

The Serbian Society for Ceramic Materials  
The Academy of Engineering Sciences of Serbia  
Institute for Multidisciplinary Research - University of Belgrade  
Institute of Physics - University of Belgrade  
Vinča Institute of Nuclear Sciences - University of Belgrade



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# **PROGRAMME AND THE BOOK OF ABSTRACTS**

**3<sup>rd</sup> Conference of The Serbian Society for  
Ceramic Materials**

**June 15-17, 2015  
Belgrade, Serbia  
3CSCS-2015**

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## **INSECTICIDE EFFECT OF ALUMINA POWDERS AGAINST BEAN WEEVILS**

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Alumina powders synthesized by combustion method were applied on uninfested grains of bean to examine their insecticide effect against bean weevil (*Acanthoscelides obtectus*). Effects of pH value (6, 8 and 10) of the precursor solution, as well as citric/nitric molar ratio (0.5, 0.8 and 1.2) on the powder properties were observed. XRD analysis of the samples calcined at 1200 °C for 1 h showed only the presence of  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> phase. SEM analysis revealed difference between the samples in respect to particle size, which varied from nano- and submicron size to characteristic rectangular particles of several  $\mu$ m and larger. The powder obtained from the solution with the pH value of 10 had the highest content of submicron and nanosized particles. Mortality rate of both male and female insects after seven days of exposure was the highest right for this sample, indicating that the particle size has the greatest influence on insecticide properties of alumina powders. Thus, by increasing the pH of the precursor solution it is possible to prevent higher degree of particles agglomeration. The lowest insecticide efficiency of the powder synthesized at pH = 6 can be prescribed to a weak chelating effect of the citric acid that allowed higher coarsening rate of the particles. When it comes to citric/nitric molar ratio at pH = 8, it had no significant effect on mortality rates, which were higher for male insects in general, while a slight efficiency trend was observed towards fuel lean region, i.e. when the ratio was  $\leq 0.8$ .