

Bangladesh Journal of Pharmacology

Volume: 13; Number 2; Year 2018



Cite this article as: Dey SK, Middha SK, Usha T, Brahma BK, Goyal AK. Antidiabetic activity of giant grass *Bambusa tulda*. Bangladesh J Pharmacol. 2018; 13: 134-36.



Letter to the Editor

Antidiabetic activity of giant grass *Bambusa tulda*

Sir,

Though the field of medical science has reached new avenues in recent years, the prevalence of diabetes and its associated complications have raised round the globe. The ethnobotanical lore of India is very rich and use of plant parts for the treatment of various ailments especially diabetes is in vogue since ancient times. Now-a-days scientific evidences also maintains these claims, since they are proven safe, effective and also helps in improving overall health (Usha et al., 2017; Wang et al., 2017)

Bamboo has been used over centuries as a potential source of medicine in China and other Asian countries (Goyal and Brahma, 2014). A number of bamboo species like *Sasa borealis* (Choi et al. 2008; Hyun and Hyeon-Sook, 2009), *Pseudosasa japonica* (Panee, 2008), *Bambusa vulgaris* (Senthilkumar et al., 2011), *B. balcooa* (Goyal et al., 2017) have been reported for antidiabetic

effects using animal models and *Dendrocalamus hamiltonii*, *D. sikkimensis*, *B. balcooa*, *B. pallida*, *B. vulgaris* using *in vitro* model (Middha and Usha, 2012).

B. tulda popularly known as Owa Gubwai (*Bodo*) or Jati Banh (*Assamese*) (Brahma et al., 2014) is considered to be one of the most useful bamboo species in North east India.

In this letter, an attempt was made to evaluate the antidiabetic activity of the leaf of *B. tulda* for the first time. LC-MS analysis revealed the presence of various compounds such as *p*-hydroxybenzoic acid, salicylic acid and many more. Preclinical validation of anti-hyperglycemic activity of *B. tulda* was carried out using alloxan induced diabetic rats. Two different doses of hydromethanolic extract of *B. tulda* leaf (50 and 100 mg/kg/mL) were used.

The animals treated with *B. tulda* leaf have shown an increase in body weight as compared to diabetic animals. Maximum increase was noted in standard drug than the animals treated with the extract (Figure 1). Goyal et al. (2017) also indicated the same previously in a different species of bamboo. Weight loss was

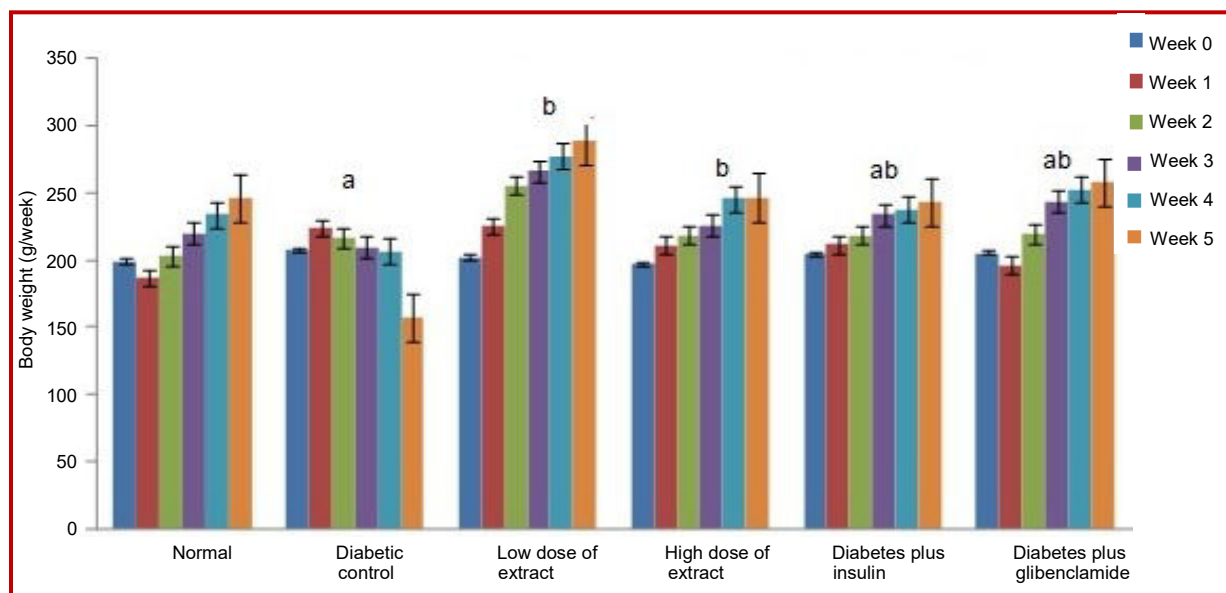
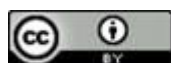


