

Herbal Supplementation to Improve Management of Diabetes Mellitus Patient Care: Current Progress

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Abstract

Diabetes affects millions of patients round the world, with dancing complications, inclusion, cardiovascular diseases, neuropathie and rétinopathie. However, the progression of type 2 diabetes mellitus might be slowed down and its health impact limited. Nevertheless, current anti-diabetic treatments have limitations and is not enough to significantly improve the cardiovascular prognosis of diabetic patients. This work focus on herbal supplement and nutrition as potential therapies for type 2 diabetes mellitus. Actually, Herbal and nutritional supplementation is required in the management of diabetic patients, a binding shared unanimously by scientists. Recent diabetologists have come to the evidence that a therapeutic supplement consisting of nutrients and herbal is necessary to optimize the treatment of diabetes. The treatment of Type 2 diabetes mellitus, which is very often associated with overweight, is based on hygiene and dietetic measures and, where appropriate, on taking oral antidiabetics. This review describes the therapeutic arsenal of conventional oral antidiabetic drugs and emphasizes on innovative therapeutic option introduction herbal medicine and nutrition to the management of diabetic patients. Recent studies showed interesting potential in the reduction of blood sugar for many herbal for example Cinnamon, also berberine has been linked to the reduction of blood glucose levels, insulin levels and showed to be as effective as metformin, the most commonly prescribed drug for diabetics, at controlling blood sugar levels in diabetics. Moreover, a medicinal plant or herbal mixture can provide multi-targeted therapeutic action due to its complex chemical composition with hundreds of active ingredients such as oligosaccharides, alkaloids, polyphenols, flavonoids, tannins and at the same time ensure safety for the patients. We conclude by the fact that herbal and nutritional supplementation can bring major and promising progress in order to improve the patient care, by slowing the progression of type 2 diabetes and limiting its complications.

Keywords: diabetes; insulin; oral antidiabetics; nutrition; herbal medicine

Introduction

About 422 million people worldwide have diabetes and 1.6 million deaths are directly attributed to diabetes each year according to WHO 2021 [1]. Faced with these alarming statistics. It becomes important to improve the management of diabetic patients care.

One of the most promising approaches might be herbal diet supplementation combine to modern oral antidiabetics to improve care of diabetes mellitus patients.

Strong evidence supports the efficacy and cost-effectiveness of nutrition therapy as a component of quality diabetes care, inclusion its integrations into the medical management of diabetes [2]. In fact, nutrition, herbal medicine and lifestyle management are paramount to bring the diabetic condition into homeostasis [3].

This state of homeostasis and balance between insulin, glucagon, glycogen, cholesterol, release of enzymes and synthesis of hormones cannot be achieved by a single molecule. However a medicinal plant or herbal mixture can provide multi-targeted therapeutic action due to its complex chemical composition with hundreds of active ingredients such as oligosaccharides, alkaloids, polyphenols, flavonoids, tannins and at the same time ensure safety for the patients.

Diabetes, which is a major public health problem whose prevalence has increased exponentially over the past 20 years, is a disorder in the assimilation, use and storage of sugars provided by food [4].

It is characterized by a state of chronic hyperglycemia exposing it to a risk of vascular complications. It is due to a relative or absolute deficit in the secretion and / or action of insulin [5].

Classically, there is type 1 diabetes, which most often occurs before the age of twenty and which represents 5 to 10% of diabetes, and type 2 diabetes mellitus (T2DM) often appearing after 40-50 years and which concerns about 90-95% of diabetes.

1. Conventional oral antidiabetiques drus

The treatment of T2DM, which is very often Associate with overweight, is based on hygiene and dietetic measures and, where appropriate, on taking oral antidiabetics (ADO).

Treatment has diversified greatly over the past decade, with the commercialisation of :

- first glitazones of the thiazolidinediones family (pharmacological ligands of the adipocyte transcription factor peroxisome proliferator-activated receptor gamma or PPAR γ , causing a decrease in the level of circulating fatty acids and the amount of abdominal fat).
- then gliptins (inhibitors of dipeptidyl peptidase-4 or DPP4 increasing Glucagon like peptide 1 called insulinotropic GLP1),
- and, finally, very recently, giflons (inhibitoires of renal co-transport of sodium-glucose SGLT2, partially blocking the reabsorption of glucose and increasing its urinary excretion).

Numerous studies, including the famous United Kingdom Prospective Diabetes Study [6]. Have shown that current anti-diabetic treatments are only imperfectly effective in controlling blood sugar levels in most T2DM patients, or only temporarily. The same UKPDS study showed that improving blood sugar control alone, at least with a sulfonylurea or insulin, is not enough to significantly improve the cardiovascular prognosis of these patients.

Given the limitations observed with anti-diabetics in modern medicine, the search for new anti-diabetic molecules based on plant extracts would be a promising alternative [7].

2. Herbal medicine and nutrition in the management of diabetic patients

Plant extracts are interesting and can potentielle be more active than conventional drugs, by their chemical composition, these plants are likely to have a specific mode of action and which involves Séverac active ingrédients acting in synergy and harmony to achieve better blood sugar control.

The recent boom in herbal medicine offers and Opportunity to find natural molecules capable of exerting beneficial effects on the regulation of carbohydrate metabolism, by avoiding the side effects of synthetic substances [8].

A large Numbers of plants are used in the practices of traditional medicine. Therefore, the search for natural active ingrédients from médicinal plants that can treat the métabolique disorders of diabetes is of Great intérets for Heath.

