

## Moisture Removal of Katuwelbatu Fruit (*Solanum virginianum L.*) by Heat Pump Drying with Different Temperature Treatments

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### Abstract

*Katuwelbatu (Solanum virginianum L.)*, is a commonly found prickly herb in most of the Asia and used as a valuable indigenous medicine. In Sri Lankan condition, *Katuwelbatu (Solanum virginianum L.)*, a medicinal plant mainly used for colic fever, loss of appetite and in the treat itching, fever, cough and cold etc. Different pre-treatment methods are used to increase the drying rate of *Katuwelbatu* fruits when drying using heat pumps. This research study was focused to identify the most suitable pre-treatment condition for heat pump drying of *Katuwelbatu* fruit in different temperature treatments. Hot air drying and Hot water blanching pre-treatment method were conducted at 40°C, 60°C and 80°C (3minutes) temperature, respectively. The experiment was conducted in completely randomized design with three replicates. Pre-treated *Katuwelbatu* samples (30g) were dried in a heat pump dryer for 142.6 hours. The drying characteristics and colour variation ( $\Delta L$ ,  $\Delta a$ ,  $\Delta b$ , and  $\Delta E$ ) of the *katuwelbatu* fruits were analysed. Dehumidify room conditions were monitored by recording relative humidity and temperature data by a data logger during research time period. The initial moisture content of fresh and pre-treated fruit samples was 80 % $\pm$ 1 (wb). The 80°C hot water treated sample had the lowest final moisture content of 50 % $\pm$ 1 (wb) while other sample had final moisture content of 70%-75% (wb). The values of the drying constant of control, 40°C hot water and hot air treated, 60°C hot water and hot air treated and 80°C hot water and hot air treated were -0.0015,-0.0016,-0.0014,-0.0018,-0.0016, -0.007 and -0.0017, respectively. The colour changes of 80°C hot water treated sample obtained more closer to the reference colour (golden brown) value ( $\Delta L=12.86$ ,  $\Delta a=-2.87$ ,  $\Delta b=10.67$ ,  $\Delta E=16.95$ ) for *Katuwelbatu* fruit. The statistical analyses indicated that 80°C hot water treated sample moisture content was significantly different ( $P < 0.05$ ) than that of pre-treated samples. The results suggest that the 80°C hot water treatment increases the drying rate of *Katuwelbatu* fruits in heat pump drying.

**Keywords:** Drying, Heat pump, *Katuwelbatu (Solanum virginianum)*, Pre-treatment

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