

## **Preparation of apple powder as a value added product**

Master Thesis at the Section of Agricultural Engineering

1. examiner: Dr. Barbara Sturm
2. examiner: Prof. Dr. Oliver Hensel

Presented by: Luna Shrestha

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### Abstract

The influence of different pre-treatments and drying air temperature on produce quality and drying behaviour of apples was investigated in three section of experiment. Firstly, the interaction of drying air temperature (50°C and 70°C), hot water blanching and use of acids in combination with hot water blanching pre-treatments with moisture content, colour changes and hyperspectral imaging were measured continuously. Based on these results, the effect of ascorbic and citric acid in combination with 50°C blanched slices dried at 70°C had significant influence based upon the overall size of slices, colour and drying rate. However, the results from the second experiment were contradictory with the first experiment while producing apple powder. These variations were assumed due to the last harvested apples differing in the structure itself, influence of scale up process and also divergence in controlling system of dryer in two places (Agrartechnik- first experiment and Innotech- second experiment). Furthermore, it was shown from the third experiment; the effect of waiting time prior to drying with acids blanched pre-treatment leads to negative impact on quality. As such the longer the processing duration- the greater the change in quality was accomplished. Thus, it was found that if the process is anticipated with the consideration of such negligible factors that is, the effect of waiting period prior drying; undesirable degradation can be minimized to produce a good quality product. Additional, hyperspectral imaging system were applied that showed a good fitness model to predict moisture and colour of dried apples. Moreover, analysis of apple powder reflects acceptable quality in both pre-treatments since no significant difference was found in water activity, total phenol content and bulk density. Therefore, a control of processing parameters during drying and performing simulations using accurate kinetic parameters can contribute to the optimization of the process for quality product output.

A study on the socioeconomic investigation of apple farmers was conducted in two important District of Nepal during March and April, 2015. The aim of the study was to

identify the trends of apple cultivations in two study area and to address for equitable economic development of the people living in two districts (its impact on the socioeconomic development of people living in two districts). Information was collected through the semi-structured method and personal interviews during field trips. Respondents were selected based on those involved in apple cultivation or apple product development. Among two districts, Jumla district was observed to be highly indulged in apple cultivation and its product diversifications whereas Mustang is known as apple kingdom due to the quality of apples profound. Nevertheless, people in both districts are highly inspired to cultivate more orchards and to produce more products to reach the town. The accessibility of road way is of great importance in supporting people's healthcare, income and stabilization. In spite of deprived of many infrastructures, farmers are ready to adopt any feasible technology to produce apple products so that local commodity could be promoted which parallel enhances the livelihood. Efficiently more apples cultivation and diversifying into many different products would take a competitive market share meeting the customer needs with related economic criteria. Thus, apple products (viz.apples powder) could be unique feature to reduce losses that ultimately offers a chance to people living in those pocket area of Nepal for the economic stability.