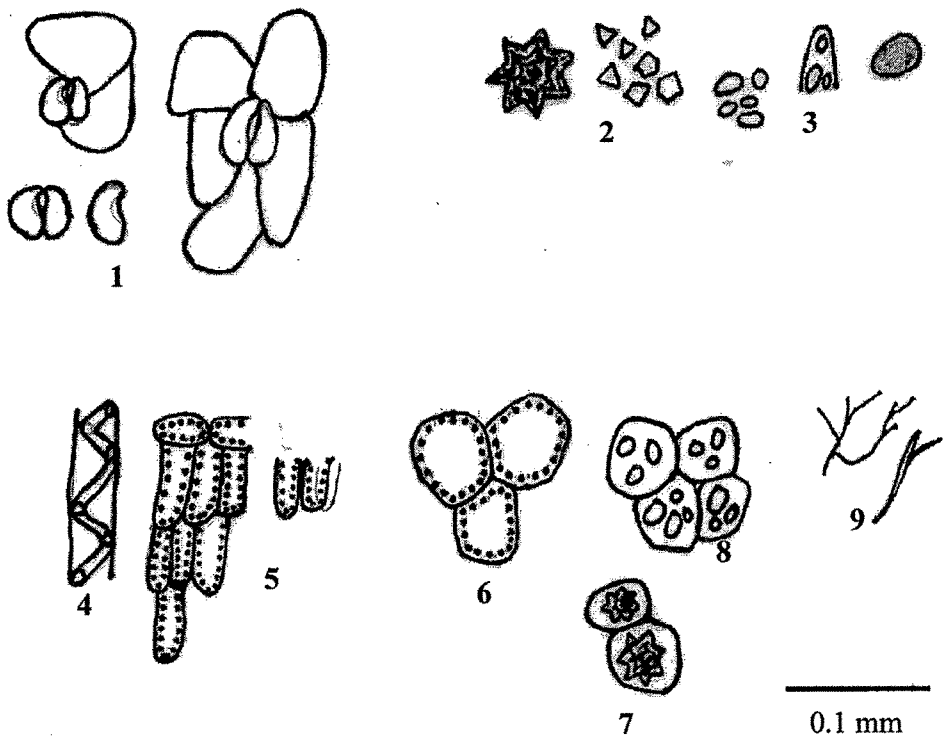


Fig. 5:*Bauhinia purpurea*
1. Stomata, 2. Crystal pieces, 3. Starch grains and tannin cells, 4. Trachieds with spiral coils, 5. Palisade, 6. Chlorenchyma, 7. Crystals in the parenchyma cells, 8. Starch grains in the parenchyma cells, 9. Vein fibres.

Phytochemistry

Bauhinia purpurea leaves contained flavonols such as 3'-OMe-Quercetin, 4'-OMe-apigenin and phenolic acids such as vanillic, syringic and sinapic acids. Alkaloids, glycoflavones and saponins were absent. Quinones, steroids and tannins were present.

Pharmacology:

Results:

The fresh leaf extract when given to normal rats did not show any toxic effects or mortality up to a dose of 1 g/kg body weight in male sprague dawley rats. Even at this high dose there were no gross behavioral changes. Daily feeding of the extract for 30 days did not result in any change in general behavior of the animals. Body temperature and state of the stool, body weight, water and food intake were also not influenced by the drug treatment (Table 1-8). A significant reduction in the blood glucose level was observed (5.4%, 5.4% and 5.7%) after continuous treatment for 30 days with leaf extract 200mg, 400mg and glibenclamide respectively (Table 9).

After the preliminary study the diabetic rats were treated with the leaf extract for 60 days to check the level of thiobarbutric acid reactive substances, non enzymatic antioxidants such as GSH, vitamin C and vitamin E, the activity of enzymatic antioxidants SOD, CAT, and GPX were also estimated. Apart from this the effect of the extract on carbohydrate metabolizing enzymes, toxicity parameters such as urea, uric acid and creatinine were determined. The level of lipids in plasma was also checked.

Table 10 represents the level of blood glucose and body weight of control and experimental rats. After the induction of diabetes the blood glucose level was elevated up to 70% when compared to the control rats. Treatment with the leaf extract 200mg, 400mg and glibenclamide for 60 days significantly ($p<0.05$) reduced the blood glucose, and the percentage of reduction observed was 44.8%, 54.9% and 57.0% respectively and an improvement in the body weight observed was 29%, 26.7% and 26.9% respectively when compared to the untreated diabetic rats.

The level of TBARS, GSH, vitamin C and vitamin E are illustrated in table 11-14. The following changes were observed in the diabetic rats. The level of TBARS in plasma (56.1%), liver (57.7%), kidney (56.7%) and brain (56.7%) was significantly ($p<0.05$) increased. The level of vitamin E was increased in plasma (34.5%) and decreased in tissues (Liver: 36.2%; Kidney: 62%; Brain: 41.8%). GSH and vitamin C was decreased in plasma (44.2% and 57.8%) as well as in the tissues (Liver: 60% and 40%; Kidney: 58.8% and 50%; Brain: 52.8% and 56.6%). These observed changes in the non-enzymatic antioxidants and TBARS were restored after the treatment with the leaf extract and glibenclamide when compared to the untreated diabetic rats. The restored percentage of these parameters after the treatment with 200mg, 400mg and glibenclamide are as follows:

The percentage of decrease observed in the level of TBARS after the treatment is as follows: **plasma**: 36.1%, 47.2% and 55.5%; **liver**: 36.1%, 38.8% and 49.7%; **kidney**: 35.1%, 40.5% and 51.3% and **brain**: 40.5%, 48.6% and 54% respectively.

The increased percentage of GSH after the treatment is as follows: **plasma**: 28.35%, 30.1% and 41.9%; **liver**: 48.2%, 56.3% and 58.8%; **kidney**: 38.2%, 55% and 55% and **brain**: 38.05%, 48.1% and 51.4% respectively.

Vitamin C level was increased after the treatment in **plasma**: 41.6%, 46.6% and 52.9; **liver**: 30.7%, 31.8% and 34.7%; **kidney**: 38.7%, 42.3% and 46.4% and **brain**: 22.8%, 31.2% and 36.2% of the experimental rats.

The level of vitamin E was reduced in **plasma**: 24.2%, 26.2% and 28.9% and the same was increased in **liver**: 24.9%, 29.89% and 31.7%; **kidney**: 45.2%, 50.3% and 55.6% and **brain**: 27.7%, 31.9% and 35.6% of the treated rats respectively.

The activity of SOD, CAT and GPX in liver, kidney and brain are depicted in table 15, 16 and 17. Diabetic rats showed decreased activity of SOD (64.2% and 53.8%), CAT (57.9% and 56.9) and GPX (53.9% and 44.8%) in the liver and brain respectively. In kidney there was an increased activity of GPX (46.1%) and decreased activity of SOD (60.6%) and CAT (56.9%). After the treatment with the leaf extract 200mg, 400mg and

glibenclamide the imbalance in the antioxidant enzymes were significantly ($p<0.05$) improved to normal condition, the percentage of increase observed in the activity of SOD is as follows: (brain: 46%, 49.5% and 49.3%; liver: 57.4%, 58.6% and 59.8%; kidney: 53.5%, 54.9% and 56.7% respectively) when compared with the untreated diabetic rats.

The percentage of increased observed in the activity of CAT was **brain**: 36.9%, 39.7% and 45%; **liver**: 33.5%, 45.04% and 48.7%; **kidney**: 38.2%, 47.2% and 53% respectively.

After the treatment the activity of GPX was decreased in kidney (32.3%, 41.5% and 44.5%) and the activity of SOD (53.5%, 54.9% and 56.7%) and CAT (38.2%, 47.2% and 53%) were increased respectively.

There was a significant changes observed in the carbohydrate metabolizing enzymes in diabetic rats (Table 18). The activity of hexokinase was decreased (54.5%) and the activity of glucose-6-phosphatase (51.6%) and fructose-1, 6-bisphosphatase (49.07%) was increased. The variations in the carbohydrate metabolizing enzymes were recovered after the treatment with the extract 200mg, 400mg and glibenclamide, the activity of hexokinase was increased (47.4%, 47.4% and 50%) and the activity of glucose-6-phosphatse (38.7%, 41.9% and 45.2%) and fructose- 1,6 –bisphosphatase (35.2%, 39.8% and 44.4%) was decreased when compared to the untreated diabetic rats.

Table 19 illustrates the level of plasma urea, uric acid and creatinine. In diabetic condition the increased level of urea (70%), uric acid (85.1%), creatinine (83.8%) and BUN (70.7%) was observed, and these levels were decreased (urea: 32.2%, 42.7% and 48.6%; uric acid: 48.2%, 58% and 65.5%; creatinine: 71.2%, 77.4% and 78.8%; BUN: 32.4%, 42.8% and 48.7%) after the treatment with 200mg, 400mg and glibenclamide respectively when compared with the untreated diabetic rats.

The plasma lipid levels such as cholesterol (72%), free fatty acids (61.6%), phospholipids (42.3%), triglycerides (60.7%), LDL-c (85%) and VLDL-c (60.9%) were increased and the level of HDL-c (56.8) was decreased. Treatment with the extract and glibenclamide exhibited hypolipidemic effect with an increase in the HDL-c (Table 20 and 21). The percentage of decreased observed in the lipid level was, cholesterol: 36.8%, 43.3% and

45.5%; free fatty acids: 18.8%, 29.2%, and 43.8%; phospholipids: 16.5%, 28.5% and 32.8%; triglycerides: 42.85%, 43.9% and 54.12%, LDL-c: 47.4%, 55.3% and 62.2%, VLDL-c: 42.9%, 43.8% and 54.06% with an increased percentage of HDL-c: 50%, 55.3% and 63.4% in the rats treated with 200mg, 400mg and glibenclamide respectively when compared with the untreated diabetic rats.

Discussion:

In the present study there was a significant fall in the blood glucose level. Similar results were obtained by Wahab *et al.*, in 1987 in hydroalcoholic extract of the leaf. The decreased level of non-enzymatic antioxidants observed in the diabetic rats was because of the increased level of TBARS. The increased level of TBARS observed during the diabetic condition indicates activation of lipid peroxidation system. Similar results were obtained by other workers in diabetic rats (Suresh Kumar and Menon, 1993). In the present study it was clearly observed that the leaf extract could improve the level of non-enzymatic antioxidants there by decreasing the level of lipid peroxidation.

Leaf extract caused a decrease in the activity of SOD, CAT and GPX in the liver and brain of diabetic rats. In kidney the GPX activity was increased and the activity of SOD and CAT was decreased. This condition is clearly due to the production of free radicals, because free radicals and peroxides are clearly involved in the pathogenesis of diabetes mellitus. Similar results were also observed by Wolff (1993) in diabetic rats. After the treatment with *B. purpurea* leaf extract and glibenclamide the changes were reversed almost to normal condition, which could be attributed to the effect of the herb as a potent free radical scavenger.

The observed decrease in the activity of hexokinase in the present study can be due to insulin deficiency. The treatment elevated the activity of hexokinase significantly ($p<0.05$), there by increasing the utilization of glucose which leads to decreased blood glucose level. Where as, the increased activity of glucose-6-phosphatase and fructose-1, 6-bisphosphatase may be due to insufficiency of insulin in diabetic rats. The treatment significantly reduced the activity of glucose-6-phosphatase and fructose-1, 6-

bisphosphatase; this might be due to increased insulin secretion that is responsible for the repression of gluconeogenic key enzymes.

Lipid disorders are common in both IDDM and in NIDDM and are related to glycemic control. Goodman and Gillman (1985) observed that the high concentration of lipids in the diabetic subjects is mainly due to an increase in the mobilization of free fatty acids from the peripheral depots. In this study it is clearly observed that the observed increase in the lipid levels in the diabetic rats was recovered after the treatment with the extract and glibenclamide and this could be explained as a direct result of the extract and glibenclamide in reducing the blood glucose concentration.

The level of urea, uric acid and creatinine was decreased after the treatment this explains that the extract inhibited the alloxan renal toxicity.

