

DESIGN AND DEVELOPMENT OF AN EFFICIENT SMOKER FOR BEE KEEPING INDUSTRY IN SRI LANKA

M.P. Charithangi¹, M. Rambanda¹, I.K. Atapaththu², S.A.M.C. Samarakoon¹
and D.P.L. Perera¹

¹*Department of Agricultural Engineering and Soil Science, Faculty of Agriculture, Rajarata University of Sri Lanka, Puliyankulama, Anuradhapura*
²*Bee Development Unit, Department of Agriculture, Bindunuwewa, Bandarawela*

The maintenance of honey bee colonies, commonly in hives by human is called bee keeping or apiculture. Often, bee keepers use a smoker to calm the bees before opening the hives. The purpose of smoking is to reduce their activity level and to reduce the chance of bee keepers being stung by bees. This study was conducted to introduce an efficient and convenient electrical bee smoker for bee keeping industry. Major components of the designed bee smoker were smoke generating unit, smoke blowing unit and power supply unit. Total weight of the bee smoker was 1.1 kg. Total cost of the machine was about 2,000 LKR. The special feature of this smoker was the ability to control the smoke flow rate according to the requirement. Performance of electrical bee smoker (T_1) was evaluated with the manually operated bee smoker (T_2) using skilled bee keepers. Satisfaction level of bee keepers about functional performance of smokers, was also tested. Non-parametric data were analyzed using Friedman test. According to the satisfaction level of bee keepers, a significant difference ($p < 0.05$) was observed between functional performance of T_1 and T_2 . Based on satisfaction level of bee keepers about behaviours of bees, there was no any significant difference between T_1 and T_2 . Overall satisfaction of the new machine revealed that 73% of bee keepers were satisfied. Smoke emission rate, firing time of smoker fuel and amount of impurities released from outlet were compared with the manual machine. Results of T_1 were $1.03 \text{ m}^3 \text{ min}^{-1}$, 34.33 minutes and 0.26 g, respectively. But results of the T_2 were $0.13\text{-}3.73 \times 10^{-5} \text{ m}^3 \text{ min}^{-1}$, 17.67 minutes and 1.29 g, respectively. According to the results of this study, it can be concluded that the newly designed electrical bee smoker is efficient and convenient for use in apiculture.

Keywords: Bee keeping, Bee smoker, Electrical smoker