

Title of the Project: Development of Extended Storage Life Functional Meat Products by Incorporating Bioactive Phyto-extracts

Funding Agency: University Grant Commission, New Delhi

Name & address of the Principal Investigator: Dr. Pavan Kumar, Dept. of Livestock Products Technology, College of Veterinary Sciences, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana – 141004, India

Co-Principal Investigator: Dr Manish K. Chatli
Prof-cum-Head, Deptt of LPT

Tenure of the Project: 3 years w.e.f. 1.07.2015

Total Grant Received: 12,10,000/-

Achievements of the project

- In the present study, processing protocols for extraction of bioactive compounds from plant sources were optimized. These phyto-extracts have strong antioxidant and antimicrobial properties and have potential to be used as novel alternative to synthetic preservatives added during preparation of processed meat products.
- Process protocols were standardized for extraction of bioactive ingredients from cinnamon bark (90% ethanol at 60°C temperature for 9 h), *aloe-vera* powder (90% ethanol at 65°C for 15 min), watermelon rind powder (absolute alcohol at 25°C for 24 h at 200 rpm), oregano leaves (60% ethanol at 80°C for 10 min), papaya leaves and licorice roots (60% ethanol at 65°C for 15 min) and arjuna tree bark (60% ethanol at 75°C for 10 min).
- During development of meat products, 0.25% cinnamon bark extract, 0.40% aloe-vera powder extract separately in chevon rolls, 0.50% licorice root extract and 1.0% arjuna tree bark extract, 1.0% oregano leaves extract and 0.50% papaya leaves extract separately in pork nuggets, 0.10% watermelon rind extract in pork patties were found optimum based on various physico-chemical, proximate and sensory parameters.

- The incorporation of extract extended the storage life of meat products under both aerobic and modified atmosphere packaging such as chevon rolls (28 days in AP, 35 days in MAP), pork nuggets (20 days in AP, 35 days in MAP), pork patties (35 days in AP).
- There had been marginal increase in cost of production by using these extracts (Rs 14 per kg for aloe vera, Rs 18 per kg for cinnamon bark, Rs 3 per Kg for licorice root), but by considering the overall benefits associated with extended storage life, functional value, it would be very economical to meat industry

Summary of the findings

Process protocols were standardized for extraction of bioactive ingredients from cinnamon bark (90% ethanol at 60°C temperature for 9 h), *aloe-vera* powder (90% ethanol at 65°C for 15 min), watermelon rind powder (absolute alcohol at 25°C for 24 h at 200 rpm), oregano leaves (60% ethanol at 80°C for 10 min), papaya leaves and licorice roots (60% ethanol at 65°C for 15 min) and arjuna tree bark (60% ethanol at 75°C for 10 min).

During development of meat products, 0.25% cinnamon bark extract, 0.40% aloe-vera powder extract separately in chevon rolls, 0.50% licorice root extract and 1.0% arjuna tree bark extract, 1.0% oregano leaves extract and 0.50% papaya leaves extract separately in pork nuggets, 0.10% watermelon rind extract in pork patties were found optimum based on various physico-chemical, proximate and sensory parameters.

The incorporation of extract extended the storage life of meat products under both aerobic and modified atmosphere packaging such as chevon rolls (28 days in AP, 35 days in MAP), pork nuggets (20 days in AP, 35 days in MAP), pork patties (35 days in AP). The phyto-extract incorporation resulted in marginally increase in the cost of production, but considering approximately 7 days extension in storage life would be very beneficial for meat industry.