Figure 1: Effect of *B. tulda* leaf extract on body weight (g/week) in different experimental group. Low dose (50 mg/kg/mL) and high dose (100 mg/kg/mL) were used. Values are in mean \pm SE of nine rats per group (n=9). Statistical analysis was done by one-way ANOVA between groups and values were considered significant at $p < 0.05$. Those which are not sharing the same letters are significantly different



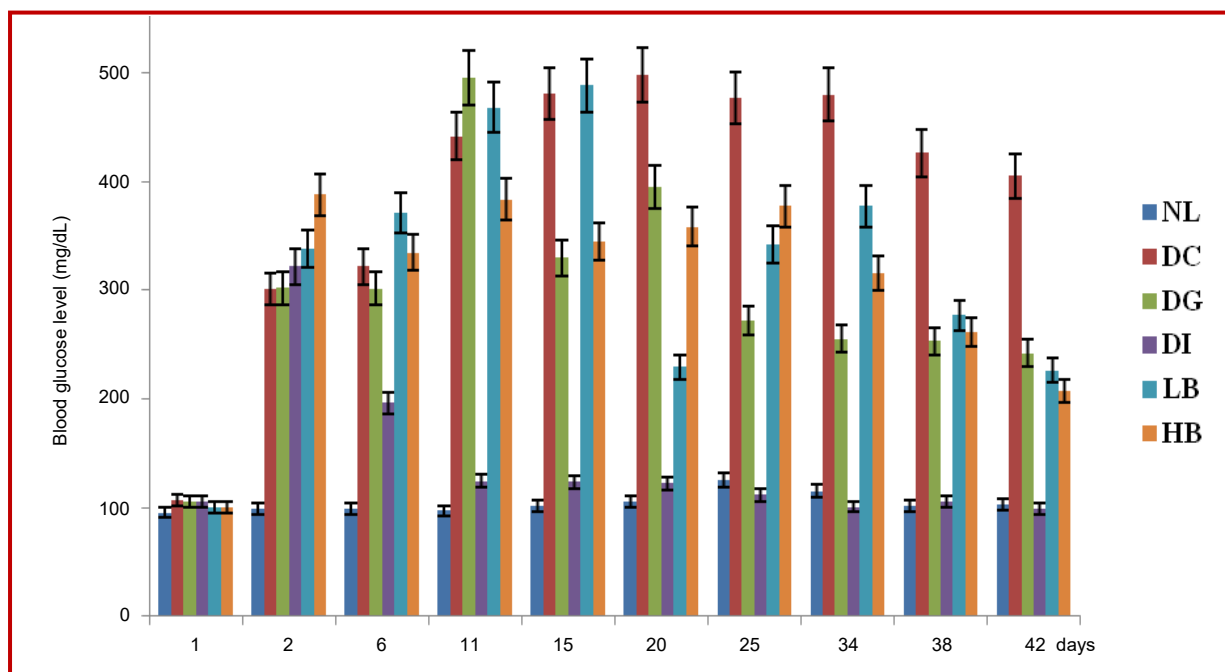


Figure 2: Effect of hydromethanolic extract of *B. tulda* leaf on blood glucose level in different experimental groups. NL, Normal; DC, Diabetic control; DG, Diabetes plus glibenclamide; DI, Diabetes plus insulin; LB, Low dose of *B. tulda* (50 mg/kg/mL); HB, High dose of *B. tulda* (100 mg/kg/mL). Values are mean \pm SE of nine rats per group (n=9). Statistical analysis was done by one-way ANOVA between groups and values were considered significant at $p < 0.05$. Those which are not sharing the same letters are significantly different

