SUMMARY AND CONCLUSION
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- The presence of phytochemical constituent was established by TLC, and subjected to HPTLC analysis. The HPTLC fingerprints of all the extracts showed different peaks confirming the presence of various constituents. The TLC and HPTLC fingerprinting were used for the quality control of the extract.

- The Hydro-alcohol and aqueous extracts of *Eugenia jambolana* and *Cinnamomum zeylanicum* were tested for antioxidant activities - DPPH, oxygen radical scavenging, alphaglucosidase inhibitory activity, DPP IV inhibitory activity and glucose uptake activity.

- All extracts have shown considerably good antioxidant activity, alphaglucosidase inhibitor and glucose uptake activity. The polyherbal extract APKJ-004 was found to exhibit highest antioxidant activity and alphaglucosidase inhibitory potential.

- The *invitro* evaluation was performed by using cell culture assays, alphaglucosidase inhibition and antioxidant property. Hydroalcoholic and aqueous extracts of the plants were screened against HepG2, C2C12 and 3T3-L1 cells using a glucose uptake assay. The results showed that the glucose uptake was significantly high in APKJ-004 polyherbal extract when compared with other extracts.

- All the extracts exhibited considerable insulinomimetic and insulin sensitization activity and among the tested three cell lines (3t3L1, C2C12 and
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HepG2) the C2C12 cell lines skeletal muscles have shown prominent activity against APKJ004 extract.

- Further the polyherbal extract APKJ-004 was selected and subjected to invivo studies i.e., acute and sub acute studies for the determination of safety and efficacy.

- The acute toxicity studies revealed that the extract APKJ-004 has LD50 greater than 5000 mg/kg b.wt. Hence it can be classified as GHS category 5 according to OECD guidelines.

- Based on the findings of the study, The no observed effect level (NOEL) of APKJ-004 in rats, following oral administration for 28 days was found to be more than 800 mg/kg b.wt.

- The sub acute toxicity studies showed that the polyherbal extract is non toxic even at high dose i.e., 800mg.kg.b.wt. Results of the study indicated that the extract APKJ-004 had no effect on general health and growth, on behavioral, hematological, clinical chemistry and urinalysis parameters. The organ weights, gross and histopathological/microscopic appearance of the tissues of the treated rats at high dose 800 mg/kg b.wt.did not produced any significant changes.

- The glucose tolerance test results revealed that the extract APKJ-004 treated animals tend to reduce the glucose levels are comparable to the standard.

- The present polyherbal extract APKJ-004 was rich with various active constituents and there was a good acceptability for new herbal formulation, which might be because of its palatability and absence of side effects.
• The present investigation has a commercial potential as the plants are available in plenty. The study needs to be authenticated with a clinical trial to commercialize the product. The scientific contributions in the field of diabetes are promising and outcome is aimed to commercialize the product.

• Based on the findings, it can be concluded that the extract APKJ -004 is potential in the treatment of diabetes mellitus and can be armamented in the pharmacotherapy.

CONCLUSIONS:

In this investigation we have evaluated the phytochemical and physicochemical properties of the extracts *Eugenia jambolana* and *Cinnamomum zeylanicum*. Characteristic identification features of all the extracts used in this study have been established using thin layer chromatography and presence of active constituents are identified.

Hydro alcoholic and aqueous extracts were prepared and evaluated for its *invitro* activity on three different cell lines representing three different organs implicated in glucose homeostasis (3T3L1, C2C12 and Hep G2). It was found that combination APKJ-004 was more prominent compared to other single as well as other combinations. Further biochemical analysis was done before evaluating these compounds for safety and efficacy.

The preclinical toxicity studies on acute and sub acute revealed that the extract APKJ-004 was found to be safe even at dose of 800mg/kg. Further these extracts were evaluated for antidiabetic activity in STZ induced rat model. The glucose tolerance test on rats proved to be positive.
It is therefore concluded that the compound APKJ-004 proved to be effective against diabetic rats. On the basis of the results obtained in the present investigation, that the extracts of the selected plants exert a significant hypoglycemic activity. The present investigation has a commercial potential as the plants are available in plenty. Further clinical trial will be useful to take the product for patenting and commercialization.