MedCrave
Step into the World of Research

Journal of Nutritional Health & Food Engineering

Research Article

Open Access

CrossMark

Is it possible to correct the level of uric acid with the help of herbal preparations?

Summary

As it is well-known, an increased level of uric acid in the blood serum is the cause of a number of chronic diseases, such as atherosclerosis, gout, nephritis, obesity, diabetes mellitus. At the same time, the use of known drugs for hyperuricemia correction, obviously, does not solve this problem. Meantime, a number of plant extracts effectively enhance the clearance of uric acid and its salts, helping to reduce the concentration in blood serum and tissues.

The aim of this work was to evaluate the effectiveness of the composition based on plant components on the level of uric acid serum in patients with initially elevated levels.

The study involved patients with elevated serum uric acid level (uric acid more than 350μmol/l in women, and 415μmol/l in men). A total of 109 patients aged 45-65years were examined, including 47 men (Group 1) and 62 women (Group 2). At the time of the study, patients maintained a routine diet.

Plant composition of micronized leaves of Filipendula (*Filipéndula ulmária)* as well as the bark of Aspen (Pópulus trémula) was used in a dose of 1.0 g for 30 days.

Application of the plant composition for a month made it possible significantly reduce the level of uric acid in both men and women. Importantly that this effect persisted for 1 month after the end of the composition treatment. Simultaneously with a decrease in uric acid positive significant changes in triglycerides and blood sugar were noted in patients with initial hypertriglyceridemia and hyperglycemia.

Conclusion: Composition based on plant components of Filipendula (*Filipéndula ulmária)* as well as the bark of Aspen (Pópulus trémula) may be recommended for patients with elevated levels of uric acid, metabolic syndrome and gout as a component of functional nutrition or an independent herbal preparation.

Keywords: uric acid, metabolic syndrome, gout, diabetes, triglycerides, functional nutrition, dietary flavonoids

Volume 12 Issue 1 - 2022

Eugene I Vereschagin
Novosibirsk state medical university, Novosibirsk, Krasny Prospekt, Russian Federation, Russia

Correspondence: Eugene I Vereshchagin, Head of the department of anesthesiology and intensive care, State medical university, 630091, Krasny Prospekt 52, Novosibirsk, Russia, Tel +79134583327, Email eivv1961@gmail.com

Received: February 16, 2022 | **Published:** February 28, 2022

Introduction

Uric acid is known to be the end product of the breakdown of purine bases during the metabolism of nucleic acids. Elimination of UA is carried out through the kidneys, but for certain reasons, the concentration of uric acid in the tissues increases due to enhanced formation of UA, and the violation of elimination. Well-known reasons of increased UA levels are increased intake of fructose and/or meat products,[1] or acute or chronic renal damage.

Moreover, uric acid salts themselves can lead to chronic kidney damage, which in turn also accompanied by a progressive accumulation of MC and its salts.[2] As a consequence of UA enhancement metabolic syndrome develops, i.e. an increase in the level of blood pressure, blood sugar, triglycerides and body weight.[3–7] Moreover, the danger is represented while blood UA concentrations reaches 300μmol/l, both for man and women, i.e. values commonly taken as normal. The relationships between the level of UA and the development of systemic atherosclerosis,[5] diabetes mellitus of the second type[8,9] fatty hepatosis[10] were shown as well.\

In order to reduce UA, in addition to correcting the diet, preventing the formation of UA drugs such as allopurinol may be used. Several studies have shown that high doses of allopurinol can be useful in reducing the risk of metabolic disorders, cardiovascular disease, and even mortality in patients with high levels of MK.[11,12] In addition, one study showed that lowering uric acid with benzbromarone improves insulin resistance in subjects with congestive heart failure.[13] However, this drug also characterized by the every disadvantages of allopurinol.[14] First, these drugs have pronounced side effects, in particular, hepatotoxicity. In addition, with prolonged application their effectiveness decreases. It should be taken into account that allopurinol or benzbromarone practically do not affect the UA salts already deposed in the tissues.

