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EXPERIMENTAL AND CLINICAL EVALUATION OF A MIXTURE OF MEDICINAL PLANTS COMMONLY USED IN FOLK THERAPY OF DIABETS MELLITUS

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ABSTRACT

A mixture of raw dried & grounded medicinal plants (Nigella Sativna, Chamomella, Damsesa, Mahlab and Aloe) and two legumes (Helba and Termis) in a proportion of one volume of each medicinal plant and five volumes of each legume has been largely used in Folk medicine by many diabetics for better control of blood glucose level. The present study was conducted to examine the effect Or this mixture on fasting and 2 hours post prandial serum glucose levels and fasting serum insulin level in alloxan diabetic albino rats and in patients with type II diabetes mellitus.

administration of the tested mixture to alloxanized rats (0.5 gm/kgm/day) and to diabetic patients (5 gm/day) for two or four weeks produced statistically significant lowering of fasting and 2 hours post prandial serum glucose levels , accompanied with a significant elevation of serum insulin level. Histo-pathological examination of pancreas of alloxanized rats demonstrated that this mixture produced a marked increase in the size of islet tissue with significant recovery of the destructed B-cells.

This study is a preliminary report of the antidiabetic action of this tested mixture, Further well controlled studies are required to evaluate the

The results revealed that oral

efficacy and safety of long term use of this mixture and to investigate the possible underlying mechanism (s) for its antidiabetic action,

INTRODUCTION

Several investigators reported that it is possible to achieve substantial lowering of blood glucose level in diabetic patients by increasing dietary fibres content and/ or leguminous seeds (Jenkins et al., 1978; Miranda and Horwitz, 1978 and Anderson et al., 1979). Similar findings were also reported in experimental models of diabetes mellitus in rats (Ibrahim et al., 1979 and Hafez et al., 1990).

In folk medicine some mixtures of legumes and/or medicinal plants with high fibre content attain a popular use by many diabetic patients for better control of their blood glucose levels and marked reduction of glucosuria. However, scientific evaluation of the efficacy and safety of most of these mixtures is still lacking. Therefore, the present study was designed to investigate the effect of one of these commonly used mixtures on blood glucose

and serum insulin levels in alloxan diabetic rats as well as in patients with type II diabetes mellitus. Histopathological examination of pancreatic tissue was performed in treated and untreated alloxan diabetic rats.

MATERIAL AND METHODS

The mixture used consists of some dried medicinal plants namely *Nigella Sativa*, *Chamomella*, *Damsesa*, *Mahlab* & *Aloe* and two legumes *Termis* & *Helba*. These constituents were grounded and mixed in a proportion of one volume of each medicinal plant and five volumes of each legume.

ANIMAL STUDY

Albino rats of either sex and similar age. mean weight 180 gm were caged under similar conditions and were fed constant diet of bread, lettuce and milk with free access to water. An experimental model of diabetes mellitus was induced in these rats by a single I.P. injection of freshly prepared solution of alloxan monohydrate 150 mg/kg body weight after an overnight (Rossini et al., 1975). Three days after alloxan injection, rats with fasting

blood glucose level more than 150 mg/dl were selected for this study. The diabetic rats were divided into 2 groups each of ten. The first group served as control and was given 0.5 ml distilled water daily through gastric intubation for 4 weeks, the second group was given 0.5 gm/kgm of the tested mixture suspended in equal volume of distilled water daily for four weeks, this dose was calculated according to Paget & Barnes (1964). On the 14th day and at last day Of the experiment after an over night fasting, blood samples were taken by cardiac puncture for estimation of fasting serum glucose level by the enzymatic glucose oxidase method (Trinder, 1969) and fasting serum insulin level by radio-immunoassay (Morgan & Lazarow, 1963). Other blood samples were drawn 2 hours after 1.75 gm/kgm oral glucose load for eatimation of postprandial serum glucose level.

Animals were decapitated at the end of experiment and pancrease was gently dissected out from each rat, fixed in 10 % formalin and processed for histopathological examination using Hx. & E. stain and modified

aldehyde fuchsin stain for identification of B-cells (Halami, 1952).

Human Study :

Twenty patients (8 males), mean age 52.1 ± 3.5 years , with type II diabetes mellitus. The approximate duration of diabetes was 7.9 ± 0.4 years. A written consent was taken from each patient after explaining the nature of the study. The patients had good general conditions and were clinically free with normal blood pressure and no apparent clinical manifestations of diabetes complications or infections. The oral antidiabetic drugs were withdrawn and the patients were advised to follow diet regim for two weeks as a washout period and to test the response to diet regim alone. Then the test mixture was given orally 5 gm once dialy at the morning before breakfast for 4 weeks.

