

## INFLUENCE OF PREPARATION INULIN-NUTRIMED ON THE STATE OF CARBOHYDRATE AND LIPID EXCHANGE AMONG PATIENTS WITH II TYPE DIABETES MELLITUS

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*According to modern World Health Organization classification, there are two types of diabetes mellitus: insulin dependent and insulin independent. Treatment of these two types of diabetes differs considerably. In case of I type diabetes the injection of insulin is necessary along the diet so in case of II type diabetes the compensation of the carbohydrate exchange for continuous period of time can be reached only using the diet or combined treatment with diet and peroral sugar lowering preparations {1,2,3}*

In case of II type diabetes in order to reach the compensation along with the diet preparations of chemical origin – sulfanilamides, biguanides, blockers of intestine ferments etc. are often used. The mechanism of influence of sulfanilamides and biguanides is stipulated by the stimulating influence over the insulin apparatus of pancreas, increase of biological activity of insulin on the level of tissues, insulin similar influence. The recently proposed acarbose blocks the intestine ferments which are necessary for imbibing of carbohydrates. But it was discovered that long term administrations use of such preparations can result in forming resistance; considerable worsening of lipid exchange; acceleration of development of atherosclerosis of big and small vessels; formation of so called diabetic retinopathy, nephropathy, angiopathy limbs were also noted {1,2,3}. That's why the search for new sugar reducing preparations, which could not only regulate the carbohydrates exchange but positively influence the lipid exchange, immunologic status continuous. Actuality of these elaborations is stipulated by the evidence that the number of diabetes mellitus patients in Ukraine increases annually; 80% of them suffer from the II type diabetes.

During the last years the new preparations of vegetable nature, mainly of foreign origin, appeared, which are recommended for diabetes mellitus patients not only for the purpose of carbohydrate exchange improvement, but also for the prevention of complications {3,4}. Phytotherapy started to be used widely for these purposes; biological active additives of national origin have been already developed and introduced to the market {5,6,7}. One of these preparations is **Inulin-Nutrimed** developed by the company **Nutrimed**. Inulin is a polysaccharide extracted from plants, growing in Ukraine, in particular it is extracted from chicory, Jerusalem artichoke and other plants, reach with insulin {3,5,6}.

We set a task to study efficiency of **Inulin-Nutrimed** in relation with carbohydrate and lipid exchange among patients with type diabetes mellitus of the type II. Preliminary data of research of Jerusalem artichoke related to carbohydrate, lipid exchange and immune status among diabetes patients has shown that due to high concentration of insulin the positive steps of the exchange processes in the cell and humoral immunity, reduction of glycemia among II type diabetes mellitus patients is noted {3,4,5}.

Table 1

Examination time	Glycemia in mmol/l				Cholesterol, mmol/l	Triglycerides, mmol/l
	on an empty stomach	at 12.00	at 15.00	at 18.00		
Prior to treatment, M±m, n-25	10,13 ± 0,94	12,27 ± 1,56	14,60 ± 1,68	11,88 ± 1,23	6,13 ± 0,29	2,41 ± 0,18
After treatment, M±m, n-25	7,44 ± 0,85	8,52 ± 0,97	9,12 ± 1,05	8,08 ± 0,91	5,09 ± 0,17	1,86 ± 0,11
After traditional treatment, n=15	9,5 ± 0,78	10,04 ± 1,12	11,78 ± 1,40	11,0 ± 1,47	6,33 ± 0,27	2,23 ± 0,20
Control, n = 20					4,07 ± 0,13	1,05 ± 0,16
P	< 0,05	< 0,05	< 0,01	< 0,05	< 0,01	< 0,01
P <sub>1</sub>					< 0,01	< 0,01

**Notice.**

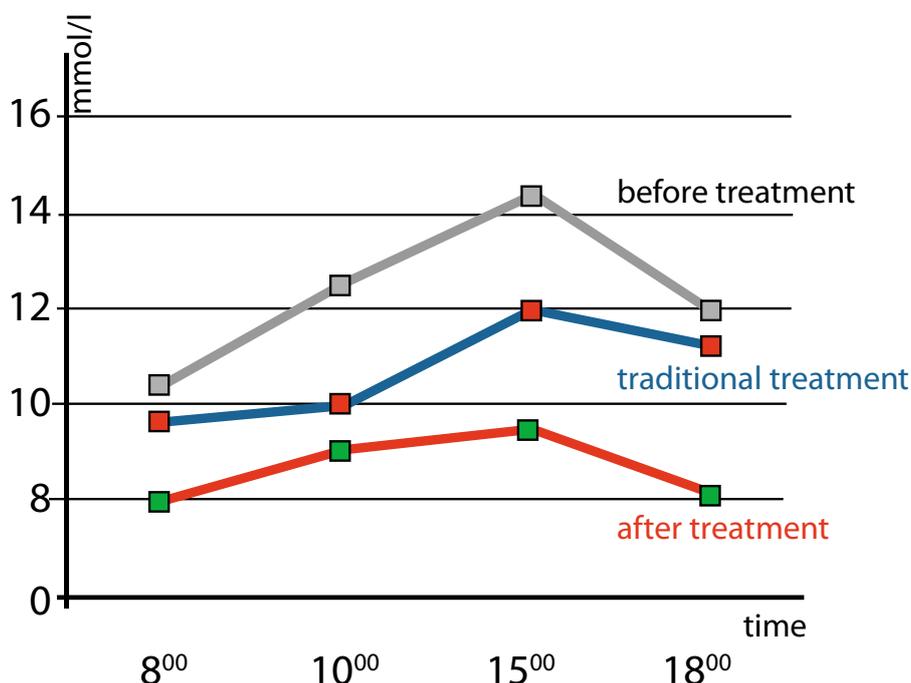
*P* — authenticity of differences among those receiving inulin prior and after treatment;

*P*<sub>1</sub> — authenticity of differences with control.

