Chapter-32

Estimation of Natural Products on Diabetes Mellitus Treatment

Authors

Hari Mohan Prasad Singh
Assistant Professor,
Department of Chemistry, Dr. L.K.V.D College,
Tajpur, Samastipur- 848130, India
E mail: harimohanprasad3216@gmail.com

Kumari Sushma Saroj
Assistant Professor,
Department of Zoology, Dr. L.K.V.D College,
Tajpur, Samastipur- 848130, India

Sanjeev Kumar Vidyarthi
Assistant Professor,
Department of Botany, Dr. L.K.V.D College,
Tajpur, Samastipur- 848130, India

Abstract

Diabetes mellitus is a metabolic syndrome that can be considered a growing health problem in the world. The study was carried out to relate the role of natural products in the metabolism of an increasingly prevalent disease, type 2 diabetes mellitus. At present, in addition to the pharmacological resources, an attempt is being made to treat diabetes mellitus with natural products. Natural products are considered a promising source, due to the huge diversity of metabolites with pharmaceutical applications. Therefore, this review aims to uncover the latest advances in this field as a potential alternative to the current therapeutic strategies for the treatment of Diabetes mellitus. Gut microbiota is a promising therapeutic target in the treatment of diabetes. Therefore, it would be necessary to work on the relationship between the microbiome and the benefits in the treatment of diabetes mellitus. Treatment based solely on these natural products is not currently recommended as more studies are needed.

Keywords: Diabetes mellitus, Pharmacological resources, Therapeutics; Natural products

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1. INTRODUCTION

Diabetes mellitus (DM) is characterized by chronic hyperglycemia and impaired carbohydrates, lipids, and protein metabolism caused by complete or partial insufficiency of insulin secretion and/or insulin action. The rapid development of society over the 21st century has brought about a complete change in the lifestyle of the population in both a positive and negative way; new risk factors have emerged that have conditioned an increase in the prevalence of chronic diseases worldwide, such as diabetes mellitus type 2, which in turn increases the morbidity and mortality of the world population [1]. Diabetes mellitus type 2 is the most common form of DM, which accounts for 90% to 95% of all diabetic patients [2] and is expected to increase to 439 million by 2030 [3].

Diabetes mellitus type 2 is a multifactorial metabolic pathology. The WHO puts its prevalence at over 422 million subjects and a total of 1.6 million die per year. It is estimated that eight out of every 1000 inhabitants suffer from it and its prevalence increases in the elderly; however, it is becoming increasingly common in children and adolescents [4]. The constant increase in the population diagnosed with Diabetes mellitus type 2, together with its associated complications, makes it a first-order healthcare and economic problem whose impact is reflected in its treatment and complications that cause poor quality of life. Annual healthcare costs are calculated to be between 119.27–139.2 million euros, which is why it is estimated that people with Diabetes mellitus type 2 generate twice the healthcare costs of persons who do not suffer from this pathology. Type 2 diabetes is currently deemed one of the pandemics of the 21st century **[**5].

2. METHODOLOGY

The literature search was carried out in PubMed and Web of Science. The search strategy was carried out by combining the terms “Diabetes Mellitus”, “Type 2”, “Biological Products”, “Antioxidants”, “Plants”, “Therapeutics” and “Phenols”, combined using Boolean operators. Randomized controlled trials from within the last two years were selected, giving a total of 06 to review. The Joanna Briggs Institute (JBI) checklist for

randomized controlled trials was used to assess study design and quality [6]. One point was ascribed to each criterion achieved on the checklist. The quality of the studies was rated as a percentage of the total available points on the checklist.

3. RESULT AND DISCUSSION

The present study was carried out to relate the role of natural products in the metabolism of an increasingly prevalent disease, type 2 diabetes mellitus, it is apparent that the concept of natural products is ambiguous as no clear boundary has been established between what is natural and what is synthetic since a product can be synthesized from a natural extract. The studies analyzed do not show enough scientific evidence to use the methods investigated in a population.