Fasting and 2 hours post prandial serum glucose and fasting serum insulin levels were estimated just before start of treatment and after two and four weeks treatment. Out of the 20 patients included in the study only 16

patients can be followed to the end of the study. The laboratory data for the patients who did not complete the study were excluded.

RESULTS

Administration of the tested mixture to the diabetic rats for two or four weeks led to a significant decrease of the fasting and postprandial serum glucose levels ($P < 0.05$), and a significant increase in serum insulin level as compared to the diabetic non treated rats (Table I).

In the human study the comparison between serum glucose and insulin values before and after treatment with the tested mixture revealed a significant reduction of fasting or 2 hours post prandial serum glucose level ($P < 0.05$) and a significant rise of fasting serum insulin after treatment ($P < 0.05$), (Table II). The treatment was well tolerated by all patients without any apparent clinical manifestation of untoward effects.

Histopathological examination of rats pancreas revealed marked

degenerative and necrotic changes of most islet cells and the islets appeared small in size in alloxanized rats. In the diabetic rats treated with the tested mixture, there was marked hypertrophy of the islet cells with little destructive changes and marked increase in islets size. B-cells showed marked proliferation with increased size and granulation as evidenced by the modified aldehyde fuchsin stain.

DISCUSSION

The present study revealed that the tested mixture of medicinal plants and legumes had a significant antidiabetic action in alloxan diabetic rats and in patients with type II diabetes as evidenced by the significant lowering of the fasting and post-prandial serum glucose levels following daily oral treatment with this mixture for two or four weeks.

In parallel to our results, several investigators reported a beneficial effect of other raw high fibre medicinal plants and legumes in control of diabetes mellitus. Melmed et al. (1983), Jenkins et al., (1978) and Ibrahim et

al., (1979) reported that feeding on diet containing raw leguminous seed as soybean successfully contributed to control of diabetic state in laboratory rodents. Also, Hafez et al., (1990) found that feeding legumes mixture of termis and helba led to a significant decrease in fasting blood glucose and improved the lipogram in diabetic albino rats. Furthermore, Kiehm et al., (1976) found that a high fibre diet decreased requirement for sulphonylurea or insulin in many diabetic patients. Similarly, Miranda and Horwitz (1978) reported that increasing dietary fibres lower plasma glucose level in diabetic patients.

Although the present study did not fully investigate the underlying mechanism (s) of the antidiabetic action of the test mixture yet it may through some light on the possible mechanism (s) of this action viz :

The increase in fasting serum insulin level reported in the present results following treatment with this mixture in both diabetic patients and rats may suggest that the mixture could have

stimulatory effects on pancreatic B-cells akin to the oral antidiabetic sulphonylurea compounds (Krall et al., 1978 ; Balant, 1981 and Nelson et al., 1987).

Again, the concept that the antidiabetic action of the test mixture might be due to increased pancreatic insulin generation and secretion could be supported by our finding that marked histological improvement of pancreatic islets occurred in alloxan diabetic rats treated by this mixture. Similarly Ibrahim et al., (1979) suggested that soybean may lead to recovery of alloxan destructed beta cells. Another support that could also explain the mechanism for the increase in serum insulin is presented by Miranda & Horwitz (1978) who assumed that the changes in dietary fibre content lead to altered secretion of various gastro-intestinal hormones, therefore, changes in insulin level may be due to changed level of one or more of these hormones because some of these hormones are known to be able to stimulate insulin secretion e.g. the gastric inhibitory peptide, glucagon like peptide-I,

gastrin and cholecystokinin (Mojsov et al., 1987 and Kahn & Shechter, 1990).

It is not new that alloxan produces partial destruction of B-cells of pancreas and lead to insulin deficiency (House, 1958), but the relatively new point is that alloxan may produce some sort of insulin resistance through interference with post-receptor steps of insulin action, though it may increase insulin binding to receptors (Kobayushi and Olefsky, 1979); a possible role of the test mixture to correct insulin resistance can not be ignored and needs analysis.

