Available online on 30.08.2019 at http://jddtonline.info

Journal of Drug Delivery and Therapeutics

Open Access to Pharmaceutical and Medical Research

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Open Access Review Article

Ayurvedic Polyherbal Formulation and Diabetes: An Overview

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ABSTRACT

At this era the world is suffering from many health dilemmas. Most of them are environmental, ecological, depending on several human races or ethnic background. Diabetes is one of them. Diabetes is chronic metabolic disorder which is group of diverse complications. The present study is overview of various 30 Ayurvedic polyherbal formulations and their significance as antidiabetic potential in diabetic rats. Models used are alloxon induced, streptozotocin induced and streptozotocin-nicotinamide induced diabetes. Plants have always been an exemplary source of drugs and many of the currently available drugs have been derived directly or indirectly from them. The Ayurveda and other Indian literature strongly believe; current scientific evidences, the use of medicinal plants in treatment of various human diseases is found significant. Diverse researches conducted in the last few decades on plants, mentioned in ancient literature or used traditionally for diabetes, have shown antidiabetic property. Further research should continue, especially in areas within nations that have received less attention.

Keywords: Ayurvedic polyherbal formulation, Diabetes, Antidiabetic, Survey, Preclinical, Madhumeh

Article Info: Received 06 July 2019; Review Completed 14 Aug 2019; Accepted 22 Aug 2019; Available online 30 Aug 2019

Cite this article as:

Upasani SV, Bhandari GS, Upasani MS, Torne AA, Haswani NG, Ayurvedic Polyherbal Formulation and Diabetes: An Overview, Journal of Drug Delivery and Therapeutics. 2019; 9(4-A):779-784 **http://dx.doi.org/10.22270/jddt.v9i4-A.3517**

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DIABETES

At this era the world is suffering from many health dilemmas. Most of them are geographical, ecological, depending on a variety of human races or ethnic backgrounds. Diabetes is one of them. Diabetes is chronic metabolic disorder which is group of different complications. At present India is leading the world in number of diabetes, furthermore it having second ranking in number of Prediabetes.[1] As per International Diabetes Federation (IDF) Diabetes Atlas, the global Diabetes occurrence in the age group 20–79 years is estimated to be 6.6% for the year 2010 which convert into 285 million people suffering from Diabetes.[1, 2, 3]

Signs and Symptoms

As per Indian Health Services (IHS), Australian Diabetes Society (ADS) and American Diabetes Association (ADA) following are some symptoms which observed - Constant hunger, Unexplained weight loss or weight gain, Flu-like symptoms, including weakness and fatigue, Blurred vision or visionary problems, Slow healing of cuts or bruises, Tingling or loss of feeling in hands or feet, Recurring gum or skin infections, and Recurring vaginal or bladder infections etc. [1-8]

Risk Factors

Following are associated with insulin resistance and are risk factors for the development diabetes - Age ≥ 30 years, Family history of diabetes, Sedentary lifestyle, Metabolic syndrome, Cardiovascular disease, Hypertension or family history of cardiovascular diseases, Overweight or obese, Women who have had gestational diabetes, had high birth weight babies (greater than 9 lbs.), and/or has Polycystic Ovarian Syndrome (PCOS), Middle age women who has Large bra cup size at age 20.[1, 4-7]

TREATMENT AND AYURVEDIC APPROACH

The goals of early glucose-directed therapies are to normalize glucose levels, to prevent or delay progression to diabetes, and to prevent micro vascular complications. Plants have always been an exemplary source of drugs and many of the currently available drugs have been derived directly or indirectly from them. In India, diabetes has been known for a long time, but its incidence is not of the same magnitude across the subcontinent. The wide range of structures of the plant constituents, which appear to be the active hypoglycaemic principles, suggests different sites of action within the body. The plants provide a potential source

of hypoglycaemic drugs because many plants and plant derived compounds have been used in the treatment of diabetes. Several medicinal plants have found potential use as hypoglycaemic in the Indian system of medicines. A number of researches conducted in the last few decades on plants, mentioned in ancient literature or used traditionally for diabetes, have shown antidiabetic property. Among them, most off plants and their products (active natural principles and crude extracts) that have been mentioned used in the Indian traditional system of medicine have shown experimental or clinical antidiabetic activity.[8] In Ayurved it is considered as '*Naasti Moolam Anaushadhim*' - no plant present on Earth which isn't having medicinal properties. The Ayurved and other Indian literature strongly believe; current scientific evidences, the use of medicinal plants in treatment of various human diseases is found significant. Diverse researches conducted in the last few decades on plants, mentioned in ancient literature or used traditionally for diabetes, have shown antidiabetic property.[9] The Indian word for diabetes derived from Sanskrit literature Ayurved is *"Madhumeha"*. The *Madhumeha* is a combination of two *"Madhu"* means "sweet or sweetness" as like honey and *"Meha"* means "excessive urination"*.* All the renowned traditional texts of Ayurveda like Charaka Samhita (1000 B.C.), Sushruta Samhita (600 B.C.) and subsequent works refer to this disease under the term *Madhumeha* or *Ikshumeha* (*Ikshu* means Sugarcane).[8] Indian plants which are most effective and the most commonly studied in relation to DM and their complications are [10-12]

