



25. HRVATSKI SKUP KEMIČARA I KEMIJSKIH INŽENJERA  
s međunarodnim sudjelovanjem  
3. simpozij „VLADIMIR PRELOG“  
19.-22. travnja 2017.  
Poreč, Hrvatska



Poreč, 2017.

**HSKIKI**

25<sup>th</sup> CROATIAN MEETING OF CHEMISTS AND CHEMICAL ENGINEERS  
with international participation  
3<sup>rd</sup> symposium “VLADIMIR PRELOG”  
19-22 April 2017  
Poreč, Croatia

Knjiga sažetaka  
Book of abstracts

A background image showing laboratory glassware, including a graduated cylinder and a beaker, with water splashing and bubbles. The image is overlaid with a semi-transparent white box containing the text 'Knjiga sažetaka' and 'Book of abstracts'.



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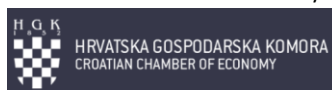
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**The influence of amino acids relevant for pathological biomineralization on the precipitation of calcium oxalate monohydrate**  
**Utjecaj aminokiselina relevantnih za patološku biomineralizaciju na taloženje kalcijeva oksalata monohidrata**

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Urolithiasis, a form of pathologic biomineralization, is a disease which causes the formation of urinary stones in different parts of kidney or bladder [1]. Recently, increasing number of kidney stones in industrial countries is observed and the interest of scientists to explain their pathogenesis with a special focus on calcium oxalate stones is renewed. Calcium oxalates crystallize in the form of hydrated salts: thermodynamically stable calcium oxalate monohydrate (COM, CaC<sub>2</sub>O<sub>4</sub>·H<sub>2</sub>O, whewellit) [2,3] and metastable dehydrate (COD, CaC<sub>2</sub>O<sub>4</sub>·2H<sub>2</sub>O, weddellit) [4,5], and trihydrate (COT, CaC<sub>2</sub>O<sub>4</sub>·3H<sub>2</sub>O) [6,7]. The kidney stones formation under biological conditions can be triggered by various metabolic disorders such as: hiperkalciuria, hypocitraturia, hiperoksalurija, and the change in the urine acidity. The mechanisms and the conditions under which they crystallize are still not completely clarified.

In this work, the spontaneous precipitation and characterization of calcium oxalate monohydrate under conditions of hiperoksalurija is reported. The experiments were conducted in a simple model system and with the addition of amino acids reportedly important for pathologic biomineralization [8,9]. The precipitations were carried out with solutions  $c_i(\text{Ca}^{2+}) = 7.5 \times 10^{-3} \text{ mol dm}^{-3}$  and  $c_i(\text{C}_2\text{O}_4^{2-}) = 6.0 \times 10^{-3} \text{ mol dm}^{-3}$ . The amino acids selected for the addition are often found in the urine of healthy people and in the organic matrix which is an integral part of kidney stones.

The reactant solutions were mixed under controlled hydrodynamic and thermodynamic conditions. Changes in the composition and morphology of precipitated calcium oxalate monohydrate were observed by means of PXRD, EPR, SEM, IR and TGA.

## References

- [1] B. Hess, R.L.R., J. Kavanagh, S.R. Khan, D.J. Kok, A.L. Rodgers and H.G. Tiselius, *Eur. Urol.* **40** (2001) 220-230.
- [2] Lj. Brečević and D. Kralj, *J. Cryst. Growth* **79** (1986) 178-184.
- [3] Lj. Brečević, D. Kralj and J. Garside, *J. Cryst. Growth* **97** (1989) 460-468.
- [4] C. Conti, M. Casati, C. Colombo, M. Realini, L. Brambilla and G. Zerbi, *Spectrochim. Acta A* **128** (2014) 413-419.
- [5] P. Brown, D. Ackermann and B. Finlayson, *J. Cryst. Growth* **98** (1989) 285-292.
- [6] D. Škrtić, M. Marković, Lj. Komunjer and H. Füredi-Milhofer, *J. Cryst. Growth* **66** (1984) 431-440.
- [7] D. Škrtić, H. Füredi-Milhofer and M. Marković, *J. Cryst. Growth* **80** (1987) 113-120.
- [8] K. Kohri, M. Takada, Y. Katoh, K. Kataoka, M. Iguchi and T. Kurita, *Int. Urol. Nephrol.* **21** (1989) 9-16.
- [9] S.S. Atanassova, P. Panchev and M. Ivanova, *Amino Acids* **38** (2010) 1277-1282.