The mechanism that was largely investigated by many authors is that the high fibre diet including bran and legumes could significantly decrease the gastro-intestinal absorption of nutrient carbohydrates (Jefferys 1974; Brodribb & Humphreys, 1976 and Jenkin et al., 1977). It was suggested that the fibres may limit diffusion of nutrients toward the absorptive mucosal

surface (Southgate, 1973) or raw fooda may contain less available calories because many plant cell wall remain unruptured in the uncooked state, and the cell content are thus not available for absorption (Horwitz & Slowie, 1975). Additionally, this mixture might affect intestinal glucose absorption in diabetics in much the same way as the oral anti diabetic biguanides do (Fantus & Brasseau, 1986 and Jackson et al., 1987).

In conclusion, the present study provides a preliminary report on the potential value of one of the currently used mixtures of medicinal plants and legumes in treatment of diabetes mellitus in experimental animals and in man. However, further controlled studies are necessary to test the efficacy and safety of the long term administration of this mixture as well as to investigate the possible underlying mechanism (s) for its antidiabetic action.

Table I: Effect of the test mixture on serum glucose and insulin levels in alloxan diabetic rats

	Norm Treated Diabetic Group (n = 10)	Diabetic Group Treated With 0.5 gm/ kg / day of The Test Mixture orally (n = 10)	
		For 2 weeks	For 4 weeks
Fasting serum glucose (Mean mg/d l ± S . E .) .	178 ± 8.9	115 ± 9.5 *	108 ± 8.3 *
2 hours - post prandial Serum Glucose . (Mean mg/d l ± S . E .) .	266.4 ± 14.8	165 ± 11.3 *	140 ± 10.4 *
Fasting serum insulin (mean μ l . U . /ml ± S . E .)	10.9 ± 0.62	13.3 ± 0.72 *	15.2 ± 0.91 *

* : Significant difference from the non treated diabetic group (P < 0.05) .

Table II: Effect of the test mixture on serum glucose and insulin levels in diabetic patients .

	Before Treatment (n = 16)	Oral Treatment With 5 gm/day of The Test Mixture (n = 10)	
		For 2 weeks	For 4 weeks
Fasting serum glucose (Mean mg/d l ± S . E .) .	189.6 ± 9.7	120.3 ± 8.7 *	102.9 ± 7.6 *
2 hours - post prandial Serum Glucose . (Mean mg/d l ± S . E .) .	285.3 ± 14.8	148 ± 12.1 *	137.3 ± 10.2 *
Fasting serum insulin (mean μ l . U . /ml ± S . E .)	13.3 ± 0.92	17.9 ± 1.2 *	19.9 ± 1.2 *

* : Significant difference from form pretreatment values (P < 0.05) .

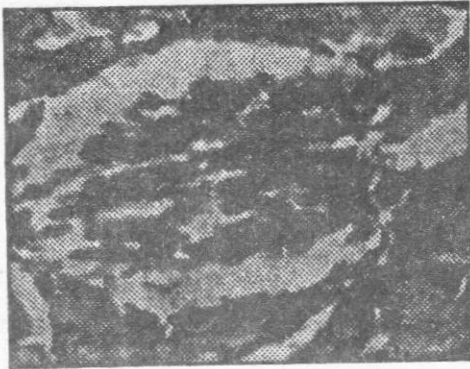


Fig . 1 : Shows the normal appearance of islets of langerhans in normal rat, (Hx & E 160).

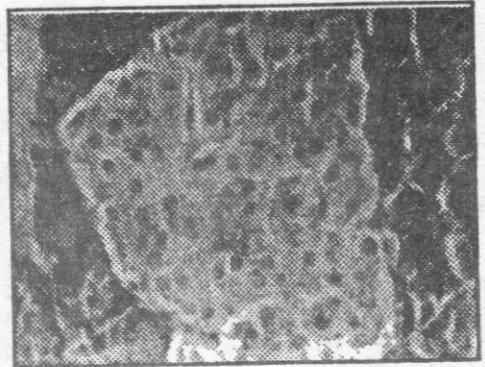


Fig. 3 : Shows the hypertrophied islet cells of pancreas in alloxanized rats after treatment with the test mixture Hx & E 160).

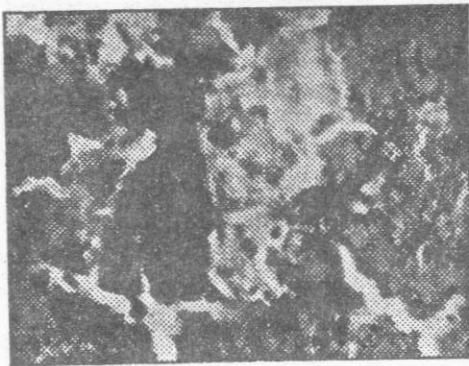


fig. 2 : Shows the atrophic islet's of langerhan's in alloxanized rat (Hx & E 160).