The results indicated that fresh leaf extract of *B. purpurea* possesses hypoglycaemic activity, as well as antioxidant and hypolipidemic activity and thus lend credence to the suggested folkloric use of the herb in the control or management of diabetes mellitus. The dose at 400mg/kg body weight was better than the 200mg/kg body weight. Since the drug was not much effective than the standard drug glibenclamide it is better to use it with an herbal formulation for better results.

Table: 1 Effect of *B. purpurea* aqueous leaf extract on blood glucose levels in fasted normal rats.

Groups	Treatment (Dose/Kg body weight)	Blood glucose (mg/dl)			
		Fasting	**1h**	**2h**	**3h**
1	Control (received 2% gum acacia)	68.75 ± 2.99[a]	67 ± 2.58[b]	65.25 ± 2.50[b]	63.5 ± 2.38[c]
2	*B. purpurea* 100mg	69.5 ± 1.9[a]	67.5 ± 1.91[b]	67 ± 2.16[b]	65.75 ± 1.71[c]
3	*B. purpurea* 200mg	67.5 ± 1.91[a]	66.25± 1.26[b]	65 ± 0.82[b]	63.5 ± 1.29[c]
4	*B. purpurea* 400mg	68.75 ± 2.99[a]	66.25 ± 3.50[b]	64.25± 3.30[c]	62.25 ± 3.10[c]
5	*B. purpurea* 600mg	68.75 ± 2.99[a]	67.25 ± 2.22[b]	65.75 ± 1.71[c]	63.75 ± 1.50[c]
6	*B.purpurea* 800mg	69 ± 2.58[a]	66.75 ± 2.75[b]	65.5 ± 3.00[c]	63.5 ± 3.00[c]
7	*B. purpurea* 1000mg	71 ± 2.58[a]	69 ± 2.58[b]	68 ± 3.56[b]	66.75 ± 2.75[b]

Table: 2 Effect of continuous administration of aqueous extract of *B. purpurea* on blood glucose levels in normal fasted rats.

Groups	Treatment (Dose/Kg body weight)	Blood glucose (mg/dl)			
		Initial Day	**4th Day**	**7th Day**	**15th Day**
1	Control (received 2% gum acacia)	71.25 ± 2.99[a]	70.25 ± 2.99[a]	69.5 ± 2.65[a]	68.75 ± 2.75[b]
2	*B. purpurea* 100mg	69.75 ± 4.03[a]	67.25 ± 4.57[a]	65.5 ± 4.43[a]	63.5 ± 4.43[b]
3	*B. purpurea* 200mg	71 ± 2.58[a]	69.25 ± 2.99[a]	67.5 ± 2.52[b]	65 ± 2.45[c]
4	*B. purpurea* 400mg	69.5 ± 1.91[a]	68 ± 1.41[a]	66.5 ± 1.00[b]	65.25 ± 0.50[b]
5	*B. purpurea* 600mg	71 ± 2.58[a]	69 ± 2.58[a]	67 ± 2.58[b]	64.75 ± 2.50[c]
6	*B. purpurea* 800mg	71.5 ± 1.91[a]	69.5 ± 1.91[a]	67.75 ± 2.06[b]	65.25 ± 1.89[c]
7	*B. purpurea* 1000mg	68.75 ± 2.99[a]	67 ± 2.58[a]	65 ± 2.58[b]	63 ± 2.58[c]

Values are means ± S.D for six animals in each group.
Values not sharing a common superscript differ significantly at $p<0.05$.
Duncan's Multiple Range Test (DMRT)

Table: 3 Effect of *B. purpurea* aqueous leaf extract on oral glucose tolerance in normal fasted rats (2g/kg body weight).

Groups	Treatment (Dose/Kg body weight)	Blood glucose (mg/dl)			
		Fasting	**30 min**	**60 min**	**90 min**
1	Control (received 2% gum acacia) + glucose	70.5 ± 1.91^{a}	171.25 ± 2.99^{b}	168.75 ± 3.77^{a}	164.75 ± 3.59^{a}
2	*B. purpurea* 100mg + glucose	67.25 ± 2.22^{a}	169.5 ± 1.91^{b}	166.75 ± 2.75^{c}	163.5 ± 1.91^{d}
3	*B. purpurea* 200mg + glucose	70 ± 2.83^{a}	165.75 ± 4.79^{b}	161.5 ± 4.51^{c}	160 ± 4.32^{d}
4	*B. purpurea* 400mg + glucose	69 ± 2.58^{a}	166 ± 4.32^{b}	163 ± 3.37^{c}	160.75 ± 4.27^{d}
5	*B. purpurea* 600mg + glucose	71.5 ± 1.91^{a}	166 ± 3.65^{b}	163.75 ± 3.50^{c}	161.75 ± 3.30^{d}
6	*B. purpurea* 800mg + glucose	72.75 ± 2.22^{a}	169 ± 2.58^{b}	166.25 ± 2.06^{c}	163 ± 2.45^{d}
7	*B. purpurea* 1000mg + glucose	71.25 ± 2.99^{a}	168 ± 1.63^{b}	165.5 ± 1.73^{c}	163.25 ± 1.50^{d}

Table: 4 Effect of *B. purpurea* aqueous leaf extract on oral glucose tolerance test in normal fasted rats after 30 days of continuous drug administration (2g/kg body weight).

Groups	Treatment (Dose/Kg body weight)	Blood glucose (mg/dl)			
		Fasting	**30 min**	**60 min**	**90 min**
1	Control (received 2% gum acacia)	70.75 ± 5.62^{a}	171 ± 5.29^{b}	168 ± 5.72^{b}	164 ± 5.16^{c}
2	*B. purpurea* 100mg	67 ± 2.58^{a}	164.25 ± 4.35^{b}	161.5 ± 4.51^{b}	159 ± 3.46^{c}
3	*B. purpurea* 200mg	68 ± 1.83^{a}	169 ± 2.58^{b}	166.75 ± 2.75^{b}	163.75 ± 3.50^{c}
4	*B. purpurea* 400mg	69 ± 2.58^{a}	167 ± 6.22^{b}	164.5 ± 6.66^{c}	161.5 ± 5.20^{d}
5	*B. purpurea* 600mg	69.5 ± 1.91^{a}	168.75 ± 2.99^{b}	166.75 ± 2.75^{b}	163.75 ± 3.50^{c}
6	*B. purpurea* 800mg	71 ± 3.46^{a}	170.5 ± 3.00^{b}	167.75 ± 2.63^{c}	165.25 ± 2.75^{d}
7	*B. purpurea* 1000mg	69 ± 2.58^{a}	165.75 ± 4.35^{b}	163.25 ± 4.27^{c}	160.5 ± 4.20^{d}

Values are means $\pm$ S.D for six animals in each group.
Values not sharing a common superscript differ significantly at $p<0.05$.
Duncan's Multiple Range Test (DMRT)

Table: 5 Effect of continuous administration of *B. purpurea* aqueous extract on body weight changes in normal rats.

Groups	Treatment (Dose/Kg body weight)	Body weight changes (gm)			
		Initial day	**4th Day**	**7th Day**	**15th Day**
1	Control (received 2% gum acacia)	162 ± 4.32[a]	163 ± 3.74[a]	164 ± 3.74[a]	164.75 ± 3.86[a]
2	*B. purpurea* 100mg	155.25 ± 4.11[a]	156.25 ± 4.50[a]	156.25 ± 4.50[a]	157.5 ± 5.00[a]
3	*B. purpurea* 200mg	154.5 ± 5.26[a]	155.75 ± 4.99[a]	156.25 ± 5.32[a]	157.25 ± 5.19[a]
4	*B. purpurea* 400mg	156.75 ± 2.75[a]	157.75 ± 3.40[a]	158.25 ± 3.30[a]	159 ± 3.46[b]
5	*B. purpurea* 600mg	154 ± 4.32[a]	155.25 ± 4.72[a]	156 ± 5.48[a]	157.25 ± 5.25[a]
6	*B. purpurea* 800mg	155.75 ± 3.30[a]	156.75 ± 3.86[a]	158 ± 4.32[a]	158.75 ± 4.27[a]
7	*B. purpurea* 1000mg	160.75 ± 3.77[a]	161.5 ± 3.11[a]	162.25 ± 3.10[b]	163.5 ± 2.38[b]

Table: 6 Effect of continuous administration of aqueous extract of *B. purpurea* leaf on food intake in normal rats.

Groups	Treatment (Dose/Kg body weight)	Food intake (g/week)			
		Initial day	**4th Day**	**7th Day**	**15th Day**
1	Control (received 2% gum acacia)	79.5 ± 4.80[a]	79.8 ± 4.91[a]	79 ± 4.55[a]	79.75 ± 4.86[a]
2	*B. purpurea* 100mg	79.25 ± 2.75[a]	78.5 ± 3.11[a]	79.25 ± 3.77[a]	82.5 ± 3.00[b]
3	*B. purpurea* 200mg	79.25 ± 2.75[a]	79 ± 2.71[a]	80 ± 1.83[a]	84.25 ± 1.71[b]
4	*B. purpurea* 400mg	78.5 ± 3.51[a]	79.5 ± 3.51[a]	80.5 ± 3.51[a]	83.5 ± 1.91[b]
5	*B. purpurea* 600mg	77.25 ± 2.99[a]	78.5 ± 3.11[a]	79.5 ± 3.11[a]	83 ± 2.94[b]
6	*B. purpurea* 800mg	79.25 ± 2.75[a]	80.25 ± 3.30[a]	80.75 ± 3.77[a]	84.5 ± 1.91[b]
7	*B. purpurea* 1000mg	77.25 ± 2.99[a]	78.25 ± 2.63[a]	79.25 ± 3.20[a]	82.25 ± 2.63[b]

Values are means ± S.D for six animals in each group.
Values not sharing a common superscript differ significantly at $p<0.05$.
Duncan's Multiple Range Test (DMRT)

Table: 7 Effect of continuous administration of aqueous extract of *B. purpurea* leaf on water intake in normal rats.

Groups	Treatment (Dose/Kg body weight)	Water intake (L/week)			
		Initial day	**4th Day**	**7th Day**	**15th Day**
1	Control (received 2% gum acacia)	4.93 ± 0.30	4.6 ± 0.28	5.2 ± 0.31	5.4 ± 0.29
2	*B. purpurea* 100mg	4.50 ± 0.24	4.48 ± 0.19	4.9 ± 0.28	5 ± 0.37
3	*B. purpurea* 200mg	4.53 ± 0.25	4.4 ± 0.16	4.9 ± 0.28	5 ± 0.37
4	*B. purpurea* 400mg	5.25 ± 0.34	5.1 ± 0.19	5.2 ± 0.28	5.2 ± 0.43
5	*B. purpurea* 600mg	5.13 ± 0.25	4.85 ± 0.25	4.7 ± 0.42	5.0 ± 0.30
6	*B. purpurea* 800mg	5.08 ± 0.19[a]	4.7 ± 0.10[a]	4.8 ± 0.22[b]	4.8 ± 0.26[b]
7	*B. purpurea* 1000mg	5 ± 0.37[a]	5 ± 0.37[a]	4.9 ± 0.35[a]	4.9 ± 0.28[a]

Table: 8 Effect of *B. purpurea* aqueous leaf extract on blood glucose level in alloxan induced diabetic rats.

Groups	Treatment (Dose/Kg body weight)	Blood glucose (mg/dl)			
		Fasting	**1h**	**2h**	**3h**
1	Control (received 2% gum acacia)	68.3 ± 1.33	67 ± 1.00	67 ± 1.00	66.3 ± 1.53
2	Diabetic control	258.6 ± 2.08[a]	257.6 ± 2.93[a]	258.7 ± 2.97[a]	255.9 ± 1.90[a]
3	Diabetic + *B. purpurea* 200mg	252.0 ± 4.00[a]	249.3 ± 1.15[a]	249.7 ± 8.50[b]	246.7 ± 3.06[c]
4	Diabetic + *B. purpurea* 400mg	253.3 ± 3.06[a]	251.3 ± 3.06[a]	248.7 ± 2.31[b]	246 ± 2.00[c]
5	Diabetic + glibenclamide (600 µg/ kg body weight)	254 ± 2.00[a]	252 ± 2.00[a]	249 ± 1.00[b]	244 ± 3.46[c]

Values are means ± S.D for six animals in each group.
Values not sharing a common superscript differ significantly at $p<0.05$.
Duncan's Multiple Range Test (DMRT)

Table: 9 Effect of continuous administration of *B. purpurea* aqueous leaf extract for 30 days on blood glucose level in alloxan induced diabetic rats.

