

## A REVIEW ON: PATHOPHYSIOLOGY OF AMORPHOPHALLUS PAEONIIFOLIUS

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### ABSTRACT

The tubers of *Amorphophallus paeoniifolius* (Araceae), commonly known as Suran or Jimmykan, have medicinal and nutritional value. In ethnomedical practice, it is used to treat gastrointestinal diseases such as constipation and hemorrhoids. This study evaluated the effects of peony tubers on bowel function. Konjac has long been used in the treatment of many chronic diseases. Materials and methods: Konjac stems were collected in December 2011 and high-performance liquid chromatography was used to measure the main phenolic compound betulinic acid in the methanol extract. Methanolic (APME) or aqueous (APAE) extract of tubers (250 and 500 mg/kg each) was administered to rats for 7 days. Metoclopramide (MET) (3 mg/kg, oral) was used as a prokinetic drug. Gastrointestinal parameters of the stomach. The amount of feces, wet and dry weight of the feces, water content, empty stomach and intestines were evaluated. Isolated tissue preparations were used to study the effects of the extracts on fundus and intestinal contractility. The aim of the literature review of this review is to determine glucomannan, total phenolic and flavonoid contents by spectrophotometric method. The data collected can help researchers focus on the most important areas that still need to be explored. All the details of this herb have been collected from many books, magazines and classic Ayurvedic texts like Samhitas and Nighantus. A collection of articles from the last 20 years. Chemical effects, phytochemical isolation, toxicity tests, etc. Information on is derived from published studies focusing on the safety of plants. After the tests, the safety of all plants was determined.

**Keywords:** Konjac, Phytochemistry, Toxicity, Pharmacological Effects. Betulinic Acid, Intestinal Transit, Glucomannan, Intestinal Transit, Jimmy Conde.

### I. INTRODUCTION

*Amorphophallus paeoniifolius* (Dennst.) Nicolson (family - Araceae), or foot-like, is a native of Southeast Asia. In India it is often called suran or jimikand. The tubers of this plant have medicinal value and are eaten by many people. It is an important ingredient in many Ayurvedic preparations. [1] Herbal medicines are very popular in the treatment of gastrointestinal disorders. Ayurveda, the Indian medical tradition, also advocates the use of various medications in the treatment of such disorders. In India, plants/herbs with medicinal properties form part of the diet and have medicinal properties as well as food. [2] The Ayurvedic classic Charaka Samhita lists what happens when preparing them or using them in any medicine. Effects. Improper use. To reduce the adverse effects, Charaka also explained some host-related factors such as the patient's constitution (Prakriti), age (Vayam), disease (Vikruti), tolerance (past traumatic history) that should be considered while choosing a medicine. (Satmya), mental capacity (Satwa) and digestive capacity (Ahara-shakti) etc. [3]. It has been observed that Vatsanabha (Aconite) can be a side effect of taking too much Ayurvedic medicine and may cause negative side effects. [4] Some foods have anti-cancer properties that may compete with anti-inflammatory drugs. It prevents the onset of cancer [5-6]. Problems associated with bowel movements include constipation, diarrhea, and bowel dysfunction. These diseases are not serious or life-threatening, but they affect the quality of life (7). Glucomannan was also isolated from tubers and characterized spectroscopically [8]. Plant products found in onions include quercetin, rutin, sitosterol, etc. is available. [9]. Experimental studies have shown central nervous system depressant activity [10], anti-inflammatory activity [11], cytotoxic activity [12], antimicrobial activity, and antifungal activity [13]. The use of plants in all major medical conditions, regardless of their theoretical basis, is an example of the important role of plants in the treatment of diseases. Consider the Unani (Islamic) and Ayurvedic (Hindu) systems in West Asia and the Indian subcontinent, as well as in the East. Western medicine originated in Mesopotamia and Egypt (China, Japan, Tibet, etc.). Details of how and when medicinal plants in general were first used are lost in prehistoric times; in fact, non-human animals seem to have their own materia medica. Medical knowledge is based on oral tradition, transmitted in writing (such as

