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THE EFFECTS OF A NEW PLANT MIXTURE ON LIPID LEVELS IN PATIENTS WITH METABOLIC SYNDROME

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The metabolic syndrome describes a condition characterized by the presence of coexisting traditional risk factors for cardiovascular disease such as hypertension, dyslipidemia, glucose intolerance and obesity, in addition to non-traditional cardiovascular disease risk factors such as inflammatory processes and abnormalities of the blood coagulation system (Cefalu et al., 2008). It is an important pathological entity, associated with the risks for cardiovascular and cerebrovascular morbidity and mortality. Prevention and treatment are therefore of great importance (Grundy et al., 2004). Overall mortality in Serbia, compared to the other countries in the region, is among the highest and more than 60% higher than in the EU (European Mortality Database, WHO, 2009) (Strategy, Ministry of Health of Republic of Serbia, 2009). Diseases of the circulatory system and ischemic heart disease are the leading causes of mortality in the Serbian population. Lifestyle changes, in combination with natural supplements, could improve these worrying statistical data.

Plants have played a significant role in maintaining human health and improving the quality of human life for thousands of years. The World Health Organization estimated that ~ 80% of the earth's inhabitants rely on traditional medicine for their primary health care needs. Most of these therapies involve the use of plant extracts or their active components (Craig, 1997). Numerous experimental studies have confirmed the important role of medicinal plants in the prevention, treatment and in lowering risk factors of chronic diseases (Petlevski et al., 2001; Sezik et al.2005).

The aim of this study was to investigate the efficacy of a new plant mixture (HM5) in patients with metabolic syndrome. The HM5 mixture is made up of ethanol extracts from 5 medicinal plants (*Olea europaea* L., *Vaccinium myrtillus* L., *Sambucus nigra* L., *Coriandrum sativum* L., and *Centaurium umbellatum* Gil.) often used in traditional medicine. The most recent studies have shown that these plants influence glycemic metabolism and the mechanisms of adipogenesis (Cignarella et al., 1996; Gray et al., 2000).

Olive leaves, bilberry leaves, elder flowers, coriander fruits and the aerial parts of centaury were commercially purchased from the Institute for Medicinal Plant Research "Dr. Josif Pančić", Belgrade, Serbia. The air-dried, ground plant material (3 kg each) was separately extracted with 60% EtOH (1:1) by percolation for 24h. The obtained extracts were filtered after 5 days. The extracts were mixed in the following ratio: olive extract : bilberry extract : elder extract : coriander extract : centaury extract = 30 : 30 : 15 : 15 : 10. The mixture was filtered after 5 days and packed in 30 ml flasks.

Table 1. Total effects of the plant mixture HM5 on TG, cholesterol and glucose levels (number of patients = 13). *p<0.05.

Parameter	Baseline (mmol/l)	After 6 weeks treatment (mmol/l)	Change (%)
TG	2.15±0.70	1.57±0.56*	27
Cholesterol	5.82±1.07	5.76±1.17	1.1
Glucose	7.18±2.01	6.86±2.10	4.5

In order to investigate the glucose- and lipid-lowering effects of the HM5 extract, a pilot study was conducted on a small number of patients (n=11) with high sugar and/or lipid levels. A control group consisting of 10 healthy subjects with normal biochemical parameters was included in the study. 62% of the patients finished the study (n=13). The patients received 30 HM5 drops 3 times daily for 6 weeks. The fasting levels of glucose, total cholesterol, triglycerides (TG), enzymes aspartate aminotransferase (AST), alanine aminotransferase (ALT), gamma-glutamyl transferase (gamma-GT), lactate dehydrogenase (LDH) and urea, creatinine and α-amylase were measured before and after the treatment with HM5 drops. All participants were told to maintain their usual dietary habits. The biochemical parameters were measured on a Cobas Mira biochemical analyzer (Roche, France), with standard enzymatic kits (EliTech Diagnostic, Sées, France). All results are expressed as a mean ± SD. Differences between the formed groups were analyzed using the unpaired Student's t-test, accepting an alpha significance level of $p \leq 0.05$.

The obtained results showed that the HM5 mixture had the strongest effect on decreasing TG levels (27%), (Table 1). A high level of TG before treatment was observed in 9 of the 13 patients.