At the same time, it is known that a number of plant extracts when regularly used had a therapeutic effect for gout. In traditional and official medicine, there are a mentions of the effectiveness of plants extracts such as Aspen, Birch, Filipendula for gout treatment.[15,16] In addition, a complex of active ingredients, such as flavonoids and organic acids, were shown to reduce production and/or enhance uric acid excretion.[17, 18] In particular, the flavonoids quercithin and baicalin are effective blockers of xanthine oxidase, a key enzyme in UA production.[19,20] The advantages of plant components are the minimum number of side effects, and the possibility of long-term use as a supplement to the main or therapeutic diet, or in the form of an independent herbal preparation. The purpose of this work was to evaluate the effectiveness of the composition based on a number of plant extracts in reducing the level of UA in patients with its initially elevated level.

Material and methods

The study involved patients with elevated serum UA levels (UA more than 350μmol/l in women, and 415μmol/l for men). The first stage of the study involved 39 men aged 45-65 years. In the second stage, 109 patients aged 45-65years were examined, including 47 men (Group 1), and 62 women (Group 2). Patients maintained a routine diet and drinking regimen all the time of study. The study was conducted in accordance with the ethical standards and standards adopted in RF.

At the first stage, the activity of micronized (up to particle sizes of 0.01-0.001mm) Filipendula herb, Aspen bark, and the composition of these components in a ratio of 1: 1 was investigated. Each drug taken encapsulated at a dose of 1.0g/day for 30 days.

In the second stage of the study only a composition of micronized (up to particle sizes of 0.01-0.001 mm) Aspen bark and Filipendula herb in a ratio of 1: 1, respectively, was used. The encapsulated composition used at a dose of 1.0g/day for 30 days.

The level of UA was determined before the use of the composition, at the end of the course, and a month after the end of the course. In addition, the level of blood sugar and triglycerides was determined before the start, and immediately after the end of taking the drug. The level of uric acid, glucose and triglyceride concentration in blood serum were determined by biochemical analyzer «AU- 480» of the company Beckman Coulter, Inc. (UK) using kits of Biocon (Germany).

Statistical analysis

Data processing was held by software package Statistical 10.0. Calculated values were expressed as mean ± SEM. Significance was determined as $p \leq 0.05$ between experimental groups.

Results and discussion

At the first stage of the study, the effect of micronized Aspen bark, micronized Filipendula, as well as their compositions (1:1) when taken for 30 days were compared (Table 1). In patients taking the Filipendula, there was a significant decrease in UA by 15%, when taking Aspen the decrease in UA was only 13% ($p>0.05$, unreliable), while taking the composition of Filipendula^{+} Aspen accompanied by a significant decrease by 25% ($p<0.05$).

Thus, Fillipendula and the composition of Filipendula and Aspen showed a significant decrease in UA, but the combination of Filipendula and Aspen had a significantly greater effect on the clearance of the UA compared to Filipendula or Aspen *per se*. This fact suggests that the active components of Aspen and Filipendula have an effect on various UA clearance mechanisms, so the joint use of these components is to be much more effective than application of only one of the listed components.

At the second stage the effectiveness of the Filipendula+Aspen composition, the duration of its hypouricemic action, as well as the effect on carbohydrate metabolism and serum triglyceride concentration evaluated. The results are presented in Table 2.

Table 1 Uric acid serum content after Aspen and Fillipendula application

Components	Initial UA (μmol/l)	UA level after treatment (μmol/l)
Micrinized Fillipendula herb	552+/-18	461+/- 11*
Micronized Aspen core	542+/-23	482 +/- 13
Fillipendula + Aspen(1:1)	549+/-11	404 +/-12******

Values are means± SE
*- values are significantly different (P<0.05) if compared with initial data
**- values are significantly different (P<0.05) if compared with the 1 subgroup data
*** - values are significantly different (P<0.05) if compared with the 2 subgroup data
N=10 in each group.