1. *Acacia Arabica*
2. *Acacia nilotica*
3. *Aegle marmelos*
4. *Allium cepa*
5. *Allium sativum*
6. *Aloe vera*
7. *Andrographis panicullata*
8. *Areca catechu*
9. *Azadirachta indica*
10. *Berginia ciliata*
11. *Beta vulgaris*
12. *Biophytum sensitivum*
13. *Bombax ceiba*
14. *Brassica juncea*
15. *Caesalpinia bonducella*
16. *Cajanus cajan*
17. *Coccinia indica*
18. *Caesalpinia bonducella*
19. *Curcuma longa*
20. *Embelica officinalis*
21. *Eucalyptus globulus*
22. *Eugenia jambolana*
23. *Enicostemma littorale*
24. *Ficus bengalenesis*
25. *Ficus glomerulata*
26. *Glycerrhiza glabra*
27. *Gymnema sylvestre*
28. *Hibiscus rosa-sinesis*
29. *Ipomoea batatas*
30. *Lantana camara*
31. *Magnifera indica*
32. *Memecylon umbellatum*
33. *Momordica cymbalaria*
34. *Momordica charantia*
35. *Morus alba*
36. *Musa sapientum*
37. *Mucuna pruriens*
38. *Murraya koenigii*
39. *Nelumbo nucifera*
40. *Ocimum sanctum*
41. *Panax ginseng*
42. *Picrorrhiza kurroa*
43. *Phyllanthus niruri*
44. *Pterocarpus marsupium*
45. *Punica granatum*
46. *Salacia reticulata*
47. *Salacia oblonga*
48. *Swertia chirayita*
49. *Syzigium cumini*
50. *Termenalia arjuna*
51. *Termenalia chebulla*
52. *Tinospora cardifolia*
53. *Trigonella foenum -*
54. *Vinca rosea*
55. *Withania somnefera*
56. *Zingiber officinalis*

Methodology

The current study provides a collection of information on Ayurvedic Polyherbal formulation and their evaluation on diabetes. The appropriate literature, including books, journals, and reports, was reviewed. The relevant information was searched using various electronic catalogs (e.g., Google Scholar, Science Direct, etc.) and keywords such as "Ayurvedic Polyherbal formulation," "Polyherbal," "Ayurvedic formulation," "Indian," "diabetes," and "*Madhumeh*". It was difficult to include all the information. This study focused on information that would be easily accessible for researchers.[13] Table number 01 is focusing some selected experimental preclinical antidiabetic activities. Figure number 01 and 02 will show frequency and number of plants used, and frequency of experimental model used respectively.