Groups	Treatment (Dose/Kg body weight)	Blood glucose (mg/dl)			
		Initial day	**4th Day**	**7th Day**	**15th Day**
1	Control (received 2% gum acacia)	70.25 ± 1.71	68.75 ± 1.50	67 ± 1.15	65.25 ± 0.96
2	Diabetic control	263 ± 4.40[a]	264 ± 3.65[a]	266 ± 3.65[a]	268.5 ± 4.43[a]
3	Diabetic + *B. purpurea* 200mg	259 ± 2.58[a]	257 ± 2.58[b]	256.3 ± 2.22[b]	254 ± 1.63[c]
4	Diabetic + *B. purpurea* 400mg	260 ± 3.65[a]	258 ± 3.65[b]	256 ± 3.65[b]	254 ± 3.65[c]
5	Diabetic + glibenclamide (600 µg/ kg body weight)	259 ± 2.58[a]	257 ± 2.58[a]	255 ± 2.58[b]	253 ± 2.58[c]

Table: 10 Effect of *B. Purpurea* on blood glucose level and body weight

Groups	Treatment (Dose/Kg body weight)	Blood glucose (initial)	Blood glucose (final)	Body weight (initial)	Body weight (final)
1	Control (received 2% gum acacia)	84.7 ± 1.7	94.1± 4.9[a]	172.5 ± 11.9	175.8 ± 10.9[a]
2	Diabetic + control	271.8 ± 10.9	314.2 ± 28.4[b]	176.0 ± 11.0	136.5 ± 14.3[b]
3	Diabetic + *B. Purpurea* (200mg)	278.0 ± 3.7	173.3 ± 13.7[c]	192.0 ± 8.9	194.5 ± 10.6[c]
4	Diabetic + *B. Purpurea* (400mg)	274.5 ± 16.5	141.6 ± 9.8[d, e]	182.8 ± 2.5	186.3 ± 2.6[c]
5	Diabetic + Glibenclamide(600µg/kg body weight)	297.5 ± 13.2	135 ± 17.3[e]	184.3 ± 2.9	186.8 ± 3.3[c]

Values are means ± S.D for six animals in each group.
Values not sharing a common superscript differ significantly at $p<0.05$.
Duncan's Multiple Range Test (DMRT)

Table: 11 Effect of *B. Purpurea* on TBARS, GSH, Vitamin C, and Vitamin E in plasma of alloxan induced diabetic rats

Groups	Treatment (Dose/Kg body weight)	TBARS (n mol /ml)	GSH (µg /dl)	Vitamin C (µg /dl)	Vitamin E (µg /dl)
1	Control (received 2% gum acacia)	1.58 ± 0.56^{a}	25.8 ± 2.5^{a}	1.9 ± 0.18^{a}	0.70 ± 0.01^{a}
2	Diabetic + control	3.6 ± 0.39^{b}	14.4 ± 1.6^{b}	0.8 ± 0.09^{b}	1.07 ± 0.03^{b}
3	Diabetic + *B. Purpurea* (200mg)	2.3 ± 0.81^{c}	20.1 ± 1.7^{c}	1.37 ± 1.36^{c}	0.81 ± 0.01^{c}
4	Diabetic + *B. Purpurea* (400mg)	1.9 ± 0.80^{c}	20.6 ± 3.7^{d}	1.5 ± 0.10^{d}	0.79 ± 0.02^{c}
5	Diabetic + Glibenclamide(600µg/kg body weight)	1.6 ± 0.51^{d}	24.8 ± 2.7^{d}	1.7 ± 0.18^{d}	0.76 ± 0.01^{d}

Table: 12 Effect of *B. Purpurea* on TBARS, GSH, Vitamin C, and Vitamin E in liver of alloxan induced diabetic rats

Groups	Treatment (Dose/Kg body weight)	TBARS (n mol /ml)	GSH (µg /dl)	Vitamin C (µg /dl)	Vitamin E (µg /dl)
1	Control (received 2% gum acacia)	1.52 ± 0.52^{a}	18.0 ± 2.2^{a}	0.75 ± 0.02^{a}	5.33 ± 0.15^{a}
2	Diabetic + control	3.6 ± 0.39^{b}	7.2 ± 2.5^{b}	0.45 ± 0.04^{b}	3.40 ± 0.16^{b}
3	Diabetic + *B. Purpurea* (200mg)	2.3 ± 0.57^{c}	13.9 ± 1.6^{c}	0.65 ± 0.03^{c}	4.53 ± 0.25^{c}
4	Diabetic + *B. Purpurea* (400mg)	2.2 ± 0.63^{c}	16.48 ± 3.1^{d}	0.66 ± 0.04^{d}	4.85 ± 0.21^{c}
5	Diabetic + Glibenclamide(600µg/kg body weight)	1.81 ± 0.40^{d}	17.5 ± 2.4^{e}	0.69 ± 0.03^{a}	4.98 ± 0.17^{d}

Values are means $\pm$ S.D for six animals in each group.
Values not sharing a common superscript differ significantly at $p<0.05$.
Duncan's Multiple Range Test (DMRT)

Table: 13 Effect of *B. Purpurea* on TBARS, GSH, Vitamin C, and Vitamin E in Kidney of alloxan induced diabetic rats

Groups	Treatment (Dose/Kg body weight)	TBARS (n mol /ml)	GSH (µg /dl)	Vitamin C (µg /dl)	Vitamin E (µg /dl)
1	Control (received 2% gum acacia)	1.6 ± 0.47^{a}	17.5 ± 2.4^{a}	0.60 ± 0.02^{a}	3.50 ± 0.22^{a}
2	Diabetic + control	3.7 ± 0.33^{b}	7.2 ± 2.5^{b}	0.30 ± 0.05^{b}	1.33 ± 0.15^{b}
3	Diabetic + *B. Purpurea* (200mg)	2.4 ± 0.62^{c}	13.9 ± 1.7^{c}	0.49 ± 0.01^{c}	2.43 ± 0.17^{c}
4	Diabetic + *B. Purpurea* (400mg)	2.2 ± 0.75^{c}	16 ± 2.3^{d}	0.52 ± 0.02^{d}	2.68 ± 0.15^{c}
5	Diabetic + Glibenclamide(600µg/kg body weight)	1.8 ± 0.66^{d}	16 ± 2.3^{d}	0.56 ± 0.01^{d}	3.00 ± 0.18^{d}

Table: 14 Effect of *B. Purpurea* on TBARS, GSH, Vitamin C, and Vitamin E in Brain of alloxan induced diabetic rats

Groups	Treatment (Dose/Kg body weight)	TBARS (n mol /ml)	GSH (µg /dl)	Vitamin C (µg /dl)	Vitamin E (µg /dl)
1	Control (received 2% gum acacia)	1.6 ± 0.71^{a}	17.6 ± 2.5^{a}	0.84 ± 0.05^{a}	5.38 ± 0.21^{a}
2	Diabetic + control	3.7 ± 0.65^{b}	8.3 ± 2.5^{b}	0.44 ± 0.04^{b}	3.13 ± 0.15^{b}
3	Diabetic + *B. Purpurea* (200mg)	2.2 ± 0.75^{c}	13.4 ± 1.6^{c}	0.57 ± 0.027^{c}	4.33 ± 0.10^{c}
4	Diabetic + *B. Purpurea* (400mg)	1.9 ± 0.55^{d}	16.0 ± 2.3^{d}	0.64 ± 0.01^{d}	4.60 ± 0.14^{c}
5	Diabetic + Glibenclamide(600µg/kg body weight)	1.7 ± 0.65^{d}	17.1 ± 1.7^{d}	0.69 ± 0.02^{e}	4.86 ± 0.27^{d}

Values are means $\pm$ S.D for six animals in each group.
Values not sharing a common superscript differ significantly at $p<0.05$.
Duncan's Multiple Range Test (DMRT)

Table: 15 Effect of *B. Purpurea* on SOD, CAT and GPX in brain of alloxan induced diabetic rats

Groups	Treatment (Dose/Kg body weight)	SOD U/mg protein	CAT U/mg protein	GPx U/mg protein
1	Control (received 2% gum acacia)	11.7 ± 0.21^{a}	166 ± 34.8^{a}	8.7 ± 0.63^{a}
2	Diabetic + control	5.4 ± 1.7^{b}	71.5 ± 10.0^{b}	4.8 ± 0.79^{b}
3	Diabetic + *B. Purpurea* (200mg)	10.0 ± 0.48^{c}	97.9 ± 16.8^{c}	6.4 ± 0.36^{c}
4	Diabetic + *B. Purpurea* (400mg)	10.7 ± 0.15^{c}	118.7 ± 16.3^{c}	7.1 ± 0.67^{d}
5	Diabetic + Glibenclamide(600µg/kg body weight)	10.65 ± 0.37^{d}	130 ± 17.8^{d}	7.7 ± 0.97^{e}

Table: 16 Effect of *B. Purpurea* on SOD, CAT and GPX in liver of alloxan induced diabetic rats

Groups	Treatment (Dose/Kg body weight)	SOD U/mg protein	CAT U/mg protein	GPx U/mg protein
1	Control (received 2% gum acacia)	12.0 ± 0.32^{a}	163.2 ± 24.3^{a}	8.9 ± 1.8^{a}
2	Diabetic + control	4.3 ± 0.68^{b}	68.7 ± 8.24^{b}	4.1 ± 0.78^{b}
3	Diabetic + *B. Purpurea* (200mg)	10.1 ± 0.13^{c}	103.4 ± 11.9^{c}	6.4 ± 0.36^{c}
4	Diabetic + *B. Purpurea* (400mg)	10.4 ± 0.34^{d}	125 ± 10.8^{d}	7.5 ± 1.06^{d}
5	Diabetic + Glibenclamide(600µg/kg body weight)	10.7 ± 0.38^{c}	134 ± 13.2^{e}	8.0 ± 0.82^{c}

Values are means $\pm$ S.D for six animals in each group.
Values not sharing a common superscript differ significantly at $p<0.05$.
Duncan's Multiple Range Test (DMRT)

Table: 17 Effect of *B. Purpurea* on SOD, CAT and GPX in Kidney of alloxan induced diabetic rats

Groups	Treatment (Dose/Kg body weight)	SOD U/mg protein	CAT U/mg protein	GPx U/mg protein
1	Control (received 2% gum acacia)	11.7 ± 0.81^{a}	75.7 ± 7.17^{a}	3.89 ± 0.50^{a}
2	Diabetic + control	4.6 ± 1.17^{b}	32.6 ± 6.68^{b}	7.22 ± 0.89^{b}
3	Diabetic + *B. Purpurea* (200mg)	9.9 ± 0.40^{c}	52.8 ± 6.79^{c}	4.89 ± 0.34^{c}
4	Diabetic + *B. Purpurea* (400mg)	10.2 ± 0.18^{d}	61.8 ± 4.12^{d}	4.22 ± 0.69^{d}
5	Diabetic + Glibenclamide(600µg/kg body weight)	10.64 ± 0.20^{e}	69.4 ± 5.69^{e}	4.00 ± 0.60^{e}

Values are means ± S.D for six animals in each group.
Values not sharing a common superscript differ significantly at $p<0.05$.
Duncan's Multiple Range Test (DMRT)

Table: 18 Effect of *B. Purpurea* on Hexokinase, Glucose-6-phosphatase and Fructose-1, 6-bisphosphatase of alloxan induced diabetic rats