caused due to diabetic conditions in animals. Reversal of bodyweight might be because of the reduction in hyperglycemia after supplementing *B. tulda* leaves. Besides this a reduction pattern in blood glucose level was noticed up to 6th week in experimental animals receiving the high dose (100 mg/kg/mL) (Figure 2). The possible mechanism by which *B. tulda* brings down the hyperglycemia may be by increasing the pancreatic secretion of insulin from β -cells of Islets of Langerhans. Hence, may be the presence of phytoconstituents in the hydromethanolic extract proves that *B. tulda* leaf could be able to manage diabetic level, though not significantly, has probable anti-diabetic activity. However, detail studies to fully substantiate the antidiabetic activity of *B. tulda* leaf is currently in progress by our research group.

The authors are thankful to the Agriculture Department, Bodoland Territorial Council Secretariat, Bodofa Nwngwr, Kokrajhar for financial assistance and Maharani Lakshmi Ammanni College For Women, Bangalore for providing animal facility. Thanks are also due to Mr. Jagajit Brahma, Ms. Bijanta Bala Brahma and Mr. Karma Goyari, laboratory attendant and field attendant during field work.

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References

- Brahma BK, Basumatary A, Basumatary J, Narzary D, Mwshary N, Jamatia S, Basumatary P, Goyal AK. Inventorying bamboo diversity of Kokrajhar District, BTAD, Assam, India with emphasis on its uses by the *Bodos* tribes. *Int J Fund Appl Sci.* 2014; 3: 30-34.
- Choi YJ, Lim HS, Choi JS, Shin SY, Bae JY, Kang SW, Kang YH. Blockade of chronic high glucose-induced endothelial apoptosis by *Sasa borealis* bamboo extract. *Exp Biol Med.* 2008; 233: 580-91.
- Goyal AK, Brahma BK. Anti-oxidant and nutraceutical potential of bamboo: An overview. *Int J Fund Appl Sci.* 2014; 3: 2-10.
- Goyal AK, Middha SK, Usha T, Sen A. Analysis of toxic, anti-diabetic anti-oxidant potential of *Bambusa balcooa* Roxb. leaf extracts in alloxan induced diabetic rats. *3Biotech.* 2017; 7: 120.
- Hyun KO, Hyeon-Sook L. Effects of hamburger patties with bamboo leaf (*Sasa borealis*) extract or sea tangle (*Laminaria japonica*) powder on plasma glucose and lipid profiles. *FASEB J.* 2009; Meeting Abstract Supplement 563.17.
- Middha SK, Usha T. An *in vitro* new vista to identify hypoglycemic activity. *Int J Fund Appl Sci.* 2012; 1: 27-29.

- Panee J. Bamboo extract in the prevention of diabetes and breast cancer. Watson RR (ed). In: Complementary and alternative therapies and the aging population: An evidence-based approach. San Diego, Elsevier, 2008, pp 159-77.
- Senthilkumar MK, Sivakumar P, Changanakkattil F, Rajesh V, Perumal P. Evaluation of anti-diabetic activity of *Bambusa vulgaris* leaves in streptozotocin-induced diabetic rats. Int J Pharma Sci Drug Res. 2011; 3: 208-10.
- Usha T, Middha SK, Narzary D, Brahma BK, Goyal AK. *In silico* and *in vivo* based evaluation of traditional antidiabetic herb *Hodgsonia heteroclita*. Bangladesh J Pharmacol. 2017; 12: 165-66.
- Wang L, Roy D, Lin SS, Yuan ST, Sun L. Hypoglycemic effect of *Camellia chrysantha* extract on type 2 diabetic mice model. Bangladesh J Pharmacol. 2017; 12: 359-63.
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