the Egyptian papyrus Ebers from around 1600 BC), baked tablets (660 conical tablets from the library letters of Ashurbanipal in Nineveh, Now in the British Museum), scrolls and herbal manuscripts. , printed herbalism (printed around 1440 AD), pharmacopoeias and other reference materials (first London Pharmacopoeia in 1618, first English Pharmacopoeia. Ayurvedic medicine (Ayurveda, 250-600 BC), Chinese herbs (4th century BC. Text, and Unani medicine (Kitab-Al-Shifa, Avicenna's masterpiece, 98-1037 AD) There are similar data [14]

**Plant Description**

Indian Ayurvedic and tribal medicines frequently contain the tuberous plant *Amorphophallus paeoniifolius* (Dennst.) Nicolson (Syn. *Amorphophallus campanulate* Blume ex Decne.) of the family *Areaceae*[15] [Figures 1 and 2]

**Scientific Classification Kingdom:**

Plantae Phylum : Magnoliophyta

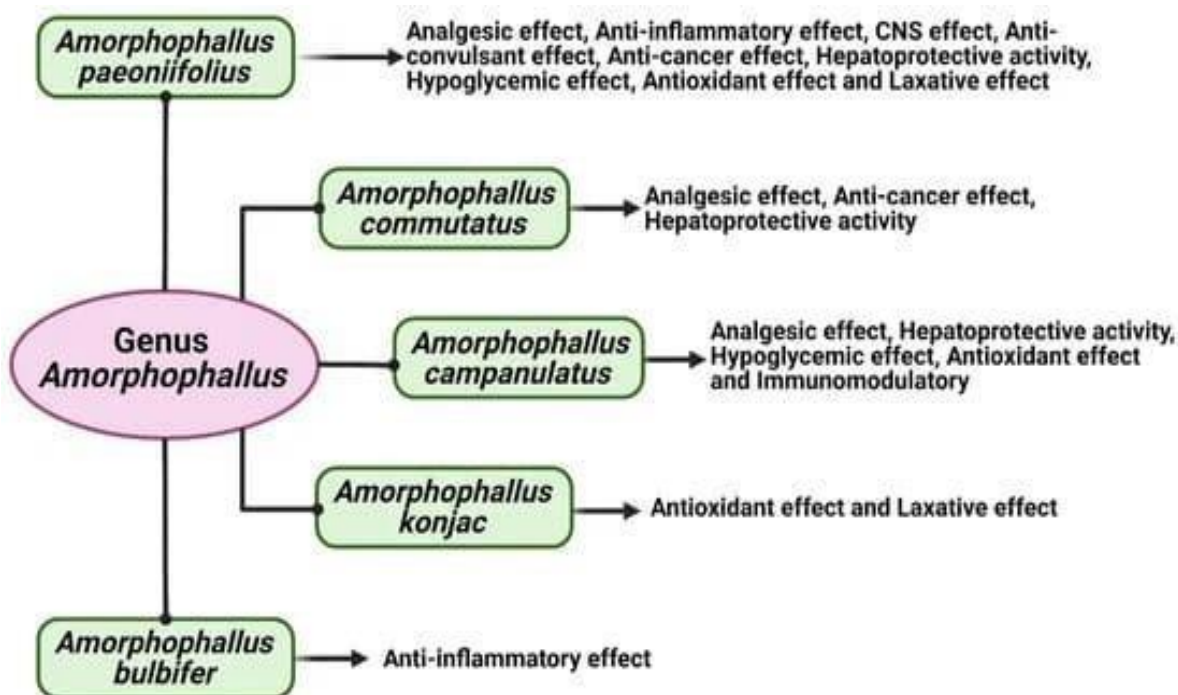
Order: Alismatales

Family: Araceae

Genus: *Amorphophallus*

Species: *A. Paeoniifolius*

Binomial Name: *Amorphophallus paeoniifolius* (Dennst.) Nicolson



**Synonyms:**

Campanulata or Elephant foot yam or Whitespot giant arum or Stink lily.