Groups	Treatment (Dose/Kg body weight)	Hexokinase (U^{a}/ mg protein)	Glucose-6-phosphatase (U^{b}/mg protein)	Fructose-1, 6-bisphosphatase (U^{c}/mg protein)
1	Control (received 2% gum acacia)	0.22 ± 0.1^{a}	0.15 ± 0.28^{a}	0.55 ± 0.02^{a}
2	Diabetic + control	0.1 ± 0.01^{b}	0.31 ± 0.6^{b}	1.08 ± 0.04^{b}
3	Diabetic + *B. Purpurea* (200mg)	0.19 ± 0.02^{c}	0.19 ± 0.01^{c}	0.70 ± 0.02^{c}
4	Diabetic + *B. Purpurea* (400mg)	0.19 ± 0.02^{d}	0.18 ± 0.02^{d}	0.65 ± 0.02^{d}
5	Diabetic + Glibenclamide(600µg/kg body weight)	0.20 ± 0.02^{e}	0.17 ± 0.02^{e}	0.60 ± 0.05^{e}

Values are means ± S.D for six animals in each group. Enzyme units are expressed as units/mg protein
[a] µmol of glucose phosphorylated/h
[b] µmol of liberated / min
[c] µmol of pi liberated / min
Values not sharing a common superscript differ significantly at $p<0.05$.
Duncan's Multiple Range Test (DMRT)

Table: 19 Effect of *B. Purpurea* on plasma Urea, Uric acid, creatinine, and BUN on alloxan induced diabetic rats

Groups	Treatment (Dose/Kg body weight)	Urea (mg/dl)	Uric acid (nmol/ml)	Creatinine (mg/dl)	Blood Urea Nitrogen (mg/dl)
1	Control (received 2% gum acacia)	19.6 ± 5.8^{a}	3.05 ± 0.4^{a}	0.70 ± 0.40^{a}	9 ± 2.7^{a}
2	Diabetic + control	66.0 ± 6.8^{b}	20.5 ± 0.87^{b}	4.34 ± 1.05^{b}	30.8 ± 3.2^{b}
3	Diabetic + *B. Purpurea* (200mg)	44.7 ± 6.4^{c}	10.6 ± 0.74^{c}	1.25 ± 0.04^{c}	20.8 ± 2.9^{c}
4	Diabetic + *B. Purpurea* (400mg)	37.8 ± 5.5^{d}	8.6 ± 0.99^{d}	0.98 ± 0.33^{d}	17.6 ± 2.5^{d}
5	Diabetic + Glibenclamide (600µg/kg body weight)	33.9 ± 2.27^{e}	7.06 ± 1.0^{d}	0.92 ± 0.48^{d}	15.8 ± 1.06^{e}

Table: 20 Effect of *B. Purpurea* on plasma Cholesterol, Free fatty acid, Phospholipids and Triglycerides on alloxan induced diabetic rats

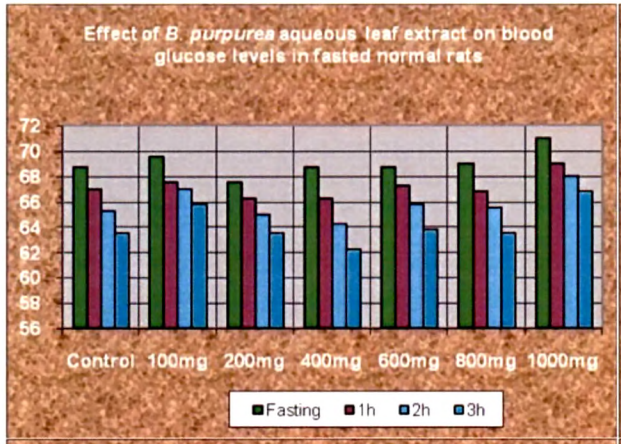
Groups	Treatment (Dose/Kg body weight)	Cholesterol (mg/dl)	Free fatty acids (mg/dl)	Phospholipids (mg/dl)	Triglycerides (mg/dl)
1	Control (received 2% gum acacia)	63.9 ± 10.9^{a}	50.9 ± 2.2^{a}	121.3 ± 1.17^{a}	59.9 ± 21.8^{a}
2	Diabetic + control	228.6 ± 27.3^{b}	132.8 ± 1.7^{b}	210.4 ± 6.5^{b}	152.6 ± 12.7^{b}
3	Diabetic + *B. Purpurea* (200mg)	144.4 ± 35.3^{c}	107.8 ± 10.5^{c}	175.5 ± 5.5^{c}	87.2 ± 4.8^{c}
4	Diabetic + *B. Purpurea* (400mg)	129.6 ± 25.7^{d}	93.9 ± 5.3^{d}	150.3 ± 1.8^{d}	85.6 ± 7.03^{c}
5	Diabetic + Glibenclamide(600µg/kg body weight)	124.4 ± 13.3^{d}	74.6 ± 2.7^{e}	141.2 ± 3.56^{e}	70.0 ± 14.17^{d}

Values are means $\pm$ S.D for six animals in each group.
Values not sharing a common superscript differ significantly at $p<0.05$.
Duncan's Multiple Range Test (DMRT)

Table: 21 Effect of *B. Purpurea* on plasma HDL-C, LDL-C and VLDL-C alloxan induced diabetic rats

Groups	Treatment (Dose/Kg body weight)	HDL-C (mg/dl)	LDL-C (mg/dl)	VLDL-C (mg/dl)
1	Control (received 2% gum acacia)	39.9 ± 4.6^{a}	35.9 ± 7.2^{a}	11.9 ± 4.3^{a}
2	Diabetic + control	17.2 ± 6.6^{b}	242.1 ± 20.1^{b}	30.5 ± 2.5^{b}
3	Diabetic + *B. Purpurea* (200mg)	34.5 ± 3.1^{c}	127.3 ± 36.5^{c}	17.4 ± 0.96^{c}
4	Diabetic + *B. Purpurea* (400mg)	38.5 ± 1.02^{c}	108.2 ± 27.6^{c}	17.13 ± 1.4^{c}
5	Diabetic + Glibenclamide(600µg/kg body weight)	47.1 ± 13.02^{d}	91.4 ± 9.1^{d}	14.01 ± 2.8^{d}

Values are means $\pm$ S.D for six animals in each group.
Values not sharing a common superscript differ significantly at $p<0.05$.
Duncan's Multiple Range Test (DMRT)


Effect of B. purpurea aqueous leaf extract on blood glucose levels in fasted normal rats
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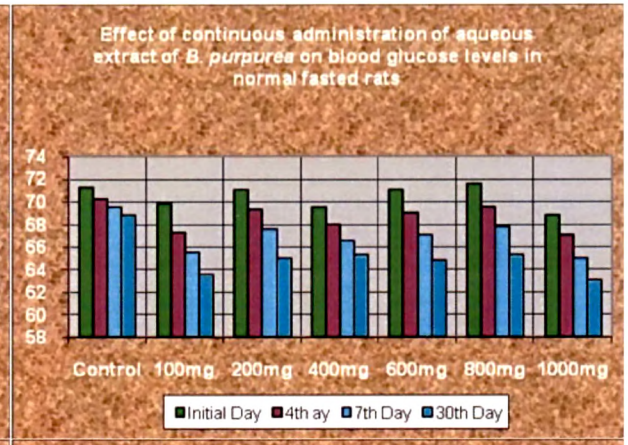
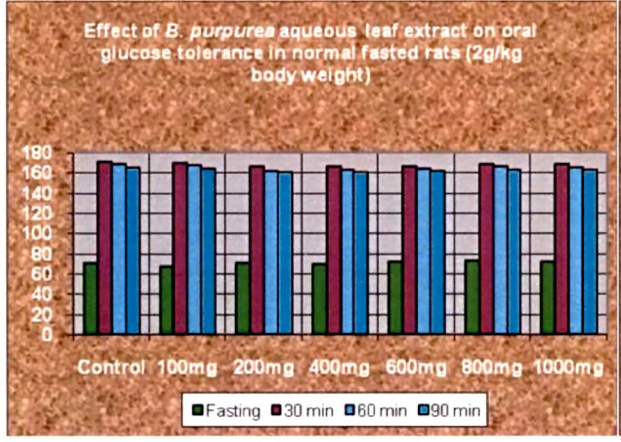
70
68
66
64
62
60
58
56
Control 100mg 200mg 400mg 600mg 800mg 1000mg
Fasting 1h 2h 3h


Effect of continuous administration of aqueous extract of B. purpurea on blood glucose levels in normal fasted rats
74
72
70
68
66
64
62
60
58
Control 100mg 200mg 400mg 600mg 800mg 1000mg
Initial Day 4th ay 7th Day 30th Day


Effect of B. purpurea aqueous leaf extract on oral glucose tolerance in normal fasted rats (2g/kg body weight)
180
160
140
120
100
80
60
40
20
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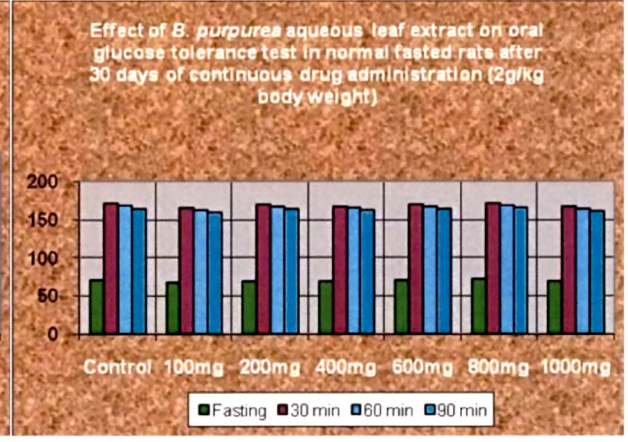
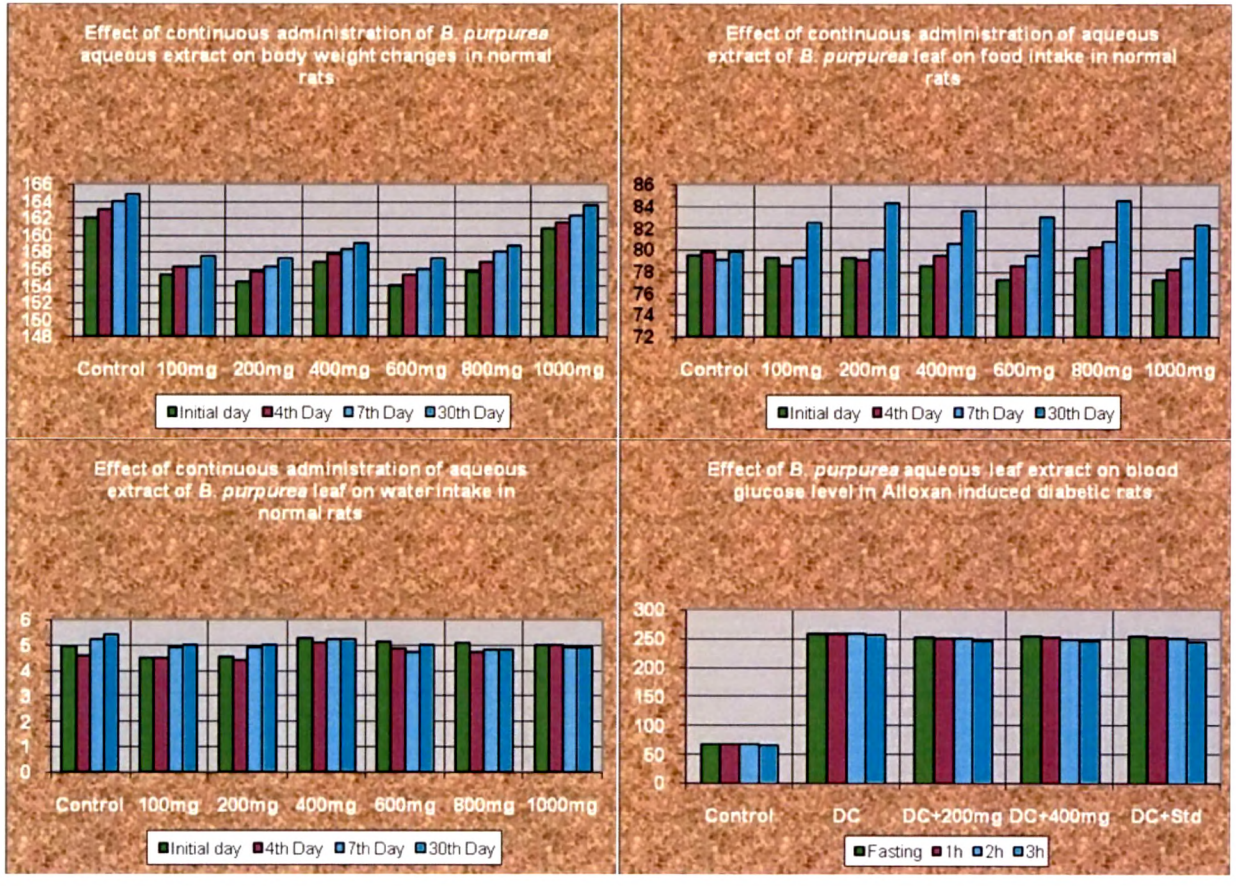
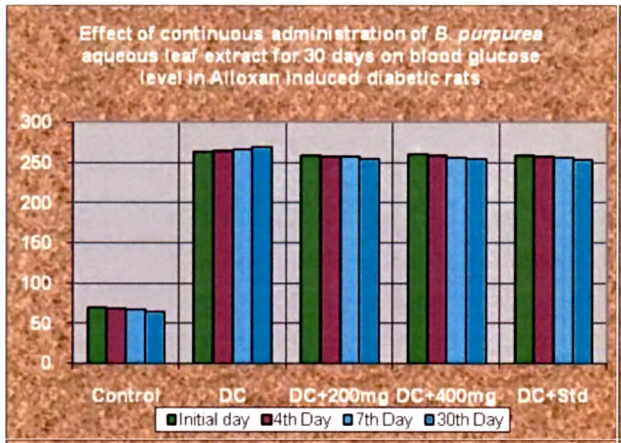
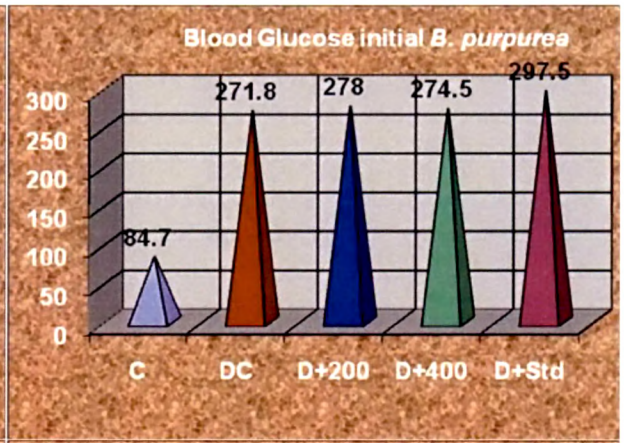
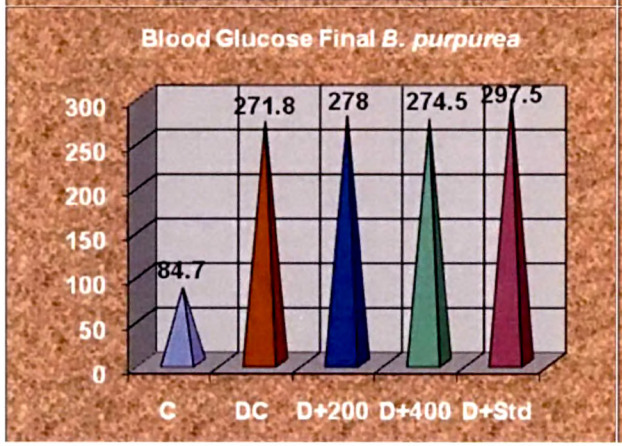
Control 100mg 200mg 400mg 600mg 800mg 1000mg
Fasting 30 min 60 min 90 min