Table 2 Changes in the levels of UA, triglycerides and blood glucose after the studied plant composition application

Parameters	Group I	Group II
Initial values of UA(μmol/l)	521+/_18	496+/_21
Level of UA after the end of the course (μmol/l)	397+/-8*	359+/-12*
Initial blood triglycerides(mmol/l)	2,9+/_0,3	2,6 +/_0,2
Level of blood triglycerides after the end of the course(mmol/l)	1,8+/_0,1*	1,6 +/_0,1*
Initial blood glucose(mmol/l)	7,5+/-0,3	7,3+/-0,2
Level of blood glucose after the end of the course (mmol/l)	6,5+/-0,1*	6,2+/-0,1*

Values are means±SE
*- values are significantly different (P<0.05) if compared with initial data.

Citation: Vereschagin EI. Is it possible to correct the level of uric acid with the help of herbal preparations? *J Nutr Health Food Eng.* 2022;12(1):37–39. DOI: 10.15406/jnhfe.2022.12.00353

Most of the patients with initial hyperuricemia demonstrated an increased content of triglycerides (>1.7 mmol / l, 76% of patients of group 1, and 68% in the second group), as well as increased blood sugar (> 6.0 mmol/l, 80% in group 1, and 74% in the second group).

Significant decrease in UA was noted in all patients after investigated composition application. Overall, the level of UA in the Group I decreased by 24% ($p<0.05$), and by 27% in the second group ($p<0.05$) (Table 1). A month after the end of treatment with the composition, reliable changes in the level of UA were not noted both in the first (403 +/-8μmol/l) and in the second groups (345+/ -10μmol/l). Only in 2 patients of group I, the level of UA, being reduced, again slightly exceeded normal values. Thus, the achieved effect persisted a month after the end of treatment.

In patients with initially elevated triglyceride levels, their significant decrease from 2.9+/ _0.3 to 1.8+/ _0.1mmol/l ($p<0.05$) was noted in the first group, and from 2.6+/ _0.2 to 1.6+/ _0.1 in the second ($p<0.05$). A significant decrease in blood sugar levels was also noted in patients with initial hyperglycemia of the both groups (by 13 and 15%, respectively, the differences are significant). The tendency to triglyceride and blood sugar normalization in patients with initial hyperuricemia also indicates a real correction of purine metabolism and UA levels due the studied composition.

As a side effect, 5% of patients in the group, and 3% of patients in Group 2 experienced short-term pain in the liver and stomach projection, did not require medical correction. In one patient, the use of the drug was discontinued due to an allergic reaction (allergic rhinitis). Toxic effects, as well as nausea or vomiting, were not noted.

Thus, the studied composition based on plant components of Filipéndula ulmária and Aspen (Pópulus trémula) showed safety and high efficiency in blood serum UA reducing. These effects persisted at least one month after treatment. In addition, there was a high efficiency in blood triglycerides and sugar reducing in patients with initially elevated levels.

The supposed mechanism of action may be associated both with a decrease in the UA production and enhancement of UA and its salts clearance from blood and other tissues, but the latter mechanism requires further research.

Conclusion

Proposed plant composition based on Filipéndula ulmária, and Aspen (Pópulus trémula) could be recommended for use in patients with elevated UA level, metabolic syndrome and gout as a component of functional nutrition or an independent herbal preparation.

Acknowledgments

None.

Conflicts of interest

The author states there are no conflicts of interest.

Funding

None.

