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Dehydration temperature- effect on physicochemical and nutritional characteristics of byproducts

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The aim of this work was to test the dehydration conditions of sweet potato (SP) and carrot (C) wastes and tomato pomace (TP) with temperature and air speed control for use as animal feed. The effects on colour, water activity (a_w), chemical and nutritional composition and cost were evaluated. Carrot was dehydrated at 60, 70 and 80 °C and SP and TP were dehydrated at 70 and 80 °C. Dehydration was conducted until weight loss stabilized. Freeze-dried samples were used as Control for chemical and nutritional composition. Except SP at 70 °C the moisture in all samples was reduced to values below the critical limit that ensures microbial stability. In SP dehydrated at 70 °C the value was 0.7% above the critical limit. However, all samples had a low a_w (≤ 0.35), which suggests microbiological and chemical stability. Organic matter digestibility was not affected by temperature but in SP, starch was significantly reduced (24, 19 and 13% in dry matter in Control, 70 and 80 °C, respectively). The energy cost to process 1 kg of fresh by-products was lower at 60 °C for C (€0.39-0.44), 70 °C for SP (€0.51-0.57) and 80 °C for TP (€0.80), assuming an electricity cost of €0.15/kWh. With these dehydration conditions, it is possible to ensure product stability at a lower cost. In an industrial setting, process, costs can be reduced by increasing the scale of production and with more efficient dehydrators. This work is funded by PRD2020 through the FEADER, project SubProMais (PDR2020-101-030991, 030988, 030993) and by National Funds through FCT-Foundation for Science and Technology projects UIDB/05183/2020 (MED) and UIDP/CVT/00276/2020 (CIISA).