

European Chemistry Congress

June 16-18, 2016 Rome, Italy

Promotion of sorghum hybrids bran grown in Southern Italy for PHB ecological production by *Sphingomonas cynarae*

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Sorghum is one of a major crop used for food, feed and industrial purposes worldwide. As such it has the potential to be a valuable source of biomaterials. Kafirin, the storage protein of sorghum, can form biodegradable plastic films. However, producing the plastic from sorghum protein could be very expensive and time consuming. A cheaper alternative would be to produce biodegradable plastics from starch present in the bran of sorghum grains. Over the last years the environmental impact of plastic waste on the ecosystems represents a critical problem. Bacterial poly-3-hydroxybutyrate (PHB) is an ecological alternative. Food industry waste represents a sustainable medium for bacterial growth and PHB production. We are interested in producing PHB by bacteria grown in the presence of sorghum bran. Our preliminary studies focused on the use of the bran of sorghum hybrids grown in South of Italy as medium for *Sphingomonas cynarae* cells in order to produce PHB. The mean composition of these brans consisted of about 28% starch, 14% protein and 3% fat. The bran powder was resuspended in water (1:10 w/v) and autoclaved to make available the starch. Primarily, we detected the amylase activity of *S. cynarae* by plating methods. Transmission electron microscopy (TEM) analysis has confirmed the PHB accumulation in the cells and it was recovered by high pressure homogenization. The yield was approximately of 0.6 g/L. To our knowledge, this is the first report describing the production and green-recovery of PHB by *S. cynarae* utilizing sorghum bran as a nutritional source.

Biography

Roberta Romano graduated cum laude in Biotechnological Sciences at University of Salento in 2012. She worked as external collaborator for Eggplant srl, conducting her research in the production and green-recovery of PHB from olive mill wastewater using *Azotobacter vinelandii*. This activity was published in the *Journal of Life Sciences* with the title "Complete valorization of Olive Mill Wastewater through an integrated process for poly-3-hydroxybutyrate production". She also conducted research at the Laboratory of Biochemistry and Microbiology of the University of Salento and worked in the Del Giudice's lab of the University of Naples analyzing the properties of various sorghum hybrids.

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