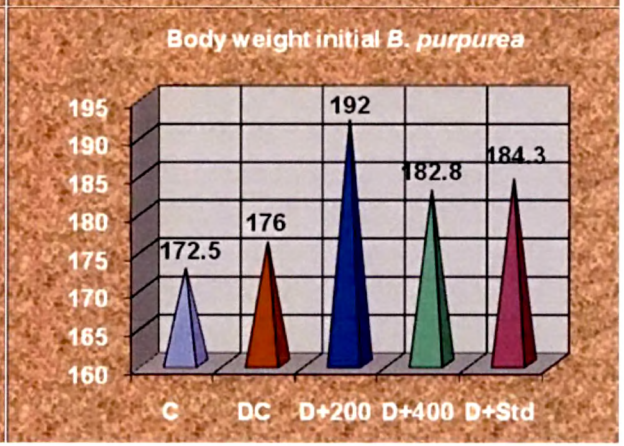

Effect of B. purpurea aqueous leaf extract on oral glucose tolerance test in normal fasted rats after 30 days of continuous drug administration (2g/kg body weight)
200
150
100
50
0
Control 100mg 200mg 400mg 600mg 800mg 1000mg
Fasting 30 min 60 min 90 min

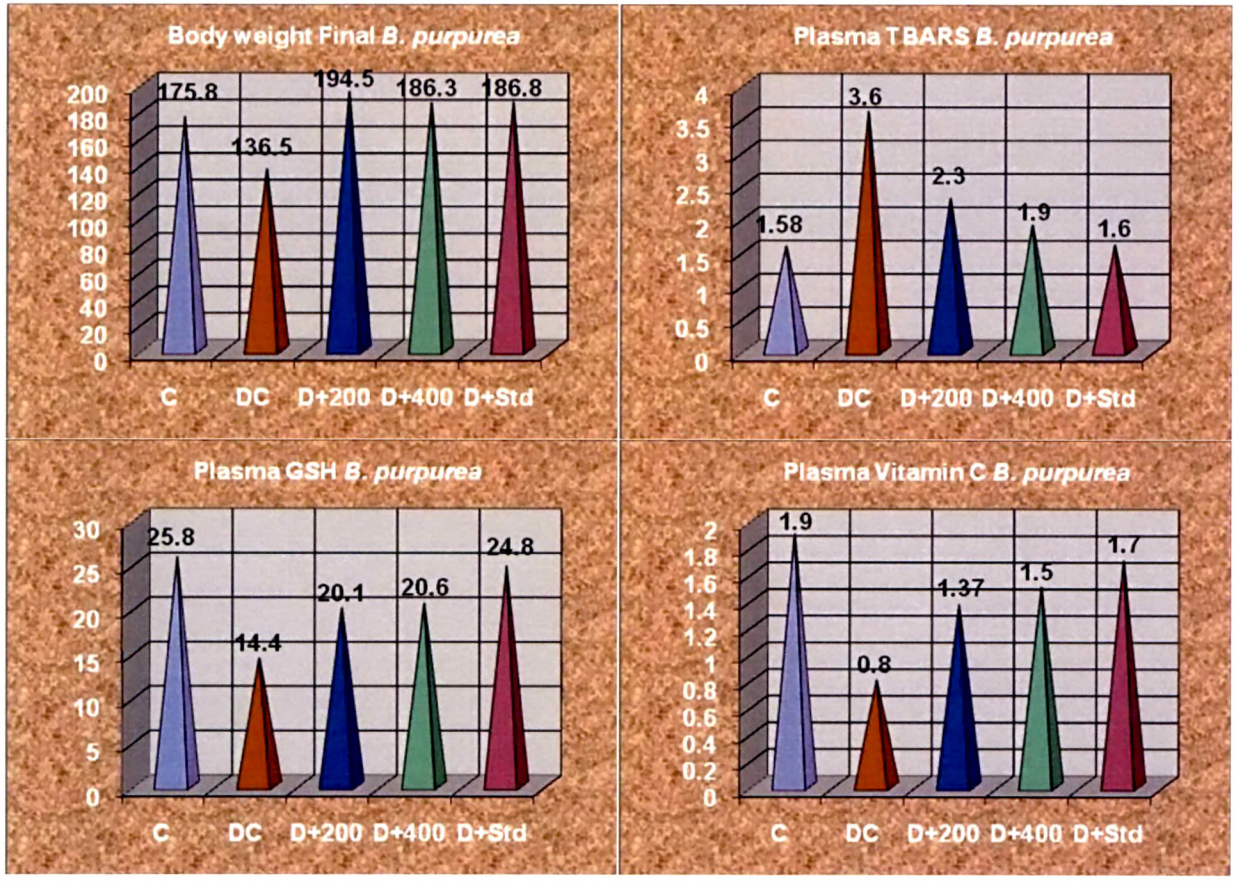

Effect of continuous administration of B. purpurea aqueous extract on body weight changes in normal rats
166
164
162
160
158
156
154
152
150
148
Control 100mg 200mg 400mg 600mg 800mg 1000mg
Initial day 4th Day 7th Day 30th Day
Effect of continuous administration of aqueous extract of B. purpurea leaf on food intake in normal rats
86
84
82
80
78
76
74
72
Control 100mg 200mg 400mg 600mg 800mg 1000mg
Initial day 4th Day 7th Day 30th Day
Effect of continuous administration of aqueous extract of B. purpurea leaf on water intake in normal rats
6
5
4
3
2
1
0
Control 100mg 200mg 400mg 600mg 800mg 1000mg
Initial day 4th Day 7th Day 30th Day
Effect of B. purpurea aqueous leaf extract on blood glucose level in Alloxan induced diabetic rats
300
250
200
150
100
50
0
Control DC DC+200mg DC+400mg DC+Std
Fasting 1h 2h 3h

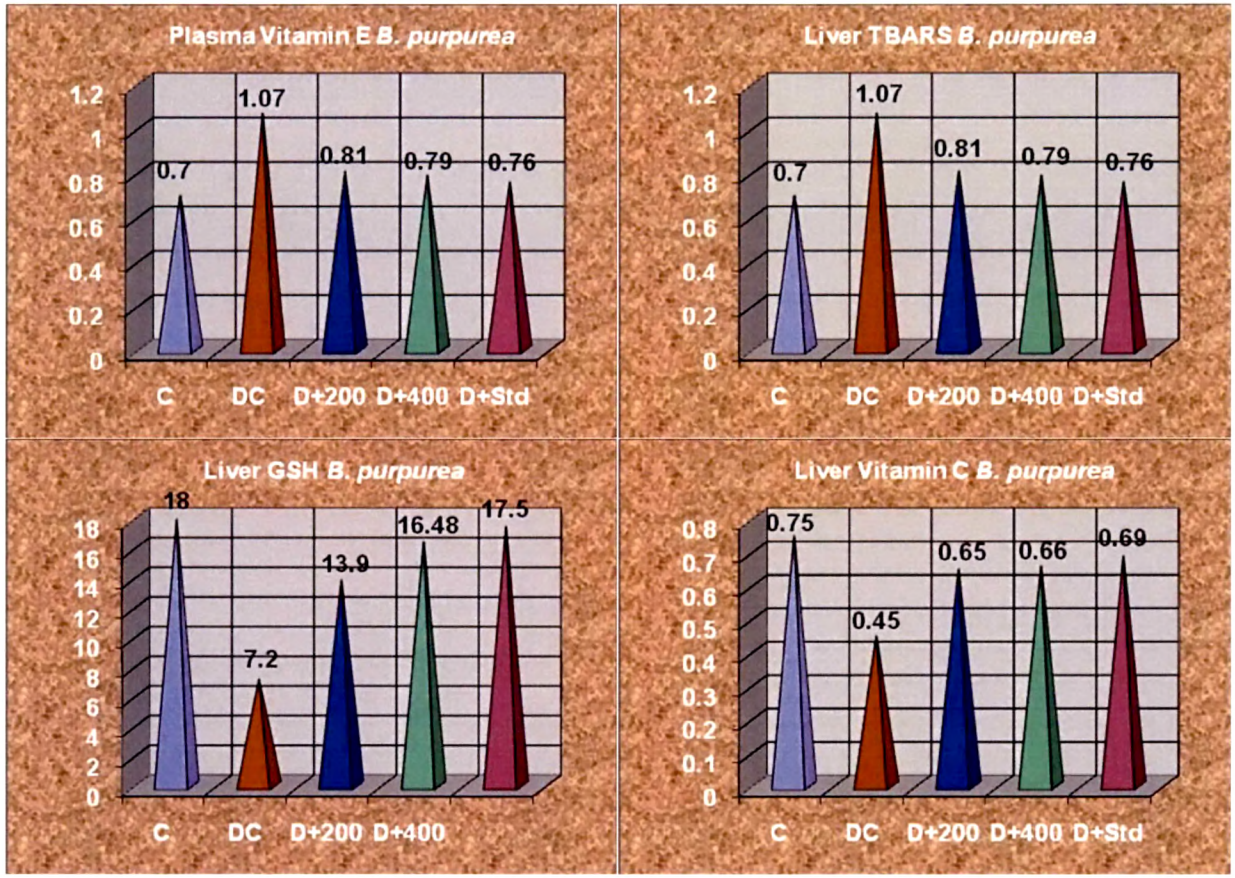

Effect of continuous administration of B. purpurea aqueous leaf extract for 30 days on blood glucose level in Alloxan induced diabetic rats
300
250
200
150
100
50
0
Control
DC
DC+200mg
DC+400mg
DC+Std
Initial day
4th Day
7th Day
30th Day