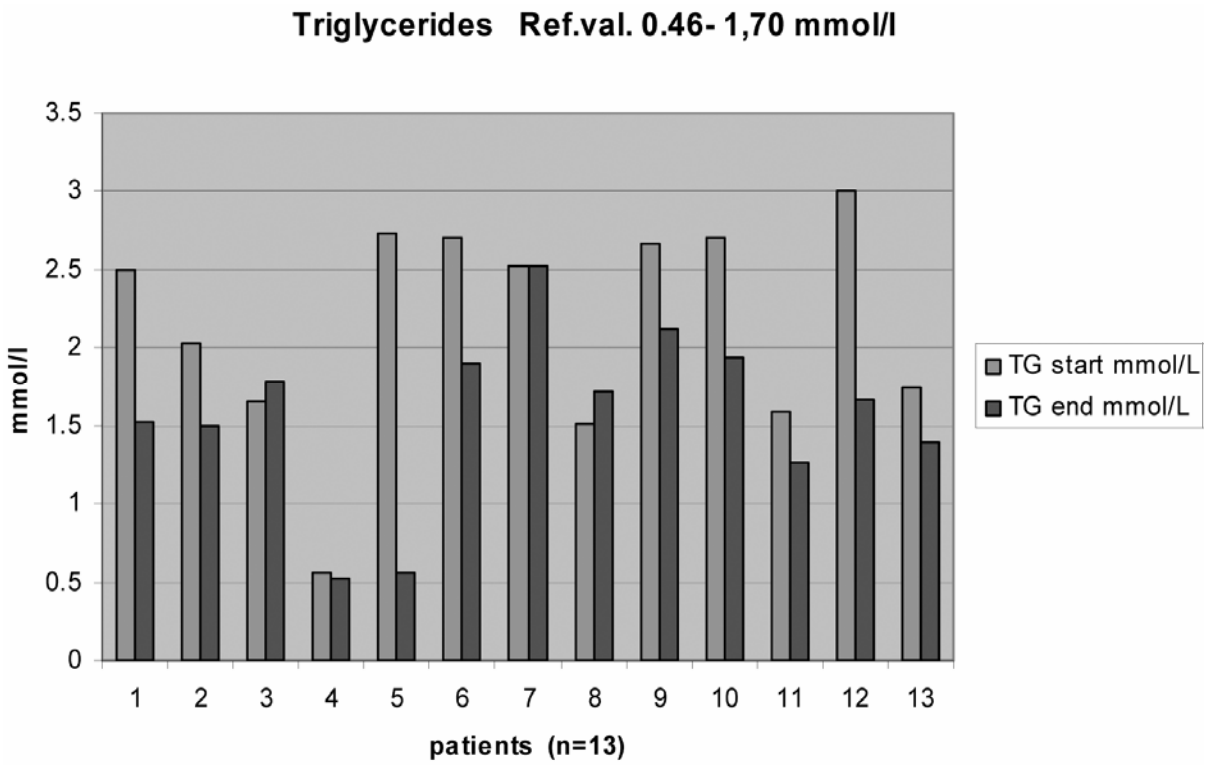

Fig. 1. Level of TG in each Patient before and after treatment with the HM5 mixture.

After 6 weeks of treatment, in 8 of the 9 patients with hypertriglyceridemia, the TG levels decreased and in 6 of them the levels even reached the normal value (0.46-1.7 mmol/l), (Fig. 1). In addition, a reduction of TG levels was also detected in 3 of the healthy people in the control group. Considering each single patient, the observed effect was between 1.2% and even 79%. The effect of the HM5 mixture on TG levels was not observed in only 2 of the patients, but 1 of them had a normal TG level before treatment. These results showed that the HM5 mixture could be a very useful natural remedy in the reduction of elevated TG levels, not only in patients with metabolic syndrome, but probably in other diseases and conditions where undesirable TG concentrations exist.

The effect of the HM5 mixture on cholesterol and glucose concentrations was inconsistent, but encouraging in more than half of the patients (Table 1). On the other hand, there were no statistically significant changes in the levels of the enzymes AST and ALT, gamma-GT, LDH, urea and creatinine. All of these biochemical parameters were within reference values before as well as after the 6 week treatment. According to these results it could be concluded that the HM5 mixture did not show adverse effects on the liver or kidneys. The hypolipidemic action of the plant species which are components of the HM5 mixture was documented earlier. Dhanapakiam et al., (2008) showed that *Coriandrum sativum* seeds had a significant hypolipidemic action while Lal et al., (2004) concluded that coriander has the potential to be popularized as a household herbal remedy with preventive and curative effect against hyperlipidemia. The hypolipidemic effect of *Vaccinium myrtillus* was also shown in several models of rat dyslipidemia (Cignarella, 1996).

The observed positive effect of the HM5 mixture on serum TG reduction, which has no significant effect on liver and kidney enzymes, provides the rationale to conduct a randomized control trial in the future.

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