References

1. Emmerson BT. Effect of oral fructose on urate production. *Ann Rheum Dis*. 1974;33:276–280.
2. Fathallah Shaykh SA, Cramer MT. Uric acid and the kidney. *Pediatr Nephrol*. 2014;29(6):999–1008.
3. King C, Lanaspa MA, Jensen T, et al. Uric acid as a cause of the metabolic syndrome. *Contrib Nephrol*. 2018;192:88–102.
4. Young HR, Yanyan Z, Hyon KC. The epidemiology of uric acid and fructose. *Semin Nephrol.* 2011;31(5):410–419.
5. Pergola G, Cortese F, Termine G, et al. Uric acid, metabolic syndrome and atherosclerosis: the chicken or the egg, which comes first? *Endocr metab immune disord drug targets*. 2018;18(3):251–259.
6. Abdullah AR, Hasan HA, Raigangar VL. Analysis of the relationship of leptin, high-sensitivity C-reactive protein, adiponectin, insulin, and uric acid to metabolic syndrome in lean, overweight, and obese young females. *Metab Syndr Relat Disord*. 2009;7(1):17–22.
7. Choi HK, Ford ES. Prevalence of the metabolic syndrome in individuals with hyperuricemia. *Am J Med*. 2007;120:442–447.
8. Johnson RJ, Nakagawa T, Sanchez-Lozada LG, et al. Sugar, uric acid, and the etiology of diabetes and obesity. *Diabetes*. 2013;62(10):3307–3315.
9. Bonakdaran S, Kharaqani B. Association of serum uric acid and metabolic syndrome in type 2 diabetes. *Curr Diabetes Rev*. 2014; 10(2):113–117.
10. Lanaspa MA, Sanchez-Lozada LG, Choi YJ, et al. Uric acid induces hepatic steatosis by generation of mitochondrial oxidative stress: potential role in fructose-dependent and -independent fatty liver. *J Biol Chem*. 2012;287:40732–40744.
11. Rho YH, Zhu Y, Choi HK. The epidemiology of uric acid and fructose. *Semin Nephrol*. 2011;31(5):410–419.
12. Luk AJ , Levin GP, Moore EE, et al. Allopurinol and mortality in hyperuricaemic patients. *Rheumatology*. 2009;48(7):804–806.
13. Ogino K, Kato M, Furuse Y. Uric acid-lowering treatment with benzbromarone in patients with heart failure: a double-blind placebo-controlled crossover preliminary study. *Circ Heart Fail.* 2010;3:73–81.
14. Lee MH, Graham GG, Williams KM, et al. A benefit-risk assessment of benzbromarone in the treatment of gout. Was its withdrawal from the market in the best interest of patients? *Drug Saf*. 2008;31(8):643–665.
15. Havlik J, de la Huebra RG, Hejtmankova K, et al. Xanthine oxidase inhibitory properties of Czech medicinal plants. *J Ethnopharmacol*. 2010;132(2):461–465.
16. Gainche M, Ogeron C, Ripoche I et al. Xanthine oxidase inhibitors from Filipendula ulmaria (L.) maxim and their efficient detections by HPTLC and HPLC. *Analyses*. 2021;26(7):1939–1947.
17. Crone C, Lassen UV. Mechanism of increased renal urate excretion during administration of salicylic acid. *Acta Pharmacol Toxicol*. 1955;11(4):362–366.
18. Oliviero F, Scanu A, Zamudio-Cuevas Y, et al. Anti-inflammatory effects of polyphenols in arthritis. *J Sci Food Agric.* 2018;98(5):1653–1659.
19. Shi Y, Williamson G. Quercetin lowers plasma uric acid in pre-hyperuricaemic males: a randomised, double-blinded, placebo-controlled, cross-over trial. *Br J Nutr Mar*. 2016;115(5):800–806.
20. Chen Y, Zhao Z, Li Y, et al. Baicalein alleviates hyperuricemia by promoting uric acid excretion and inhibiting xanthine oxidase. *J Phytomedicine.* 2021;80:153374.

Citation: Vereschagin EI. Is it possible to correct the level of uric acid with the help of herbal preparations? *J Nutr Health Food Eng.* 2022;12(1):37–39. DOI: 10.15406/jnhfe.2022.12.00353