**General Description**

- English Name: Elephant foot yam
- Bengali Name: Ol
- Sanskrit Name: Suranah
- Hindi Name: Suran, Jamikand
- Parts Used: Corms
- Traditional Uses

Stomach and anthelmintic properties, rejuvenating and tonic properties. They can help treat joint pain, skin diseases, tumors, swelling, hemorrhoids, bleeding, vomiting, cough, bronchitis, asthma, anorexia, digestion, flatulence, colic, constipation, helminths, liver disease, spleen disease, amenorrhea, dysmenorrhea, weak sperm,[16]

**Preparations and formulas**

1. Avahela and Paka- Sri BahusalaGuda
2. Churna – SamudradyaChurna
3. Vatika – Suranavatica [17, 18]
4. Tamra is the medium for the preparation of Bhasma
5. Loha – SuranavaLoha, Surana Modaka [17,18]

**Quality of Ayurveda**

1. Rasa-Katu, Kashaya
2. Guna- Ruksha, Tikshna, Guru, Vishada, Laghu
3. Vipaka-Katu
4. Veerya- Ushna
5. Prabhava – Arshaghana
6. Doshagnata-KaphaVataShamaka, Kapha-Vata Kara, Pitta-Hara, Kaphagna
7. Karma-Outer-Shothahara, Vedanasthapana
8. Inner-Arshaghna, Vatahara, Kaphahara, Yakrit-Uttejaka [17,18].
9. Rogagnata - External use with ghrta and honey converted into Sandhishotha, Shlipada, Arbuda, Internal use - Arsha, Pleea, Gulma, Shwasa, Kasa.
10. Contraindications-Raktapitta
11. Dosage-Powder 3-6 [17,18] Konjac (Dennst) Nicholson Methanol Extract (ME) and 70% Hydroalcoholic

Extract (AE) Rutin and all its ingredients are phenolic (TPC ) was evaluated as flavonoid content (FC) in terms of catechol equivalent. Thin layer chromatography (TLC) analysis of the methanolic solution was performed. ME and AE contain 36.88 mg/g and 46.33 mg/g flavonoids, respectively. The TPC of the investigational extracts (ME and AE) were 12.67 mg/g and 6.25 mg/g, respectively. However, ME contains more flavonoids and phenolics. ME found seven areas with different Rf values after TLC [19]

### Plant Morphology

Large, robust herbaceous plant with underground, hemispherical, submerged dark brown bulbs. The male inflorescence and the female inflorescence are side by side and the middle inflorescence is absent, the appendages of the inflorescence are almost spherical or amorphous, equal to or longer than the fertile area. Spates are bell-shaped, pointed, strong and good. veins and outer part are green-red.. [20]

### Quantitative evaluation of phytoconstituents

The entire glucomannan content was determined as previously described [21] and showed that it was grams of glucomannan per 100 g of extract. The total phenolic content of the extract was determined spectrometrically [22] and expressed as milligrams of tannic acid equivalent (TAE) per gram of extract; The total flavonoid content was determined by the aluminum chloride colorimetric method[23] and shown. Since milligrams of quercetin equal one gram of extract. There are many causes of some serious gastrointestinal diseases and illnesses worldwide. Research data shows that the countries with the highest prevalence of functional dyspepsia, functional constipation, gastroesophageal reflux and stomach ulcers are Argentina (43.2%), Australia (6.3-10.3%), Argentina (11.9%) and Australia (11.9%). 8,9). . %), respectively. %), [24] Approximately 50% of medicines on the market are made from natural ingredients. Interestingly, the market demand for herbs is expected to remain high as there are many active ingredients in medicinal plants that have not yet been produced synthetically. [25]

Pharmaceutical Research

Histoprotective Function

Amorphophallus

Peony bulb contains a flavonoid called quercetin, Shashtry et al. It was extracted in 2010 and tested for hepatoprotective activity using the CCl<sub>4</sub> induction model. Biochemical markers SGOT, SGPT, SALP, bilirubin, total protein and rat liver histopathology were associated with flavonoid (quercetin). The results achieved by reducing the amount of enzymes, increasing the protein level and making the liver weak against the normal body have proven to be significant. Histopathology of isolated mouse lesions provides further support for this finding. [26].

