ANTI-DIABETIC PROPERTIES OF PRICKLY PEAR CACTUS

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INTRODUCTION

Pre-Columbian medicine entailed the successful use of native medicinal plants for effective therapeutic treatment of diseases, such as Diabetes Mellitus. The sources of written information go back to the period just after the conquest of Mexico by the Spaniards. The oldest document is an herbal written in Nahuatl by Martin de la Cruz and translated into Latin by Juan Badiano (de la Cruz-Badianus Codex) in 1552. Nineteen years later the physician Francisco Hernandez spent seven years in New Spain gathering and studying native plants which resulted in the work entitled "Historia Natural de Nueva Espana".

After these accounts, there were two other written documents on medicinal herbs, "Plantas, Animales y Minerales de Nueva Espana Usados en la Medicina" by Francisco Ximenez, published in 1615, and the well known "Historia General de las Cosas de Nueva Espana" by Friar Bernadino de Sahagun (Primeros Memoriales, Codex Matritense and Florintine Codex), published after his death in 1590. Common to all these chronicles is the description of the usefulness of the Prickly pear, not specifically describing the cure of diabetes due to the unknown Nahuatl designation of hyperglycemia, but describing its implications for human health in general.

REVIEW OF SCIENTIFIC STUDIES TO DATE

It was not until the establishment of the Mexican Institute of Medicinal Plants in the early 1970s that the hypoglycemic properties of the Prickly Pear Cactus were studied in a scientific manner. The following is a brief summary of the results of research conducted in Mexican institutions and hospitals to the present date.

Ibanez-Camacho and Roman-Ramos (1979) measured the hypoglycemic effects of whole Prickly Pear pads and juice administered orally to pancreatectomized rabbits without external administration of insulin. The authors theorized from that study that the hypoglycemic action of Prickly Pear was not mediated by insulin.

Ibanez-Camacho et al. (1983) confirmed the hypoglycemic effects of orally administered sap of Prickly Pear pads, using pancreatectomized rats, rabbits and dogs. They only detected the hypoglycemic effect by inducing increases in blood sugar levels, by injecting glucose and observing glucose tolerance. Ibanez-Camacho and

Meckes-Lozoya (1983) also tested a semipurified product from pads of the Prickly Pear cactus, in order to avoid the excess fiber found in the intact pads. The crude extract was administered with a gastric tube to rabbits treated with alloxan, and they measured plasma triglycerides in addition to blood glucose levels. The results from this study were very promising for further clinical studies because effective dosage levels of the preparation were much less than those required of the fresh product.

Fernandez-Harp et al. (1984) conducted a study with healthy human volunteers and observed that ingestion of roasted Prickly Pear Cactus pads had no significant effect on blood serum levels of glucagon, cortisone and growth hormone, however blood glucose and insulin test values were lower in all subjects. They hypothesized that the hypoglycemic active principle of the ingested Prickly Pear pads increased the effectiveness of the insulin.

Meckes-Lozoya and Roman-Ramos (1986) described the case of a male volunteer with an 8-year clinical history of Diabetes Mellitus who was under prescribed synthetic hypoglycemic medicament. The patient received doses of 600 ml of freshly prepared prickly pear juice 3 times a day over an 8 week observational period. Results showed a remarkable improvement in the general symptomatology of the patient, therefore suggesting that the prickly pear juice could have a useful coadjuvant role on the hypoglycemic action of synthetic sulfonamides.

In 1987, Frati-Munari et al. conducted a study with 16 healthy human volunteers who ingested 100 g of tender Cactus pads blended with water. There were no significant differences in glucose tolerance in tests given short intervals after glucose administration. The results suggested that the Prickly Pear Cactus acts by interfering with intestinal glucose absorption, perhaps reducing absorption through the soluble dietary fiber content of the nopal.

In a subsequent study by Frati-Munari et al. (1989) 8 Diabetes Mellitus type II patients were studied, with 6 of them taking synthetic hypoglycemic medicaments while 2 were only on a hypocaloric diet. They were given 300 to 500 g of tender roasted prickly pear pads. The synthetic hypoglycemic medicaments were suspended 48 hours prior to the tests. There was a lineal hypoglycemic response in relation to the amount of ingested nopal. From this study the authors proposed that the soluble dietary fiber was not the only component responsible for the hypoglycemic action, and that there exists another, yet unexplained, hypoglycemic action of the pads. They concluded that ingesting 300g or more of prickly pear daily or its equivalent in extracts would diminish glycemia.

Gulias-Herrero et al. (1989) used the supernatant from a homogenate of tender Prickly Pear pads blended with water, filtered and centrifuged. Eight patients with radiological and endoscopic diagnoses for peptic acid disease were included for treatment. The prickly pear extract produced a significant increase in gastric pH within

30 minutes of consumption. The authors speculated that the nopal could be useful for the prevention or treatment of ulcers, however the volume of the liquid extract ingested produced vomiting in 4 of the patients because they could not physically tolerate the extract.

USE OF PURIFIED EXTRACTS OF PRICKLY PEAR

In our approach to the treatment of patients with Diabetes Mellitus, type I and type II, we are conducting studies with a dry powdered hypoglycemic product ("pectinoid") and other derivative products obtained through further purification of the pectinoid (patent pending) from wild types of Prickly Pear. The product is incapsulated in quantities of 60 mg and adminstrated orally (1 capsule/day). The pectinoid presents a regulatory effect on the blood glucose levels and decreases the amount of insulin required for injection by insulin dependent diabetics. Our results suggest that the pectinoid and purified products have a hypoglycemic effect in a coadjuvant manner in combination with oral or injected synthetic hypoglycemic medicaments. We are currently examining the use of this product on 48 patients and will report the results as soon as they are available.

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