EXTRACTION AND SOLUBILIZATION OF HUMAN HAIR KERATIN FROM HAIR CUT WASTE

Hari Har Parshad Cohly¹, Rahul Thomas² and Raj Kumar²

¹Department of Biology, Jackson State University, Jackson, MS 39217, USA
²Dayalbagh Educational Institute, Dayalbagh, Agra, India

Abstract: Hair dressers usually discard the excess hair after a haircut. The purpose of this investigation is to use human hair cut waste as a source of keratin. The harvested keratin can be solubilized and its amino acids like lysine can be used for agricultural purposes for legume growth. Since lysine is not manufactured one must acquire it from food or supplements. Amino acids like lysine are the building blocks of protein. Lysine is essential for converting fatty acids into energy and helping to lower cholesterol. Lysine appears to help the body absorb calcium, and it plays an important role in the formation of collagen. Lysine content of hair keratin is approximately 7%. Hair keratin is very sturdy and very difficult to solubilize as the hair keratins are held together by cysteine rich amino acids. Hair keratins are considered the world’s second most difficult protein and is only surpassed by the insoluble plaques observed in Alzheimer patients. The extraction procedure proceeds by breaking non-covalent bonds with 10% NaCl by mechanical disruption via grinder. We would then incubate the mixture of dry powder with a solution containing Al + NaOH (10%) + Boric Acid (10%) to produce sodium borohydride to be directly used to solubilize hair keratin in a clear glass bottle. Evidence for the effectiveness of solubilization is that black hair keratin is completely solubilized into a black solution. In order to bleach ZnCl₂ (10%) was added to the solubilized hair keratin. The solubilized hair keratins acquired a red pigment. Hair keratin completely solubilizes with sodium chloride and is reduced by sodium borohydride treatment. Hair keratin can be extracted via solubilization by utilizing sodium chloride. This is then followed by the reduction of cysteine using sodiumborohydride treatment. This novel extraction procedure is able to provide lysine. Therefore, we propose that the discarded hair material may be used to augment agriculture and enhance legume growth to supplement a vegetarian diet.