### Toxicity Studies

According to Dey et al. (2009), it is safe to use petroleum ether extract at a dose of 250 mg/kg. LD<sub>50</sub> in rats is 2500 mg/kg. These activities were measured using acetic acid-induced writhing reactions and tail movement in mice. When receiving intraperitoneal doses of 250 and 500 mg/kg body weight, A. Peony has been found to be beneficial in medicine. Activity in the control group was significantly higher compared to diclofenac sodium. [27,28].

### Antineoplastic action

Anthelmintic activity of peony tuber methanol extract against Dilong and Tubifex tubeifex was examined. Bioassays were performed on extracts at doses of 25, 50, and 100 mg/ml, including times of paralysis and death of the worms. Significant bacterial reduction was achieved when the extract reached a maximum concentration of 100 mg/ml. Add piperazine citrate (10 mg/ml) as standard and pure water as control. These extracts have been found to kill and paralyze (helmicide) worms. [29]

### Antimicrobial Effect

Ethanol extract of Konjac root was tested for its antimicrobial, antibacterial and cytotoxic properties. Disc diffusion technique was applied to evaluate the antibacterial and antifungal properties in vitro. The cytotoxicity of brine shrimp nauplii was determined. Additionally, the minimum inhibitory concentration (MIC) was determined using the dilution series method to evaluate the effectiveness of the antibiotic. This extract affects six Gram-negative and four Gram-positive bacteria (Bacillus subtilis, Bacillus megaterium, Staphylococcus

aureus and Streptococcus haemolyticus) (E. coli, Shigelladysenteriae, Shigella spp., Shigellasppneri. aeruginosa, Salmonella typhi). MICs range from 16 to 128 g/ml against a wide range of organisms. The fungi examined were ineffective against the disease. In terms of cytotoxicity, the LC50 value of the extract against brine shrimp nauplii was 7.66 g/ml. [30]

Using the cup-plate diffusion method, various pharmaceutical raw materials have been shown to have additional protection against bacteria such as Escherichia coli, Staphylococcus aureus, Enterococcus faecalis, Klebsiella pneumoniae, Clostridium difficile and other fungal infections. and antimicrobial activity. Candida albicans and Kojima fumigatus. The methanol extract of 6 was determined to be one of the most potent. [31]

High performance thin layer chromatography showed the presence of quercetin and gallic acid in tubers [32]. Betulinic acid is the main phytochemical found in the methanolic extract of tubers [33]. Isolation of water-soluble polysaccharides containing galactose, glucose, 4-O-acylmethylgalacturonic acid and arabinose from aqueous extracts of tubers [34]

Phytochemical analysis before processing The extracts were analyzed for the presence and absence of several herbs. such as carbohydrates, proteins, steroids, flavonoids, tannins and other phenolic compounds, glycosides and alkaloids [35].

#### **Drugs and Chemicals**

Acetylcholine (Himedia Laboratories Pvt. Ltd., Mumbai), D-mannose, 3,5-DNS (dinitrosalicylic acid) and Folin and ciocalteu reagents (Sisco Research Laboratories Pvt Ltd., Mumbai) and tannins (Merck Chemicals, Mumbai) from a local market and quercetin was purchased from Sigma-Aldrich, USA. All reagents and chemicals used are of the highest purity.