Manny herbes are tradition Ally considère to be anti-diabétique, somme of which are the origin of the développement of drugs such as metformine tanks to Galéga OFFICINALIS. Indeed, the history of biguanides dates back to the use of Galéga OFFICINALIS as a trématent for diabètes in the Middle Ages. Guanidine, the active component of the plant, as use to synthèse several anti-diabetic compounds in the 1920s, inclusion metformine [9].

Also, expérimental wok wasp carrier out to vérifie the anti-diabétique activité of somme of these plants as well as the active compounds responsable for this activité [10-14].

The plant King dom is clearly a deposit of molécules with genuine hypoglycaemic action, the isolation of which could lead to the development of new anti-diabetic agents [15].

Currently, ethnopharmacological investigations are focused on the experimental validation of the curative properties, traditionally attributed to these remedies.

More than 1200 plant species are already used as medicine in traditional diabetes therapy [16]. However, for most of them, scientific evidence has not yet been provided and this is the case, for example, of several plants, sold as anti-diabetic by herbalists.

In Canada, the use of plants with high thérapeutique potentiels Is increasingly considère as a complementary alternative to the conventional therapeutic arsenal (Cree community among the aboriginal population); to This end, antidiabetic activities, among plants with therapeutic potential, were screened using in vitro assays using different cell lines. Several parameters such as the capacity of glucose uptake in the muscle line and the secretion of insulin by pancreatic cells were evaluated. This bioassay served as a reference to guide the fractionation of the plant (*Rhododendron groenlandicum*, a medicinal plant of the James Bay Cree), in order to isolate and identify the active components responsible for its effect.

In addition, in vivo animal model studies of insulin resistance have been performed to determine the mechanisms of action and to validate the safety of the plant [17].

In fact, nutritional supplementation has long been studied as à possible treatment alternative or as an adjunct to the standard treatments for common ailments and diseases. According to the latest research, the Chileanmaqui berry, *Aristotelia chilensis*, has been shown to reduce postprandial insulin levels by as much as fiftypercent. The berry, which has been shown to be as effective as metformin at increasing insulin sensitivity and controlling blood glucose levels [18]. The study of natural resources with the aim of contributing to better population health appears more and more as à central task of modern pharmacologique research.

Furthermore, the isolation and determination of the structure of a natural plant-based product responsables for anti-diabetic activity can only be achieved by evaluating the pharmacological activity.

Recent interessting study showed fructooligosaccharide (FOS) enhanced enzymatic activities of catalase and glutathione reductase in à dose-dependent manner, FOS can be positioned as a nutraceutical product, beneficial in diabetes-Associate metabolic abnormalities [19].

Also, Berberine has been linked to the reduction of blood glucose levels and insulin levels. In fact, berber-ine has been shown to be as effective as metformin, the most commonly prescribed drug for diabetics, at controlling blood sugar levels in diabetics. Berberine causes a decrease in HbA1c whichleads to a hypoglycemic effect. Even cinnamon has beenimplicated in the Reduction of Blood sugar. Cinnamon helps to makecells more insulin sensitive and can also help with more efficient utilization of sugar for energy [20].

3. limits of herbal supplementation : state of evidence so far

Herbal supplémentation once traditionnel based on the use of plants accordina to the virtues discovered empirically, currently a practice based on advances and scientific evidence. Thus the identified active extracts are standardized. Moreover, nowadays many clinical trials are carried out on diabetic patients in order to explore the optimal use of plants and their active ingredients. Because to use these phytotherapy products in clinical practice, we need to know the indications, contrindications, side effets or interactions with drugs or other plants.

In fact, some clinical trials are carried out in order to evaluate the contribution of these herbal supplements in the management of diabetic patients, we quote for example, a recent study concerning cinnamon (*Cinnamomum verum*) which revealed the effectiveness of taking 3 grammes of cinnamon per day for 90 days in the reduction of glycemic and lipid levels of adults with type 2 diabetes compared with placebo [21]. Annoter work [22]. indicated that Rosemary tea intake after 90 days, statistically decreased anthropometric parameters like the body mass index and waist-hip ratio and decreased the percentages of glycated hemoglobin, insulin resistance.

To date, it is important to consider that nutritional supplements and herbal products are not standardized or regulated yet. Therefore, micronutriments, herba suppléments, and risk of medication Associate efficiency diabetes or prediabetes have not been supported by evidence, and therefore routine use is not recommended. Research is needed to add evidence supporting the addition of herbal supplements to manage glycémie and get newar thérapies that minimise the frequency and severity of diabetes.

Conclusion

Diabetes is a disease that requires appropriate care throughout life patients to prevent the dreaded macro and microvascular complications. However current anti-diabetic treatments are only imperfectly effective in contrôlent blood sugar levels in most T2DM patients and is not enough to significantly improve the cardiovascular prognosis of these patients. This study suggests optimizing the management of diabetic patients through herbal medicine and nutritional supplementation, which may offer major progress in terms of patients' glycemic control. In fact, in addition to the therapeutic arsenal of already existing oral anti-diabetics, herbal supplementation whose clinical effectiveness proved by several recent studies, are essential in the overall care. Nevertheless, supplementation with medicinal plants and dietary supplements needs to be supervised by health professionals, especially for the monitoring of such a steak pathologie as diabètes. Therefore, it is important to définie harmoniez and standardise mesures of supplémentation Wirth médicinal plants to Promote the care of diabétiques patients and détermine the sadet profile of herba by considérant toxicologique évaluations.

Compliance with ethical standards

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Disclosure of conflict of interest

Authors declare that there is no conflict of interest

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