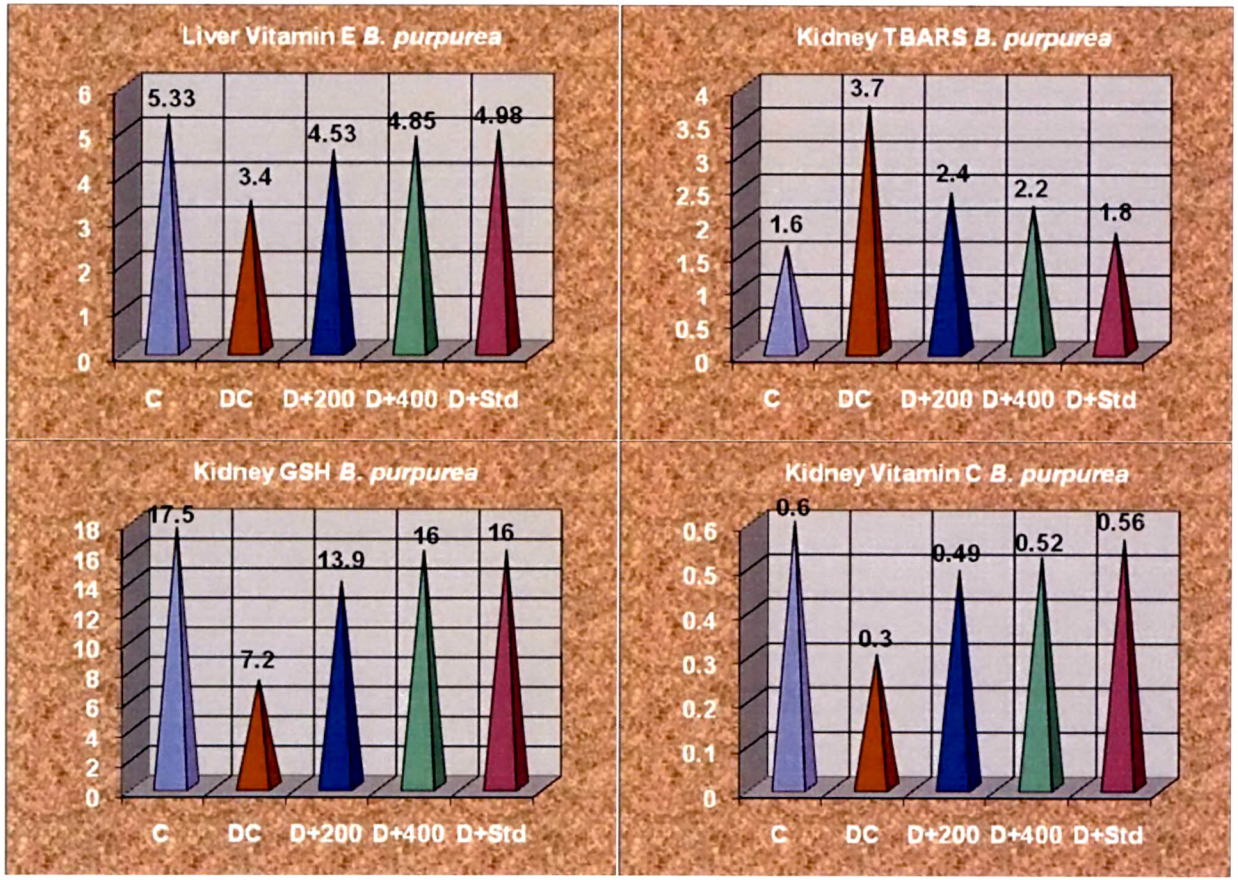

Blood Glucose initial B. purpurea
300
250
200
150
100
50
0
84.7
271.8
278
274.5
297.5
C
DC
D+200
D+400
D+Std

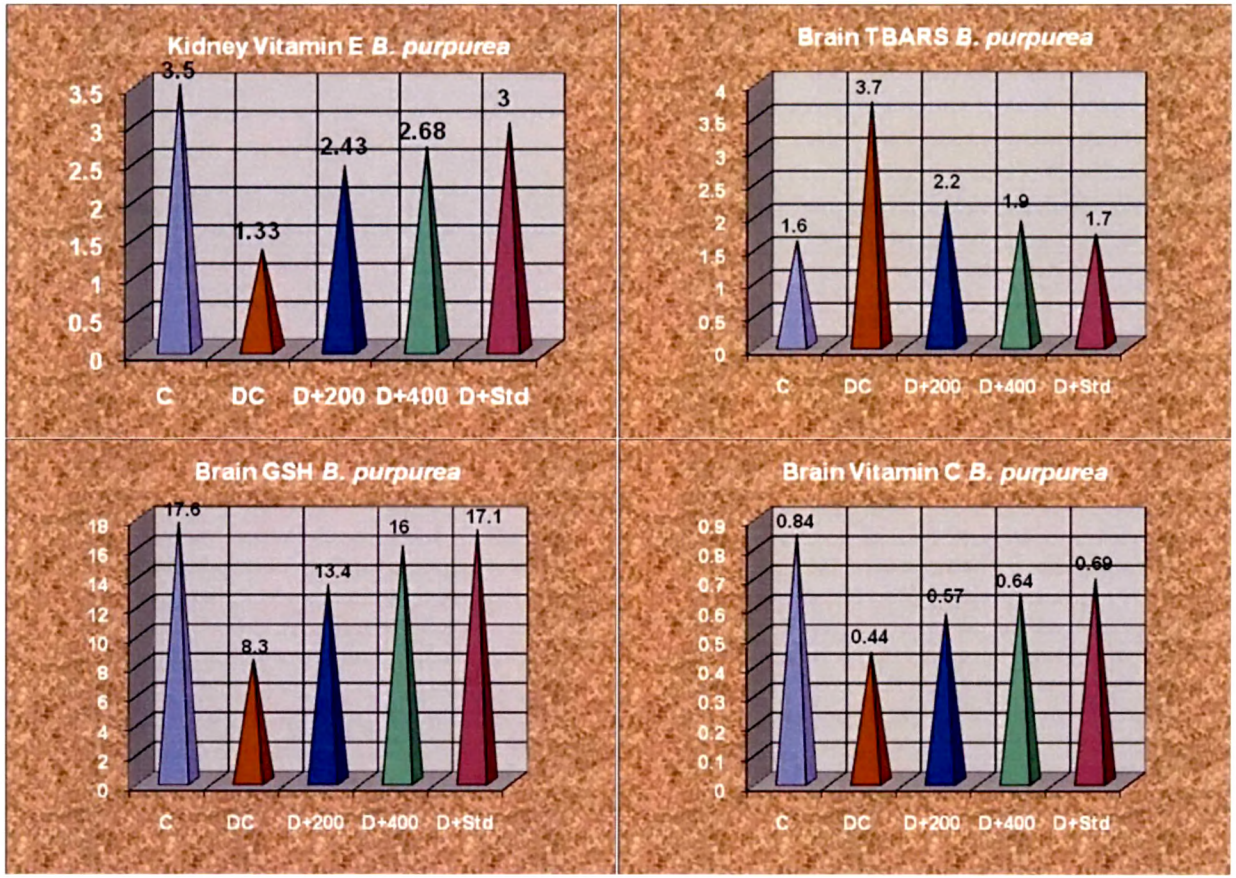

Blood Glucose Final B. purpurea
300
250
200
150
100
50
0
84.7
271.8
278
274.5
297.5
C
DC
D+200
D+400
D+Std

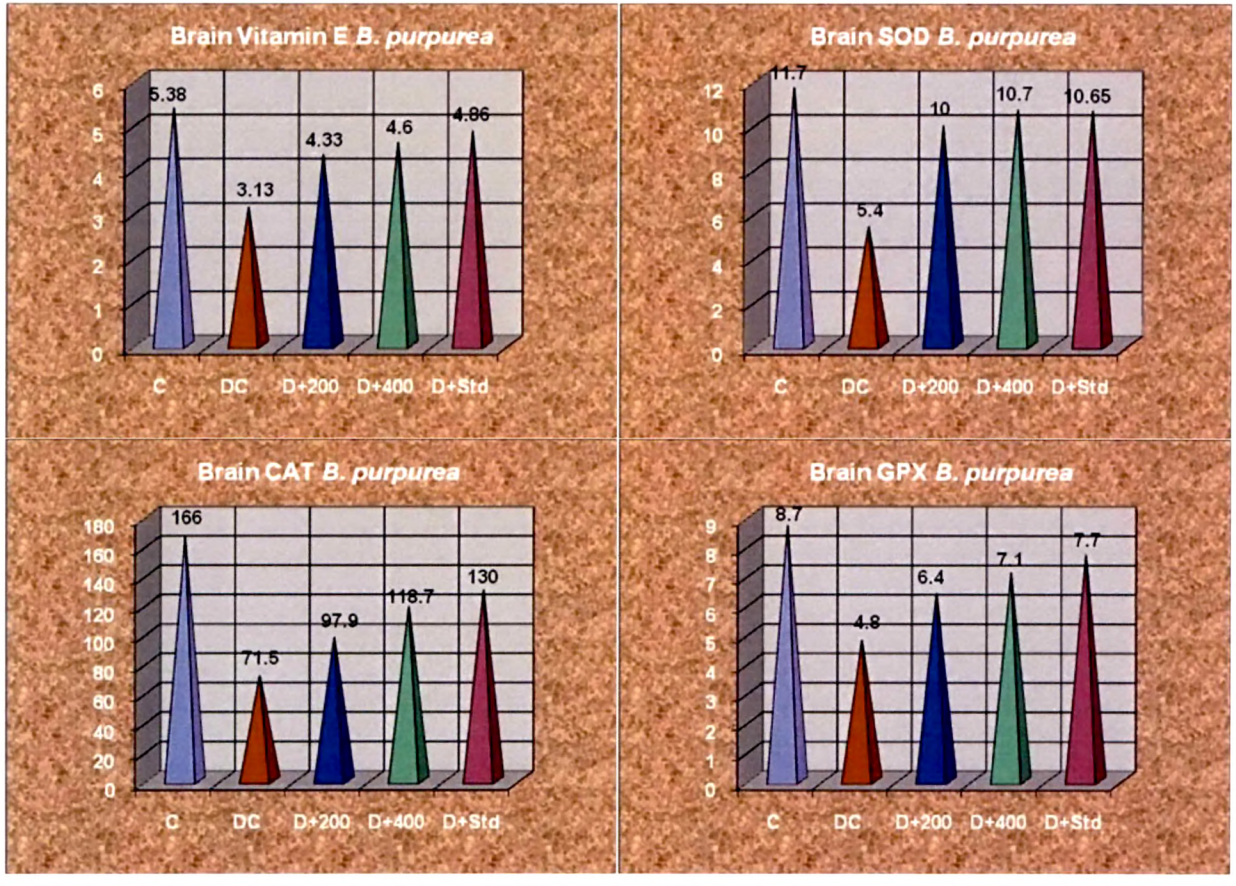

Body weight initial B. purpurea
195
190
185
180
175
170
165
160
172.5
176
192
182.8
184.3
C
DC
D+200
D+400
D+Std