Table No. 01- Composition of Ayurvedic Polyherbal formulation and other details

No. of Plants	Ayurvedic Polyherbal formulation	Experimental Model	Extraction solvent	Standard drug used	Extraction Method	Ref
11	Aegle marmelos, Annona squamosa, Bougain villia, Cassia auriculata, Emblica officinale, Ficus carica, Hybiscus rosasinensis, Psidium guajava, Tenospora cardifolia, Terminalia chebula, Zingiber officinale	Alloxon Induced DM	Aqueous	Glibenclamide	Decoction	15
11	Aegle marmelos, Annona squamosa, Azadirachta indica, Cajanus cajan, Cinnamomum tamala Ferula assafoetida, Gymnema sylvestre, Moringa oleifera, Tamar indus indica, Trigonella foenum, Zingiber oficinale,	Streptozotocin Induced DM	Dried powder	Glibenclamide	Dried powder	16
10	Azadirachta indica, Curcuma longa, Gymnema sylvestre, Momordica charantia, Paneer pera, Piper nigrum, Swerita chirayita, Syzygium cumini, Terminalia bellirica, Trigonella foenum,	Alloxon Induced DM	Hydroalcoholic	Glibenclamide	Maceration	17
8	Acacia catechu, Cassia auriculata, Hemidesmus indicus, Holarrhena antidysenterica, Salacia reticulata, Strychno spotatrum, Trigonella graecum, Vetiveria zizanioides	Streptozotocin Induced DM	Dried powder	Glibenclamide	Dried powder	18
8	Azadirecta indica, Curcuma longa, Emblica officinale, Enicostemma littorale, Gymnema sylvestre,Momordica charatia, Syzygium cumini, Tinospora cordiofolia,	Streptozotocin Induced DM				19
6	Caesalpenia bonduc, Citrullus lanatus, Evolvulus alsinoide , Gymnema sylvestra, Tinospora cordiofolia, Withania coagulans,	Alloxon Induced DM	Ethanol	Glibenclamide	Soxlet	20
5	Andrographis paniculata, Gymnema sylvestere, Momordica charantia, Pterocarpus marsupium, Tinospora cordifolia	Alloxon Induced DM	Methanol		Maceration	21
5	Adiantium capillus, Astercantha longifolia, Callicarpa macrophylla, Ficus benghalensis, Melia azedarach	Alloxon Induced DM	Ethanol		Succesive solvent extraction by soxlet	22
5	Alstonia scholaris, Gymnema sylvestre, Holarrhena pubescens, Premna corymbosa, Solanum nigrum,	Alloxon Induced DM	Aqueous		Maceration	23
5	Emblica officinalis, Gymnema sylvestre, Terminalia arjuna, Tinospora cordifolia, Zingiber officinale	Nicotinamide Streptozotocin Induced DM	Supercritical CO2		Supercritical fluid extraction	24
5	Andrographis paniculata, Eugenia jambolana, Gymnema sylvestre, Momordica charantia, Myristica fragrans	Streptozotocin Induced DM	Hydroalcoholic	Glibenclamide	Tripple maceration	25
5	Camellia sinensis, Foeniculum vulgare, Macrotyloma uniflorum, Punica granatum, Trigonella foenum	Streptozotocin Induced DM	Ethanol	Glibenclamide	Soxlet	26
5	Gymnema sylvestre, Pterocarpus marsupium, Tinospora cordifolia Trigonella foenum	Streptozotocin Induced DM	Ethanol		Maceration	27
5	Cassia auriculata, Cinnamomum tamala, Ficus banghalensis, Mangifera indica, Trichosynthis diocia	Streptozotocin Induced DM	Aqueous		Maceration	28

5	Azadirachta indica, Gymnema sylvestre, Momordica charantia, Syzigium cumini, Trigonella foenum	Streptozotocin Induced DM	Aqueous	Glibenclamide	Morter pastele	29
4	Allium sativum, Ocimum gratissimum, Vernonia amygdalina, and Zingiber officinale	Alloxon Induced DM	Aqueous		Cold maceration	30
3	Eugenia jambolana, Momordica charantia, Ocimum sanctum	Alloxon Induced DM	Hydroalcoholic		Soxlet	31
3	Piper nigrum, Ricinus Communis, Tribulus terrestris	Alloxon Induced DM	Ethanol	Glibenclamide	Cold maceration	32
3	Alternanthera sessilis, Amaranthus viridis, Boerhavia diffusa	Alloxon Induced DM	Aqueous	Glibenclamide	Decoction	33
3	Caesalpinia bonducella, Mucona puriens, Pongamia pinnata	Alloxon Induced DM	Aqueous	Glibenclamide	Continuos hot soxlet	34
3	Glycosmis pentaphylla, Mangifera indica, Tridax procumbens	Nicotinamide Streptozotocin Induced DM	Ethanol	Glibenclamide	Soxlet	35
3	Barleria Montana, Rotula aquatic, Schrebera swietenoides	Streptozotocin Induced DM	Methanol		Soxlet	36
3	Portulaca oleracea, Spilanthe safricana, Sida rhombifolia	Streptozotocin Induced DM	Aqueous	Glibenclamide	Maceration	37
3	Azadirachta indica, Boerhavia diffusa, Tribulus terestris,	Streptozotocin Induced DM	Alcoholic	Glibenclamide	Maceration	38
3	Azadirachta indica, Andrographis paniculata, Moringa oleifera	Streptozotocin Induced DM	Hydroalcoholic		Maceration	39
3	Gymnema sylvestre, Syzygium cumini, Urtica dioica	Streptozotocin Induced DM	Methanol		Rotary shaking	40
3	Azadirachta indica, Bougainvillea spectabilis, Trigonella foenum	Streptozotocin Induced DM	Aqueous, cholorform, ethanol	Glibenclamide	Extraction	41
3	Azadirecta indica, Andrographis paniculata, Moringa oeifera	Streptozotocin Induced DM	Hydroalcoholic	Glibenclamide	Extraction	42
2	Camellia sinensis, Macrotyloma uniflorum	Nicotinamide Streptozotocin Induced DM	Methanol		Maceration	43
2	Annona squamosa, Phyllanthus emblica	Streptozotocin Induced DM	Aqueous	Glibenclamide	Decoction	44

