



Sustainable Use of Chicken Feather Wastes to Produce Innovative NanoBioComposites for Multiple Applications

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- **Chicken feathers are waste products of the poultry industry. Tons of feather wastes are generated every year by commercial poultry processing plants creating a serious **solid waste management** problem in many cities including **Bangalore**.**
- **Traditional disposal strategies of chicken feathers include incineration, burial in landfills or recycling into low quality animal feed (Kelly *et al.*, 2006).**
- **These disposal methods are expensive, difficult and generate green house gases or **pose danger to the environment**.**

- Several commercial applications have been explored to produce fibers/wool from chicken feather wastes for multiple uses.
- However, due to the low volume requirements of these fiber products, they had not significantly reduced the volume of feathers generated each year (Hernandez and Krochta, 2008).
- Hence, there is a need to explore innovative ways to utilize chicken feather wastes into a novel materials such as **NanoBioComposites** which would widen their potential applications in various fields.

Multiple potential uses of chicken feather fiber/ wool



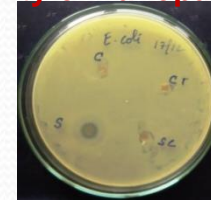
Optimization of methods for large scale processing



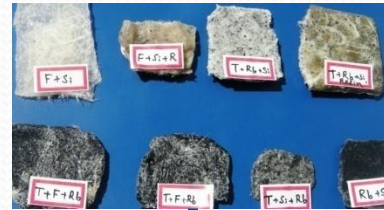
Preparation of eco-friendly silver nanoparticles
(Jancy and inbathamizh, 2012)



Testing for Antibacterial activity of nanoparticle



Grafting of NanoBioComposites sheets using feather/ wool, adhesives and nanoparticles



Moulding of NanoBioComposites into the required shape



Technical Process flow depicting the development of keratin waste based innovative products :

Future considerations for making good uses of Keratin Wastes

- As feather waste is an abundantly available and inexpensive natural source of keratin (90% protein),
 - the production biodegradable byproducts from these wastes with an innovative technology is the best way to make the good use of environmental pollutant/landfills which have posed serious challenges to the local administration.
- Optimization of methods for large scale processing of keratin based animal wastes ensures efficient utilization of solid wastes and safe environment.
- Establishment of keratin based waste processing plants locally.



➤ Similar potential applications of other animal derived keratin-based wastes such as hoof, wool, nail, hair, fish-scales generated in slaughter houses need to be explored.

➤ Development of durable and low cost innovative keratin-based products such as **NanoBioComposite** protective cow slips in animals and footwear materials in humans ensures the sustainable use of animal derived keratin wastes.



THANK YOU