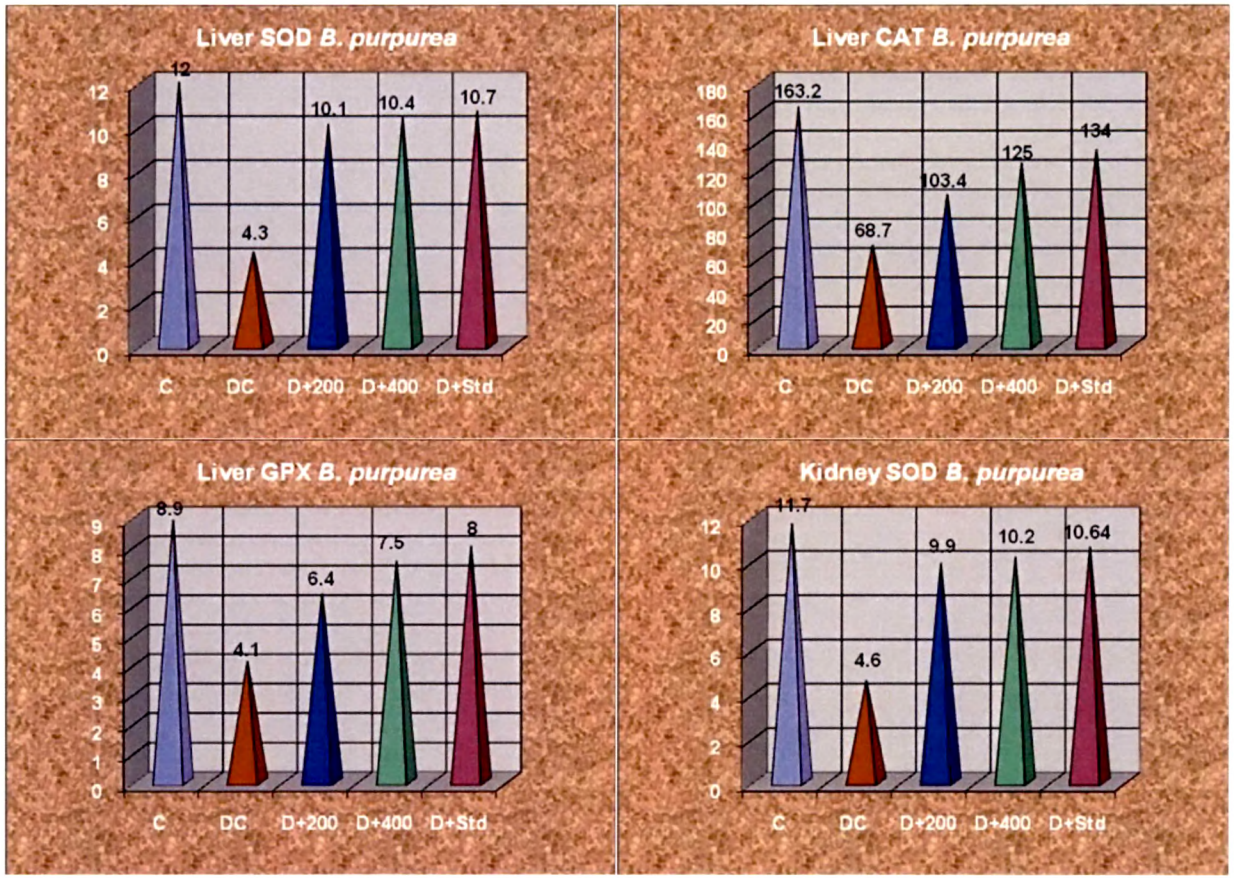

Body weight Final B. purpurea
200
180
160
140
120
100
80
60
40
20
0
175.8
136.5
194.5
186.3
186.8
C
DC
D+200
D+400
D+Std
Plasma TBARS B. purpurea
4
3.5
3
2.5
2
1.5
1
0.5
0
1.58
3.6
2.3
1.9
1.6
C
DC
D+200
D+400
D+Std
Plasma GSH B. purpurea
30
25
20
15
10
5
0
25.8
14.4
20.1
20.6
24.8
C
DC
D+200
D+400
D+Std
Plasma Vitamin C B. purpurea
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1.9
0.8
1.37
1.5
1.7
C
DC
D+200
D+400
D+Std

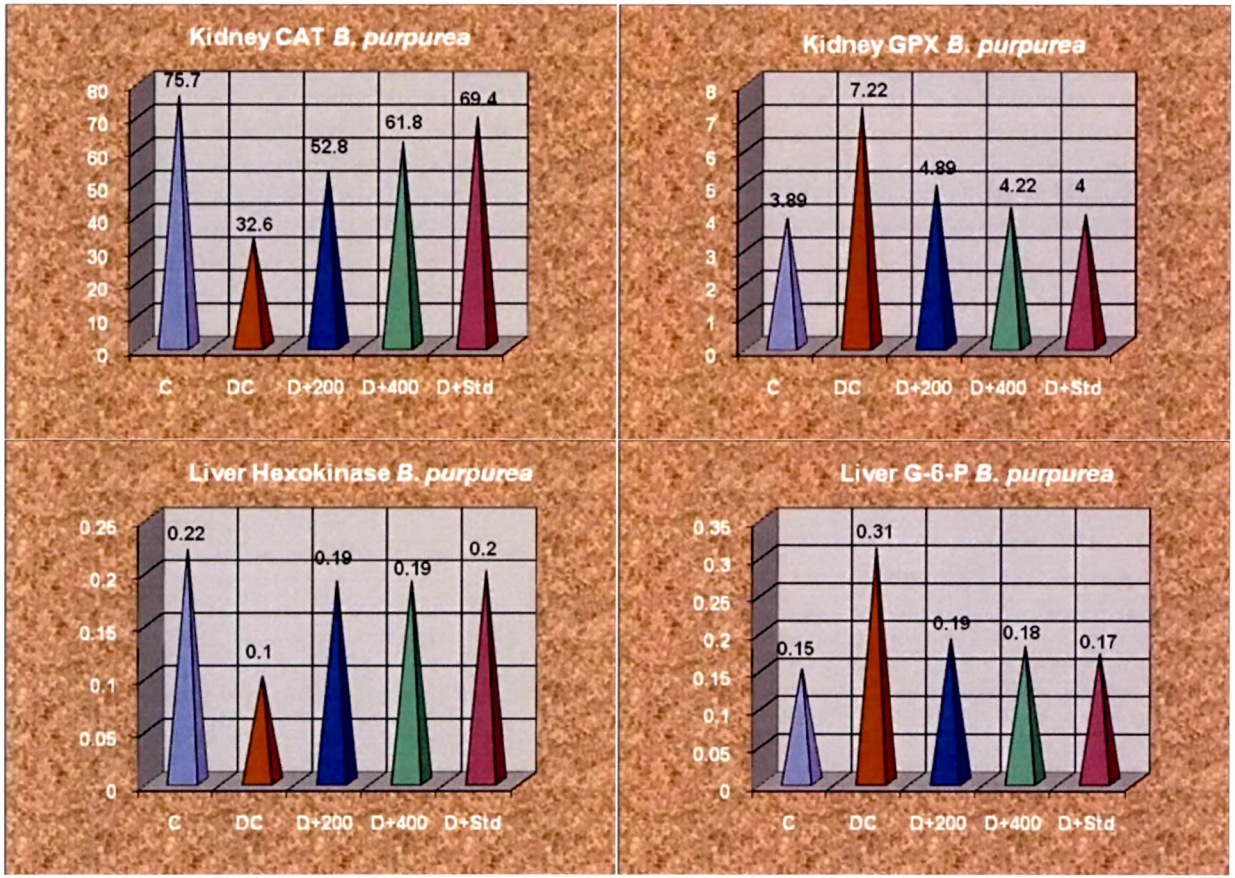

Plasma Vitamin E *B. purpurea*
1.2
1
0.8
0.6
0.4
0.2
0
0.7
1.07
0.81
0.79
0.76
C
DC
D+200
D+400
D+Std
Liver TBARS *B. purpurea*
1.2
1
0.8
0.6
0.4
0.2
0
0.7
1.07
0.81
0.79
0.76
C
DC
D+200
D+400
D+Std
Liver GSH *B. purpurea*
18
16
14
12
10
8
6
4
2
0
18
7.2
13.9
16.48
17.5
C
DC
D+200
D+400
Liver Vitamin C *B. purpurea*
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.75
0.45
0.65
0.66
0.69
C
DC
D+200
D+400
D+Std

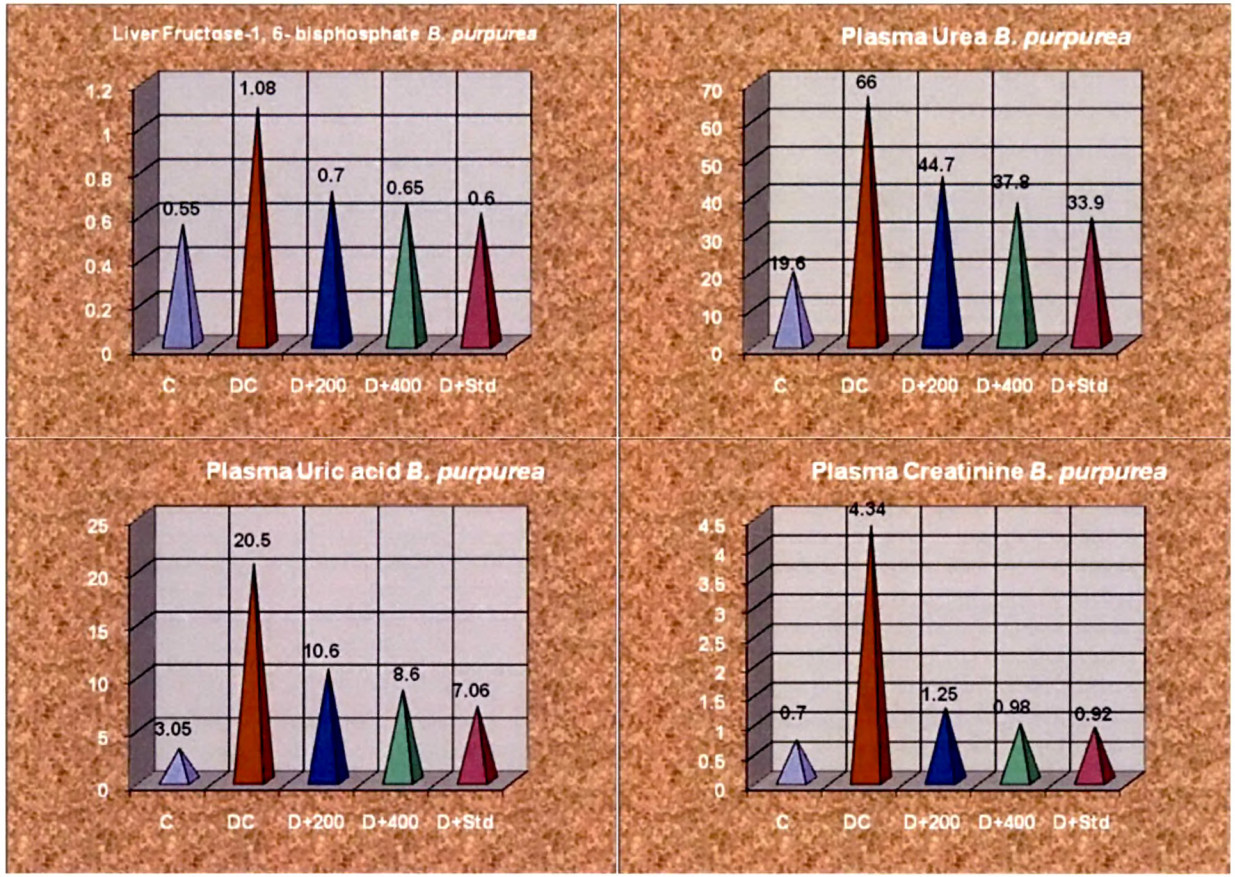

Liver Vitamin E B. purpurea
6
5
4
3
2
1
0
5.33
3.4
4.53
4.85
4.98
C
DC
D+200
D+400
D+Std
Kidney TBARS B. purpurea
4
3.5
3
2.5
2
1.5
1
0.5
0
1.6
3.7
2.4
2.2
1.8
C
DC
D+200
D+400
D+Std
Kidney GSH B. purpurea
18
16
14
12
10
8
6
4
2
0
17.5
7.2
13.9
16
16
C
DC
D+200
D+400
D+Std
Kidney Vitamin C B. purpurea
0.6
0.5
0.4
0.3
0.2
0.1
0
0.6
0.3
0.49
0.52
0.56
C
DC
D+200
D+400
D+Std