#### **Collection and Identification of Tubers**

The peonies were collected from a local market in Gwalior in December 2011 and prepared by Dr. N.K. Pandey is the organization's tax accountant. Certificate number 5-4/10-11/NRIASHRD/Tech/Survey/1611, deposited in the herbarium of the Institute [35]. Diabetes Mellitus (DM) is a major health problem for humans, and its rapid epidemic has placed a heavy burden on society and healthcare facilities. It is restricted to synthetic drugs such as insulin and oral hypoglycemic agents. However, they may cause some side effects at higher doses and oral medications are not suitable for use during pregnancy. Many herbs and foods also have a special role as alternative medicine in the treatment of diabetes because they have little or no side effects [37,38]. Approximately 800 plant species have the potential to treat many non-communicable diseases such as diabetes.

#### **Phytochemical research**

Using double restriction PCR, Santosa et al. In 2007, 19 polymorphic regions were detected in peony. These loci provide highly polymorphic microsatellite markers, containing 3 to 24 alleles per locus. Observed and expected heterozygosity fell within the range of 0.521 to 0.854 and 0.766 to 0.930, respectively. Significant allelic diversity is evident in these characters in A. Learn about the peony family. [41] Distribution The plant is grown all over India and can be found in the wild in the Rampa Hills, Konkan, West Bengal, Assam and the Dean. It is also grown in Sri Lanka. [42,43]

## **II. CONCLUSION**

In summary, the fact that peony tuber exhibits gastrointestinal effects justifies its traditional use in the treatment of gastrointestinal diseases. According to the analysis above, this plant is not risky and its dosage is 250 mg/kg. The plant has been shown to have cytotoxic, antibacterial, antifungal, antiviral, CNS depressant, anthelmintic, and analgesic properties. It has also been shown that benzodiazepines may affect receptors for CNS depressant effects. Steroids and flavonoids are the main phytoconstituents found in plants and are responsible for their effects. More research is needed to identify active ingredients for biological processes. This study confirmed that this tuber can reduce blood sugar levels and cause weight gain in normoglycemic patients.