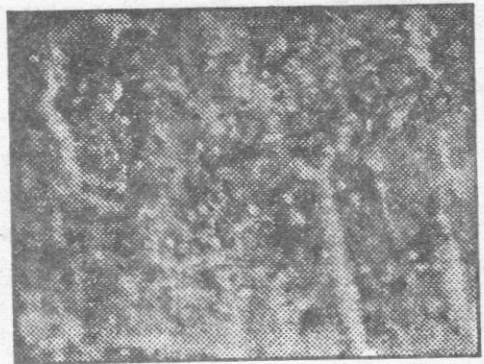


Fig. 4 : Shows prominent B-cells in alloxanized rats after treatment with test mixture (modified aldehyde fuchsin stain X 160).

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دراسة تجريبية واكاديمية لتقييم فاعلية خليط من النباتات الطبية والبقوليات في علاج مرض البول السكري

في هذا البحث تم اختيار خليط من النباتات الطبية والبقوليات شائعة الاستخدام شعبيا كعلاج لمرض البول السكري ، وذلك بغرض دراسة تأثيره على مستوى الجلوكوز والانسولين في مصل الدم للفئران البيضاء المصابة بمرض البول السكري نتيجة حقنها بمادة الكوزان وكذلك في المرضى الذين يعانون من مرض البول السكري من النوع الثاني الذي لا يعتمد على استخدام الانسولين في العلاج . ويتكون هذا المخلوط من بعض النباتات الطبية (الحبه السوداء - الشيح - الدمسيه - المحلب والصبار) والبقوليات (الترمس والخلبه) المجففه المطحونه بنسبة حجم واحد من كل من النباتات الطبية ، وخمسة جرام من كل من البقوليات المستخدمه .

اظهرت نتائج هذه الدراسة ان اعطاء الفئران البيضاء ٥ ، ٥ جم لكل كيلو جرام من وزن الجسم يوميا من هذا الخليط واعطاء المرضى ٥ جم يوميا عن طريق الفم لمدة اسبوعين أو اربعة اسابيع احدث انخفاضا ذو دلالة احصائية هامه في مستوى الجلوكوز في مصل الدم للفئران والمرضى الصائمين وكذلك بعد ساعتين من اعطاء محلول سكري للفئران (١.٧٥ جم / لكل كيلو جرام) عن طريق الفم وكذلك في المرضى بعد تناول طعام الافطار بساعتين . كما حدثت زيادة هامه احصائيا في مستوى الانسولين في مصل الدم . وقد اظهر الفحص المجهرى تحسن ملحوظ في خلايا بيتا في جزر البنكرياس وذلك في الفئران المصابة بمرض البول السكري التي عولجت بهذا الخليط .

تبين هذه الدراسة فاعلية هذا المخلوط موضوع البحث في علاج مرض البول السكري بصوره مبدئية ولكن قبل أن ينصح باستخدامه اكلينيكيًا يحتاج الامر الى دراسة

تذليل الليمون الحامض
في حياض الحماض

تعد الحماض من الأمراض التي تصيب الجهاز الهضمي في كثير من الأحيان
وذلك نتيجة زيادة إفراز حمض المعدة أو نقص إفرازه أو نتيجة
تغير في نوعية الطعام الذي يتناوله الإنسان أو نتيجة تغير في
نوعية البيئة المحيطة به أو نتيجة تغير في نوعية الهواء الذي
يتنفسه أو نتيجة تغير في نوعية الماء الذي يشربه أو نتيجة
تغير في نوعية التربة التي يعيش عليها أو نتيجة تغير في
نوعية الجو الذي يعيش فيه أو نتيجة تغير في نوعية
نوعية الحياة التي يعيشها.

ومن أهم أعراض الحماض الشعور بالحرارة في البطن
والتعب والضعف وفقدان الشهية والقيء والإسهال
والحمى وغيرها من الأعراض. وتختلف أعراض الحماض
من حيث نوعيتها وشدتها باختلاف نوع الحماض
وأسبابه. وتعد الحماض من الأمراض التي
يمكن علاجها بسهولة باستخدام الأدوية المناسبة
والتدابير الوقائية. وتعد الحماض من الأمراض
التي يمكن الوقاية منها عن طريق
اتباع نظام غذائي صحي والحفاظ على
نوعية البيئة المحيطة به.

ومن أهم أسباب الحماض الإفراط في تناول
الحمضيات والخبز الأبيض والمواد
الحامضية.