**Materials and Methods**

35 of type II diabetes mellitus patients at the age from 40 to 65 were examined. There were 16 women, 10 men. Average duration of disease composed 6,4 ± 2,1 years. The light form of diabetes is revealed among 8 people, average severity – among 27 examined persons. Among 35 examined persons 11 along with diabetes had a hepatocholecystitis, 12 – hypertonic disease. All patients complained of pain and parasthesia in the limbs, pain in the stomach area, headache, alternating lameness, worsening of eyesight which proves the presence of diabetes complications.

**Glucose profile of the patients who received and did not received Inulun- Nutrimed**



At the moment of examination the diabetes in the stage of stable compensation has been observed among 8, sub-compensation – among 21 and de-compensation – among 6 examined persons. 8 patients used only diet for diabetes compensation, 19 – a diet along with sugar containing preparations and 8 patients – a diet with grass broth (arfazetin).

25 diabetes patients were administered insulin within a month calculating 3 g of dry substance a day. Preparation **Inulin-Nutrimed** was prescribed per 1 tea spoon 2 times a day, dissolved in 150 ml of warm dose (up to 70° C) before administration.

For control purposes, 10 diabetes patients who received traditional therapy and 20 almost healthy persons have been examined. Sugar level in blood using the orthotoluidin method has been determined during a day on an empty stomach at 12, 15 and 18 hours. Amount of cholesterol and triglyceride in blood serum has been estimated using Reflotron device. The stated researches were carried out prior and after the termination of treatment course. The obtained data are subjected to statistic processing.

### Results and their interpretations

Researches of glycemia level among diabetes patients prior and after the **Inulin-Nutrimed** treatment course prove the hypoglycemic effect of this preparation (see table). So, if the sugar level in blood on an empty stomach prior to treatment among patients, who received and did not received **Inulin-Nutrimed** later on, has composed  $10,13 \pm 0,94$  mmol/l and  $9,5 \pm 0,78$  mmol/l respectively in average, so after **Inulin-Nutrimed** administration it was reduced up to  $7,44 \pm 10,85$  mmol/l ( $P < 0,05$  in both cases). It attracts attention to the fact that vacillation of sugar level in blood within a day among persons who received **Inulin-Nutrimed** is considerably lower, which confirms the stabilizing influence of preparation on glycemia within a day. Among patients who had a traditional therapy course the vacillation of glycemia within a day was considerably higher (see picture).

Interesting data were received during examination of cholesterol content in blood serum among persons who received and did not receive **Inulin-Nutrimed** (see table 1). It was revealed that under the influence of **Inulin-Nutrimed** among diabetes patients the cholesterol level in blood was considerably reduced (up to  $5,09 \pm 0,17$  mmol/l under  $6,13 \pm 0,29$  mmol/l initial,  $P < 0,05$ ). Among persons who did not receive the preparation after the treatment was completed serum cholesterol level remained the same. However, comparing with the control results the serum cholesterol level of those patients was increased prior to inulin treatment as well as after.

Similar data has been received under determination of triglyceride concentration in blood serum of diabetes patients. The concentration in both groups was increased before treatment (see table). But among persons who received **Inulin-Nutrimed**, it was reduced up to  $1,86 \pm 0,11$  mmol/l under  $2,41 \pm 0,18$  mmol/l initial ( $P < 0,01$ ) after a month of treatment. The level of triglycerides by the end of treatment remained the same among patients who received traditional therapy.

Therefore, we can conclude that **Inulin-Nutrimed** has a sugar reducing effect and stabilizes glycemia within a day, helps to reduce the level of cholesterol and triglycerides in blood serum of II type diabetes patients. Obviously, the stated effects are stipulated by the fact that inulin transfers into fructose in the body; fructose metabolism occurs without insulin intervention. This is accompanied by a stabilizing and hypoglycemic effect, improvement of lipid exchange secondary to the stabilization of carbohydrate exchange. Perhaps, **Inulin-Nutrimed** contributes to the peripheral biological activity of insulin, simulates a insulin-like activity.

## Conclusions

1. ***Inulin-Nutrimed*** has a sugar reducing and carbohydrate exchange stabilizing effect .
2. ***Inulin-Nutrimed*** positively influences the lipid exchange, reduces the level of cholesterol and triglyceride in the blood, which are mostly atherogenic in lipid spectrum.
3. ***Inulin-Nutrimed*** does not have side effects, does not causes allergy.
4. Preparation ***Inulin-Nutrimed*** can be recommended as a sugar reducing and prophylactic remedy for type II diabetes mellitus patients who have vascular complications.

## References

1. *Endocrinology Chart. Under the editorship of E. Holodova.* — Minsk: Belarus, 1966. — 507 p.
2. *Balabolkin M.* — *Endocrinology.* — Moscow: Medizina, 1989. — 416 p.
3. *Efimov A., Skrobonskaya N.* - *Clinical Diabetology.* — Kiev: Zdorovya, 1998. — 318 p.
4. *Asfandiyarova N., Kolcheva N., Shatrova I., Goncharenko L.* — *Comparative Immunology of Diabetes Mellitus.* — *Endocrinology Problems.*, 1998. — V. 44. — № 6. — p. 3-5.
5. *Topinambour — a Sunny Root. Under the editorship of L. Bobrovnik,* — Kiev: Urozhai, 1995. — 70 p.
6. *Kahana B., Arasimova V.* — *Biochemistry of Topinambour.* — Kisineu: Stiinza, 1974. — 88 p.
7. *Dudchenko L., Krivenko V.* — *Food Plant-Healers.*— Kiev: Naukova Dumka, 1988.