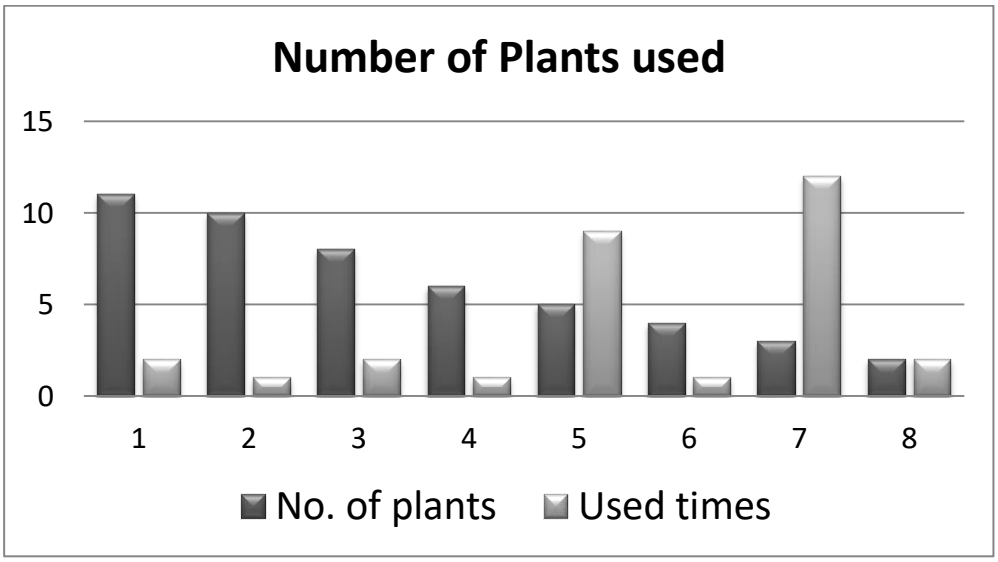


Figure No. 01 - Number of Plants used

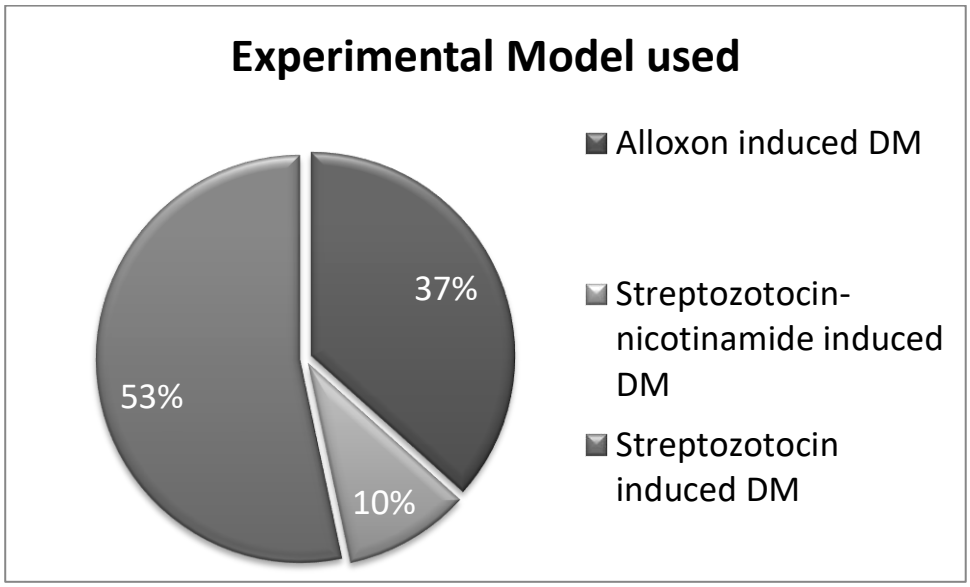


Figure No. 02 - Experimental Model used

DENOUEMENT

One valuable gift to human health is provided by nature in the form of medicinal plants in the locality and one of the significant ways in which humans directly reap the benefits provided by biodiversity.[14] In this overview of Ayurvedic Polyherbal formulation found that it has a significant effect on the diabetes. According to editorial from 'The Lancet' special issue on diabetes as health crisis, near about 366 million people worldwide currently have diabetes mellitus. Estimation is also that this number wills increases by 552 million and about 470 million people with Prediabetes by 2030.[45] Thus, by triangulation, it is probably still possible to document most of the knowledge [14], but further research should continue, especially in areas within nations that have received less attention.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

SOURCES OF FUNDS

Nil

ACKNOWLEDGMENT

The authors are thankful to Dr. S. J. Surana, Principal, R. C. Patel Institute of Pharmaceutical Education & Research, Shirpur-425405, Dhule, Maharashtra, India, Prof. R. G. Mali, Principal, KES's College of Pharmacy, Amalner-425401, Jalgaon, Maharashtra, India, for providing guidance in research work. I extend my thanks to my supportive friends, colleagues whose help improves my work and ability for it.

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