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Evaluation of the technical performance of root crop processing machines for sweetpotato grates and flour production

D. L. S. Tan[1], K. Miyamoto[2], K. Ishibashi[3], K. Matsuda[4], T. Satow[5]

[1]Philippine Root Crop Research and Training Center, Leyte State University, Baybay, Leyte, Philippines, [2,4,5] Laboratory of Agricultural Machinery, Department of Agro-environmental Science, Obihiro Univ. of Agriculture and Vet. medicine, 11 Nishi-2, Inada-cho, Obihiro 080-8555, Japan, and [3] Laboratory of Food Technology, Department of Bioresource Science, Obihiro Univ. of Agricultureand Vet. Medicine, 11 Nishi-2, Inada-cho, Obihiro 080-8555, Japan

ABSTRACT

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The performance of the root crop processing machines used in the production of sweetpotato grates and flour was determined. The machines included the Philippine Root Crop Research and Training Center (PhilRootcrops) pedal-operated root crop chipper/grater, hydraulic presser, spinner, motor-operated attrition grinder, flour finisher, and cross-beater mill. Each machine was evaluated based on the following parameters: operating power with and without load, revolution per minute (rpm), capacity, fineness modulus, dimensions of chips and grates, and percent recoveries.

The chipping capacity of the (PhilRootcrops) Chipper/Grater increased as the blade rpm increased (350 to 650 rpm), together with the amount of crumbs present in the chips, but the average weight of the chips decreased. On the other hand, the grating capacity increased and the fineness modulus of the grates decreased with an increase in blade rpm at the same rpm range. The grating operation had the most pronounced power fluctuation among the operations evaluated. Pressing the grates using the hydraulic presser at 5 kg loading rate reduced the moisture content level of grates from more than 60% to about 50%. Using the spinner of the washing machine, the moisture removed from grates was almost the same as that of the hydraulic presser although longer in time. The power required in running but the starting power increased as the load was increased, while the rpm of the spinner was alsothe same at different loads. The attrition grinder had a stable power fluctuation even in any kind and amount of material loaded to the hopper, but had the highest energy

requirement among the machines evaluated. Average diameter of the fine flour produced after grinding the coarse flour was larger than the fine flour of the first grinding. The finisher, in separating the fine from the coarse flour, had the least amount of net power among the machines evaluated. Using the cross-beater mill, the power requirement in milling the different kinds of materials varied with the small sized Shiro satsuma chips and the cassava grates recording the highest and lowest power, respectively, among the materials evaluated.

Keywords: sweetpotato, grates, chips, flour, root crop processing machines

Correspondence: D. L. S. Tan. *Present Address:* Philippine Root Crop Research and Training Center, Leyte State University, Baybay, Leyte 6521-A, Philippines. *Tel. No*. (053) 335-2616.