Studies show that natural products have more than one beneficial effect in addition to being insulin-sensitizing or hypoglycemic as they can be anti-inflammatory, antioxidant, and cholesterol-lowering [7]. These results indicate that a promising treatment can be achieved with long-term studies since the use of natural products has good potential. It is important to evaluate the significant effect of this insulin to implement a longer study time. In another study, the insulin-sensitizing effect of *Scutellaria baicalensis* was proposed as an adjunct to metformin in the treatment of type 2 diabetic patients and also indicates that *Scutellaria baicalensis* improves metabolism and the number of microbial taxa, which suggests that this treatment can improve glucose metabolism through modulation of the gut microbiota in patients with type 2 diabetic [8].

This was due to the indistinct boundary between the concepts of natural and synthetic products as well as the border between treatment and patient improvement. Another limitation is that the analysis of the action of natural products is restricted to an adjuvant action together with drugs in current use [9], which makes it difficult to define the benefits of natural compounds. The studies analyzed in this work presented some difficulties when deciding whether or not they should be part of the bibliographic review.

A limitation of this review is that the results of the studies were obtained over a short period, from three to six months, so these results may be affected if an increase in the temporality of the treatments is protocolized. Within the application of natural products as a treatment for patients with type 2 diabetes, there are single products that can have effects at different levels, that is, a natural product can generate a modulating effect on glucose and lipid metabolism hypoglycemia, hypolipidemia, modulation of the microbiota and anti-

inflammatory and antioxidant agents [10, 11]. Their multiple applicability and their effect in the short and long term must be evaluated and taken into account; consequently, studies are necessary in which the greatest number of these aspects are measured so that more significant results can be obtained.

The studies analyzed show the close relationship between the diversity of microorganisms in the intestinal microbiota and the functioning and metabolism of the host, as well as linking certain microorganisms with specific effects. Specifically, it would be interesting to study in depth the benefits of the increase in the microbiota of butyrate-producing species as well as *Blautia* spp. and *Faecalibacterium* spp. since they show an improvement in carbohydrate and lipid homeostasis [12].

In general, it can be concluded that the most notable benefits of treatments and protocols using natural products in our review studies are the improvement in the insulin resistance of the subjects, improvement in biochemical parameters of glycosylated hemoglobin, improvement in the lipid profile in general, and a reduction in glucose levels in pre-prandial blood [13].

In this estimation, it is also a source of discussion that the presence of environmental factors and factors specific to individuals can interfere with the results obtained, since, for example, when carrying out therapy with natural products accompanied by adjuvant drugs, it is difficult to determine if the effect obtained is due to the use of the natural treatment or the drug. In addition, the presence of toxic habits such as an unbalanced diet, among other aspects, can be the cause of the possible negative effects that are associated with a natural product. The individuality of the patient makes the response to the treatments different, since individual factors, such as lifestyle, eating habits, genetic factors, underlying pathologies, and treatments, can lead to totally different results. That is why when considering this type of study, it is necessary to evaluate the personal factor that characterizes each individual. This fact, together with the small sample size, can interfere with how results can be extrapolated to a larger population.

4. CONCLUSION

The purpose of this study was to analyze the effect of natural products as a therapy for type 2 diabetes. After conducting this systematic review, we feel that a more explicit definition of both the concept of “natural product” and that of “treatment” is needed. This would make it easier to select and filter different studies based on whether they focus on treatment, nutritional treatment, or quality of life improvement. However, the present review shows some limitations in the protocols of the different studies that make conclusions

difficult, which is why studies with more specific protocols are needed, such as long-term vision and larger samples to confirm the benefits and to standardize the results obtained.

More research is required to be able to observe possible side effects caused, in the short and long term, by the use of these treatments with natural products at the individual and collective levels. Some studies indicate that more research is required to determine evidence of beneficial effects through the use of natural products.

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