Development of micro/nano anacardic acid from cashew nut waste as an effective alternative to synthetic food preservatives

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Project Objectives

- To formulate anacardic acid in the form of micro/nanoencapsule using various compositions of Polyethylene glycol (PEG)
- To investigate the biocompatibility and bioactivity of encapsulated anacardic acid and its effects on food borne microorganisms
- To study the impact of micro/nano-anacardic acid as preservatives in the food system
- To assess the up-regulation and down-regulation of the proposed micro/nano-anacardic acid in food borne pathogens

Description

Food preservatives are substances added to food, to increase the shelf life and inhibit the growth of microorganisms. Research studies have described the hazardous effects of chemical preservatives on human lymphocytes, mice and rats and their resistance towards food borne pathogens. This research work emphasis the extraction of anacardic acid and its application as food preservatives, to replace the synthetic preservatives. Anacardic acid was extracted from the cashew nut liquid, which was confirmed and estimated by HPLC. The cashew nut liquid showed about 71-75% of anacardic acid. Then the extract was subject to determine antibacterial and antioxidant property. The extract showed potent antioxidant property and antibacterial activity, whereas against *E. coli*, *Listeria monocytogenes*, *Streptococcus faecalis*, *Salmonella typhi* and *Shigella boydii.* Due to potent biological acitivity of anacardic acid, it was subjected for preparation for packaging material to preserve various food systems. Packing materials was prepared with extracted anacardic acid along with different combination of polymers, chitosan alone, chitosan: gelatin: carboxymethyl cellulose, and chitosan:gelatin. Different concentration of anacardic acid (10mg, 15 mg and 20mg) was used in the packaging material to determine the anti-browning effect on the apple. Among all the concentration showed preventing the browning effect on apple, but 20mg of anacardic acid in the chitosan based packing material showed better results than the other. Hence, based on the preliminary study the concentration of anacardic acid was optimized to 20mg/100ml of polymer solution and the same was continued for further study. Simultaneously, anti-mold studies on bread were conducted, all the concentration of anacardic acid containing chitosan packing film showed anti-mold activity. Among various combinations of polymers, chitosan along with 20mg of anacardic acid proved to be an excellent packing material. The encapsulated anacardic acid in packing material will elicit changes in the food preservation that replace and reduce the risk of synthetic preservatives.