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### III. REFERENCE

- [1] Anonymous. The Ayurvedic Formulary of India. 1st English ed. New Delhi: Department of ISM and H, Ministry of Health and Family Welfare, Government of India, (Part-II); 2000. pp. 205–7. [Google Scholar]
- [2] Mitra SK, Rangesh PR. Constipation (Vibandh) In: Mishra LC, editor. Scientific basis for Ayurvedic Therapies. 1st ed. Boca Raton, New York: CRC Press; 2004. pp. 323–38. [Google Scholar]
- [3] Rastogi S, Poor quality and improper use: A review of common reasons of possible adversity in Ayurvedic practice. *Int J Risk Saf Med* 2009;21:121-30
- [4] Rastogi S, Ranjana, Singh RH. Adverse effects of Ayurvedic drugs: an overview of causes and possibilities in reference to a case of Vatsanabha (Aconite) overdosing. *Int J Risk Saf Med* 2007;19:117-25.
- [5] Dorai T, Aggarwal BB. Role of chemopreventive agents in cancer therapy. *Cancer Lett* 2004;215:129-40.
- [6] Barnes S. Effect of Genistein on in vitro and in vivo Models of Cancer. *J Nutr* 1995;125:777-83.
- [7] Saito T, Mizutani F, Iwanaga Y, Morikawa K, Kato H. Laxative and anti diarrheal activity of polycarbophil in mice and rats. *Jpn J Pharmacol.* 2002;89:133–41. [PubMed] [Google Scholar]
- [8] Nguyen TA, Do TT, Nguyen TD, Pham LD, Nguyen VD. Characterization of polysaccharide from *Amorphophallus paeoniifolius* in Vietnam. *J Chem.* 2009;47:155–9. [Google Scholar]
- [9] Sharstry RA, Biradar SM, Mahadevan KM, Habbu PV. Isolation and characterization of secondary metabolite from *Amorphophallus paeoniifolius* for hepatoprotective activity. *Res J Pharm Biol Chem Sci.* 2010;1:429–37. [Google Scholar]
- [10] Das SS, Sen M, Dey YN, De S, Ghosh AK. Effects of petroleum ether extract of *Amorphophallus paeoniifolius* tuber on central nervous system in mice. *Indian J Pharm Sci.* 2009;71:651–5. [PMC free article] [PubMed] [Google Scholar]
- [11] De S, Dey YN, Ghosh AK. Anti-inflammatory activity of methanolic extract of *Amorphophallus paeoniifolius* and its possible mechanism. *Int J Pharm Biol Sci.* 2010;1:1–8. [Google Scholar]
- [12] Angayarkanni J, Ramkumar KM, Poornima T, Priyadarshini U. Cytotoxic activity of *Amorphophallus paeoniifolius* tuber extracts in vitro. *Am Eur J Agric Environ Sci.* 2007;2:395–8. [Google Scholar]
- [13] Khan A, Rahman M, Islam MS. Antibacterial, antifungal and cytotoxic activities of amblyone isolated from *Amorphophallus campanulatus*. *Indian J Pharmacol.* 2008;40:41–4. [PMC free article] [PubMed] [Google Scholar]
- [14] Evans WC, Trease GE. *Trease and Evans pharmacognosy.* 15th ed. China: W.B. Saunders; 2002. p. 3.
- [15] Nair RV. *Indian Medicinal Plants* 3, Madras: Orient Longman; 1993. p. 118–22.
- [16] Agrawal DP. Complementary and alternative medicine: An overview. *Curr Sci* 2002;82:518-24.
- [17] Anonymous, The Ayurvedic Formulary of India, 1st English ed., Ministry of Health and Family Welfare, Dept. Of ISM and H, Govt. Of India, New Delhi, (Part-II), 2000.
- [18] Santosa E, Lian CL, Pisooksantivatana Y, Sugiyama Y. Isolation and characterization of polymorphic microsatellite markers in *Amorphophallus paeoniifolius* (Dennst.) Nicolson, Araceae. United States: Blackwell Publishing 2011 Apr 04.
- [19] Sharstry RA, Biradar SM, Mahadevan KM, Habbu PV. Isolation and characterization of Secondary Metabolite from *Amorphophallus paeoniifolius* for Hepatoprotective activity. *Res J Pharm Biol Chem Sci* 2010;1:429-37
- [20] Anonymous, *Flowering Plants of The World.* In: Heywood, editor. London: Oxford University Press; 1978. p. 309.
- [21] Chua M, Chana K, Hocking TJ, Williams PA, Perry CJ, Baldwin TC. Methodologies for the extraction and analysis of konjac glucomannan from corms of *Amorphophallus konjac* K. Koch. *Carbohydr Polym.* 2012;87:2202–10. [Google Scholar]
- [22] Singleton V, Orthofer R, Lamuela-Raventós R. Analysis of total phenols and other oxidation substrates and antioxidants by means of Folin-Ciocalteu reagent. In: Packer L, editor. *Oxidants and Antioxidants,*

