High-lights of Invention

Salient features of herbal anti-diabetic compound isolated from fruit pulp of Eugenia - Jambolana and also chemically synthesized.

1. Unique selling points of our technology.

-Herbal ant diabetic compound (FIIc) has been isolated from fruit pulp of *Eugenia jambolana*

-Besides anti-diabetic activity , it is also having Hypolipidaemic and anti-oxidant potential. Hence effective not only in controlling hyperglycemia but also in diabetic complications.e.g CAD, nephropathy & retinopathy in diabetic animal models.

- Single dose (15 mg/kg b.w) is effective in controlling hyperglycemia for 48 hrs.

- It is effective in controlling both fasting and post –prandial blood glucose levels.

-A significant fall in serum DPP4 level and serum TNF- α was observed after oral administration of herbal ant diabetic compound (FIIc)

-A significant increase in GLUT-4 and GLUT-8 gene expression levels was also observed after oral administration of herbal ant diabetic compound (FIIc)

-Treatment for 30 weeks improves glycemic control and insulin sensitivity by increasing the mRNA expression of PPAR γ, IRS-1 and IRS-2. .

-Histomorphological studies shows partial regeneration of beta –cells of islets of Langerhans of Pancreas.

- No adverse effect was observed on liver and kidney functions.

- Acute and Sub- chronic toxicity studies shows no adverse effect in normal albino –rats.

- Due to seasonal barriers and less yield, the herbal antidiabetic compound (FIIc) isolated from fruit –pulp of E . Jambolana has now been chemically synthesized(α-HSA) in our lab.

- LD_{50} of the chemically synthesized herbal compound (α-HSA) was found to be 867mg/kg b.w.

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- 1/50 of LD_{50} is about 20 mg /kg b. w. which was considered as sub lethal dose that was used as therapeutic dose in the subsequent studies.

-U.S. AND INDIAN PATENTS GRANTED – A U.S. Patent (**No. 6,428,825**dt 6th August 2002) and Indian patents (**No.188759** dated May 2003) and **Product patent No 230753 February 2009**) – Assignee- ICMR, New Delhi

-Patent filed for chemically synthesized (α-HSA) **herbal anti-diabetic compound** (Nov, 2019)

2. Market potential of the technology?

As diabetes is going to become epidemic all over the world and India occupies 2nd position in diabetic population all over the world. The market potential of our technology is very vast.

3. Who is the customer of this technology?

All pharmaceutical companies interested in commercialization of novel drug for the Management of diabetes –mellitus and its complications.

4. Details of competitive technologies, if any.

- NIL

5. Is technology validated? Provide details.

- Yes, the technology has been validated. Because I have been sanctioned four ICMR funded research projects one after another with this herbal anti-diabetic compound.

Project No.1-Studies on fruit pulp of *Eugenia jambolana* and isolation of anti-diabetic compound.

Project No. 2-To study the effect of anti-diabetic compound isolated from *E.jambolana* on various diabetic complications.

Project No. 3-To establish the molecular mechanism of anti-diabetic compound isolated from fruit pulp of E. jambolana.

Project No.4- Chemical synthesis of this herbal anti-diabetic compound.

In each research project, we were isolating the herbal compound and getting the same results.

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6. Whether the technology is cost-effective? If yes, then justify.

-The Synthetic compound will be more cheaper than Herbal compound.

7. Has in-vivo study being conducted? If yes, provide details.

Almost all in-vivo studies have been done in Streptozotocin +NAD induced stable type 2 diabetic albino rats as mentioned above.

-See the following research papers published:

1. Nikhil Khurana and S.B.Sharma. Modulation of glucose metabolism-related genes in diabetic rats treated with herbal synthetic anti-diabetic compound (α-HSA): insights from transcriptomic profiling. Journal of Complementary and Integrative Medicine, https://doi.org/10.1515/jcim-2023-0156.

2. Nikhil Khurana, Pankaj Sharma, Sunita Bhagat, **SB Sharma.** "Modulation of Antidiabetic and Antioxidative Status in Experimental Diabetic Rats following Intake of a Novel Succinamic Acid Derivative(α-HSA) ". International . J. Diabetes2021,2(1)68-75

3. Aiman Abbas Jafri[1] **Suman Bala Sharma[1]*** , Kalpana Luthra[2] Mohit Mehndiratta[1] Nikhil Khurana[1] and Usha Rani Singh[3] . Regulation of Gene Expression in Downstream Signaling Molecules by herbal Compound in Insulin Resistant Diabetic Rats. Altern Integr Med 2017, 6:243.

4. Gupta R, **Sharma SB**, Singh UR. Salutary effects of Glycine Max seeds on post prandial hyperglycemia and dyslipidemia- evidence from in vivo and in vitro studies. AlternIntegr Med. 2017; vol6: Issue 2

5. Tanwar RS, **Sharma SB**, Prabhu KM. In vivo assessment of antidiabetic and antioxidative activity of natural phytochemical isolated from fruit-pulp of Eugenia jambolana in streptozotocin-induced diabetic rats. Redox rep. 2016 Sep 21:1-7.

6. Aiman A Jafri, **Suman B Sharma**, Usha R Singh, KalpanaLuthra. Herbal Anti-hyperglycemic compound Improves Glycemic control and Insulin sensitivity in diabetic Rats.J .Diabetes Obes 2016;3(2):1-6

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7.Reenu Singh Tanwar, **SumanBala Sharma**, Usha Rani Singh and Krishna MadhavaPrabhu. Antiatherosclerotic Potential of Active Principle Isolated from Eugenia jambolana in Streptozotocin-Induced Diabetic Rats.Evidence-Based Complementary and Alternative Medicine 2011; 10: 1155.

8.SumanBala Sharma, Reenu Singh Tanwar, AfreenaNasir , Krishna MadhavaPrabhu. Antihyperlipidemic effect of active principle isolated from seed of Eugenia jambolana on alloxan induced diabetic rabbits. Journal of Medicinal Food ; 14 (4) 2010. DOI : 10.1089/jmf.2010.1227.

9.Reenu Singh Tanwar, **SumanBala Sharma**, Usha Rani Singh and Krishna MadhavaPrabhu. Attenuation of renal dysfunction by herbal compound isolated from *Eugenia jambolana*in Streptozotocin induced diabetic rats. Indian Journal of Biochemistry and Biophysics;47;83-89;2010

10.Sharma SB, Prabhu KM, Nasir A, Murthy PS. Anti-hyperglycemic effect of the fruit pulp of Eugenia-jambolana in experimental diabetes mellitus. J.ethnopharmacology 2006: 104; 367-373.

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