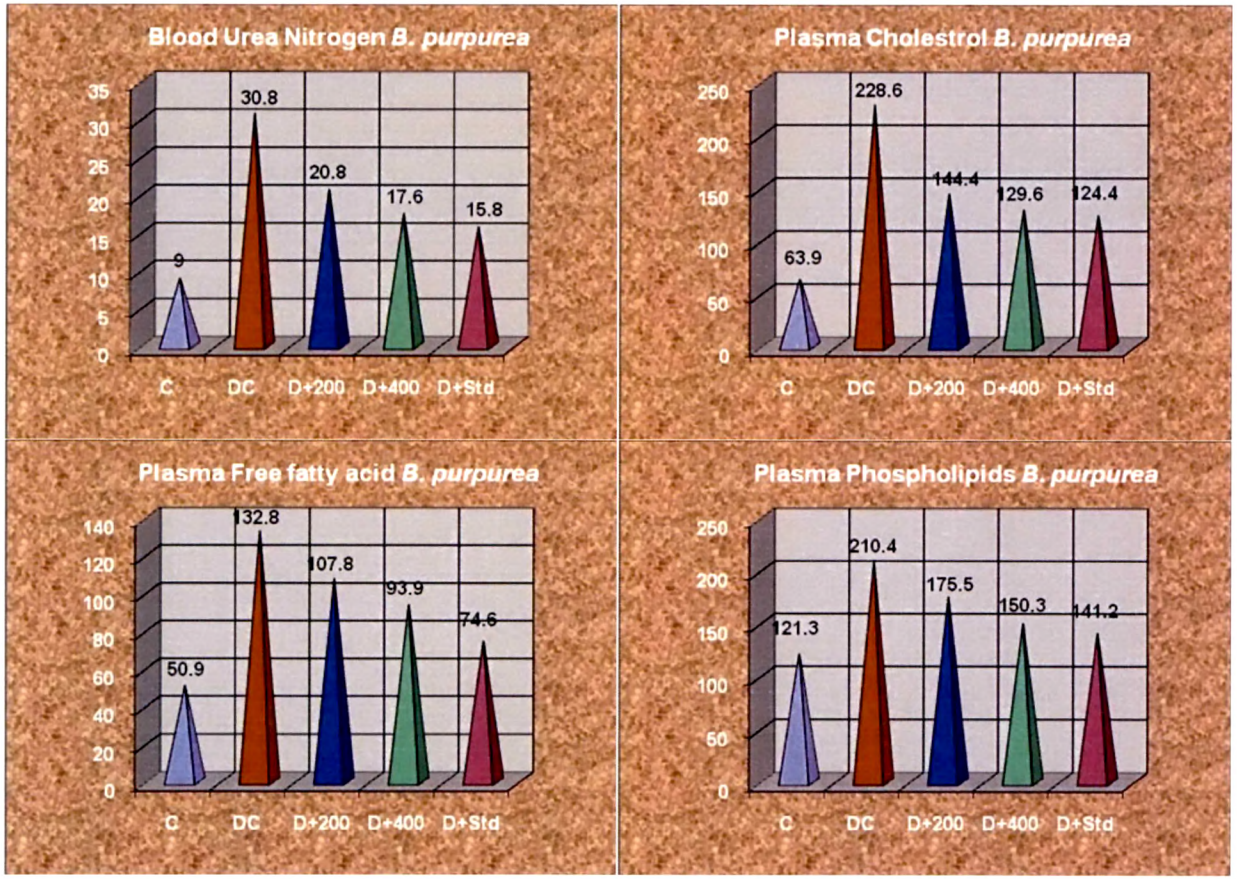

Kidney Vitamin E B. purpurea
3.5
1.33
2.43
2.68
3
C DC D+200 D+400 D+Std
Brain TBARS B. purpurea
1.6
3.7
2.2
1.9
1.7
C DC D+200 D+400 D+Std
Brain GSH B. purpurea
17.6
8.3
13.4
16
17.1
C DC D+200 D+400 D+Std
Brain Vitamin C B. purpurea
0.84
0.44
0.57
0.64
0.69
C DC D+200 D+400 D+Std

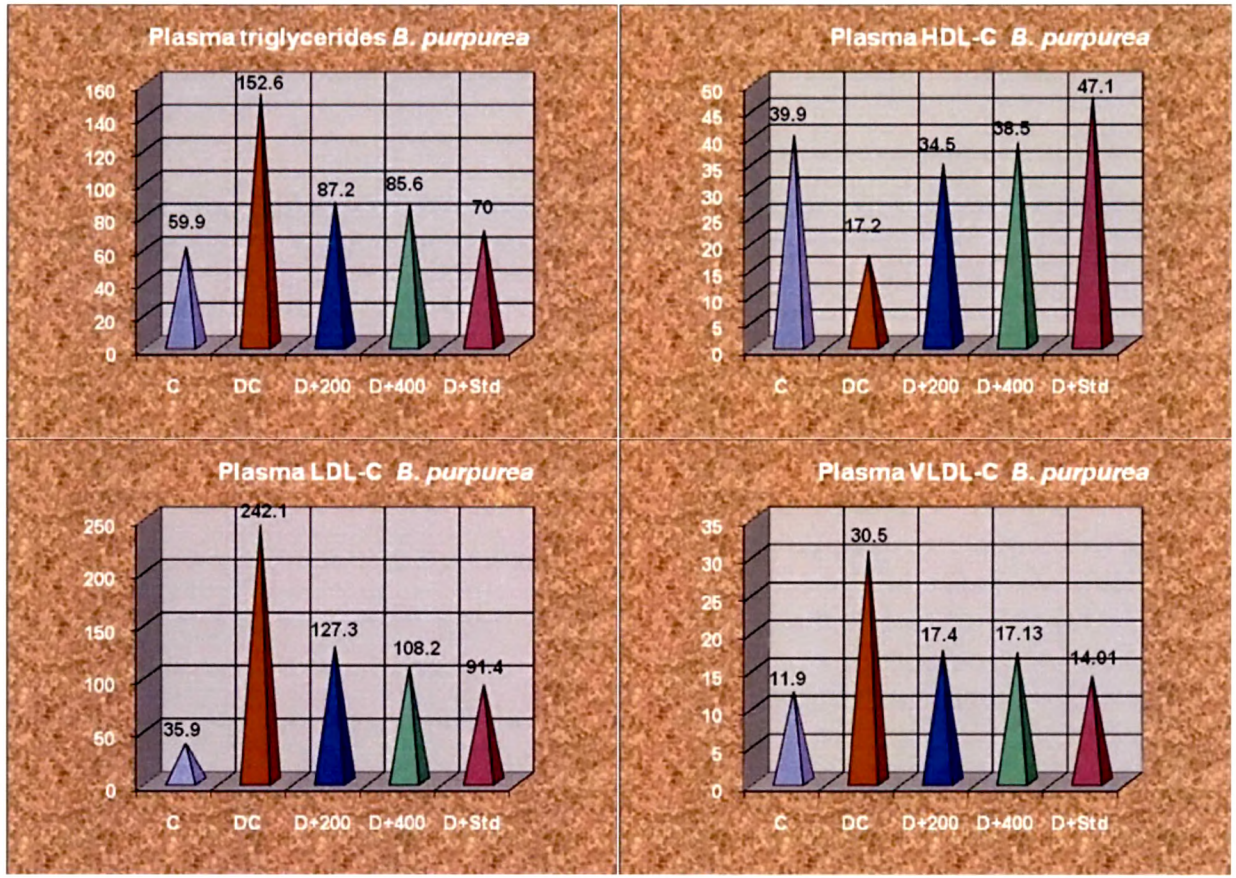

Brain Vitamin E B. purpurea
6
5
4
3
2
1
0
5.38
3.13
4.33
4.6
4.86
C
DC
D+200
D+400
D+Std
Brain SOD B. purpurea
12
10
8
6
4
2
0
11.7
5.4
10
10.7
10.65
C
DC
D+200
D+400
D+Std
Brain CAT B. purpurea
180
160
140
120
100
80
60
40
20
0
166
71.5
97.9
118.7
130
C
DC
D+200
D+400
D+Std
Brain GPX B. purpurea
9
8
7
6
5
4
3
2
1
0
8.7
4.8
6.4
7.1
7.7
C
DC
D+200
D+400
D+Std


Liver SOD B. purpurea
12
4.3
10.1
10.4
10.7
C
DC
D+200
D+400
D+Std
Liver CAT B. purpurea
163.2
68.7
103.4
125
134
Liver GPX B. purpurea
8.9
4.1
6.4
7.5
8
Kidney SOD B. purpurea
11.7
4.6
9.9
10.2
10.64


Kidney CAT B. purpurea
80
70
60
50
40
30
20
10
0
75.7
32.6
52.8
61.8
69.4
C
DC
D+200
D+400
D+Std
Kidney GPX B. purpurea
8
7
6
5
4
3
2
1
0
3.89
7.22
4.89
4.22
4
C
DC
D+200
D+400
D+Std
Liver Hexokinase B. purpurea
0.25
0.2
0.15
0.1
0.05
0
0.22
0.1
0.19
0.19
0.2
C
DC
D+200
D+400
D+Std
Liver G-6-P B. purpurea
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0.15
0.31
0.19
0.18
0.17
C
DC
D+200
D+400
D+Std


Liver Fructose-1, 6- bisphosphate B. purpurea
1.2
1
0.8
0.6
0.4
0.2
0
0.55
1.08
0.7
0.65
0.6
C
DC
D+200
D+400
D+Std
Plasma Urea B. purpurea
70
60
50
40
30
20
10
0
19.6
66
44.7
37.8
33.9
C
DC
D+200
D+400
D+Std
Plasma Uric acid B. purpurea
25
20
15
10
5
0
3.05
20.5
10.6
8.6
7.06
C
DC
D+200
D+400
D+Std
Plasma Creatinine B. purpurea
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
0.7
4.34
1.25
0.98
0.92
C
DC
D+200
D+400
D+Std


Blood Urea Nitrogen B. purpurea
35
30
25
20
15
10
5
0
9
30.8
20.8
17.6
15.8
C
DC
D+200
D+400
D+Std
Plasma Cholestrol B. purpurea
250
200
150
100
50
0
63.9
228.6
144.4
129.6
124.4
C
DC
D+200
D+400
D+Std
Plasma Free fatty acid B. purpurea
140
120
100
80
60
40
20
0
50.9
132.8
107.8
93.9
74.6
C
DC
D+200
D+400
D+Std
Plasma Phospholipids B. purpurea
250
200
150
100
50
0
121.3
210.4
175.5
150.3
141.2
C
DC
D+200
D+400
D+Std


Plasma triglycerides B. purpurea
160
140
120
100
80
60
40
20
0
59.9
152.6
87.2
85.6
70
C
DC
D+200
D+400
D+Std
Plasma HDL-C B. purpurea
60
45
40
35
30
25
20
15
10
5
0
39.9
17.2
34.5
38.5
47.1
C
DC
D+200
D+400
D+Std
Plasma LDL-C B. purpurea
250
200
150
100
50
0
35.9
242.1
127.3
108.2
91.4
C
DC
D+200
D+400
D+Std
Plasma VLDL-C B. purpurea
35
30
25
20
15
10
5
0
11.9
30.5
17.4
17.13
14.01
C
DC
D+200
D+400
D+Std