- Part A. Methods in Enzymology. New York: Academic Press; 1999. pp. 152–78. [Google Scholar]
- [23] Marinova D, Ribarova F, Atanasova M. Total phenolics and flavonoids in Bulgarian fruits and vegetables. J Univ Chem Tech Metall. 2005;40:255–60. [Google Scholar]
- [24] World Gastroenterology Organization. Map of Digestive Disorders and Diseases. Milwaukee WI: 2008. [Last accessed on 2015 October 17]. Available from:  
<http://www.worldgastroenterology.org/userfiles/file/wdhd-2008-map-of-digestivedisorderspdf>.  
[Google Scholar]
- [25] Thomas SC. Medicinal plants culture, utilization and phytopharmacology, Li. United States: CRC Press; 1995. p. 119-54.
- [26] Nataraj HN, Murthy RLN, Setty SR. Pharmacognostical parameters for evaluation of leaves of *Amorphophallus paeoniifolius*. J Pharm Res 2009; 2:1370-72.
- [27] Shilpi JA, Ray PK, Sarder MM, Uddin SJ. Analgesic activity of *Amorphophallus paeoniifolius* tuber. Fitoterapia 2005;76:367-9.
- [28] De S, Dey YN, Ghosh AK. Anti-inflammatory activity of methanolic extract of *Amorphophallus paeoniifolius* and its possible mechanism. Int J Pharma Biosci. 2010;1:1-8
- [29] Dey YN, Ghosh AK. Evaluation of anthelmintic activity of the methanolic extract of *Amorphophallus paeoniifolius* tuber. Int J Pharm Sci Res 2009;1:117-21.
- [30] Natraj HN, Murthy RL, Setty SR. In vitro screening of antimicrobial activity and Preliminary phytochemical screening of – suran. Pharmacologyonline 2009; 1:189-94.
- [31] Khan A, Rahman M, Islam MS. Antibacterial, antifungal and cytotoxic activities of amblyone isolated from *Amorphophallus campanulatus*. Indian J Pharmcol 2008;40:41-4
- [32] Nataraj HN, Murthy RL, Setty R. Evaluation of gastroprotective ability of *Amorphophallus paeoniifolius* corms against indomethacin induced gastric ulcers. RGUHS J Pharm Sci. 2012;2:67–73.[Google Scholar]
- [33] Tandan N, Sharma P. Quality Standards of Indian Medicinal Plants. New Delhi: Indian Council of Medical Research; 2013. pp. 39–47. [Google Scholar]
- [34] Das D, Mondal S, Roy SK, Maiti D, Bhunia B, Maiti TK, et al. Isolation and characterization of a heteropolysaccharide from the corm of *Amorphophallus campanulatus*. Carbohydr Res. 2009; 344: 2581–5. [PubMed] [Google Scholar]
- [35] Khandelwal KR. Practical Pharmacognosy. 15th ed. Pune: Nirali Prakashan; 2006. pp. 149–56. [Google Scholar]
- [36] Leroith D, Smith DO. Monitoring glycaemic control: the cornerstone of diabetes care. Clinical Therapeutics 2005; 27(2): 1489–1499.
- [37] Sandhya S, Sudhakar K, Vinod KR, Banji D. Formulation and Evaluation of a herbal cream incorporated with crude extracts of *Borassus flabellifer* intended for analgesic and anti inflammatory activity. International Journal of Pharmacology and Technology 2010; 2(2): 67–74
- [38] Mukherjee PK, Maiti K, Mukherjee, Houghton PJ. Leads from Indian medicinal plants with hypoglycemic potentials. J. Ethnopharmacol 2006; 106:1–28.
- [39] Grover JK, Yadav S, Vats V. Medicinal plants of India with antidiabetes potential. J of Ethnopharmacol 2002; 81: 81–100.
- [40] Pradeep G, Agarwal AK, Lakshminarasimhaiah, Singh GK. Antidiabetic and antihyperlipidemic effect of *Borassus flabellifer* in streptozotocin (STZ) induced diabetic rats. World Journal of Pharmacy and Pharmaceutical Science 2015; 4(1): 1172–1184.
- [41] Nataraj HN, Murthy RL, Setty SR. In vitro Quantification of Flavonoids and Phenolic content of –Suran. Int J ChemTech Res 2009;1:1063-7
- [42] Kirtikar KR, Basu BD. Indian Medicinal Plants. Vol. 4. Allahabad, India: Published by Lalit Mohan Basu; 1989. p. 2609-10.
- [43] Anonymous, The Ayurvedic Formulary of India, 1st ed., Ministry of Health and Family Welfare, Govt. Of India, New Delhi, Part-I, 1978