EFFECTS OF EXTRACTIVE PRETREATMENTS ON COMPOSITION OF DRUM-DRIED BEAN MEAL

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Introduction

Antinutritional and flatulence factors which interfere with protein digestibility, limit wider utilization of dry edible beans as a major source of protein. Various processing strategies to eliminate these factors include soaking, extractive pre-treatments, germination, dehulling and different cooking and drying methods. Advantages of drum-dried beans meals are: utilization of split and culled beans, selective extracts, pre-cooked readily hydrated nutritious product, controlled product consistency and a versatile ingredient for product formulations. The objectives of the study were: a) to develop hot water/steam extraction pre-treatments, b) produce drum-dried bean meals and c) establish compositional differentiation between the two techniques.

Method

Whole dry navy beans (*Phaseolus vulgaris*) soaked and hydrated for 16 hrs. (25°C) were subjected to either hot water (HW) (40°F/60 mins.) or steam (S) extraction (212°F/15 mins). Control (C) beans contained all original soak and rinse waters, cook water or condensate prior to milling to a homogeneous slurry with a Fitzmill (0.03 inch mesh screen), whereas leachate of extracted (E) beans was replaced with fresh formulation water. Heated bean slurries were dried using a 12" x 19 1/8" single drum-dryer. The drum-dried bean meals were analyzed for proximate composition (moisture, protein, fat and ash), total soluble sugars (Agbo 1982), soluble and insoluble dietary fiber (Prosky et al., 1988; AOAC, 1990), total mineral content (Plasma Emission Spectrometry) and color (Hunter Lab Color Meter Model D25-PC2).

Results

The extractive methods had no significant influence on total protein and dietary fiber contents of the drum-dried bean meals (Figs. 1 and 2). Hot water extraction resulted to significant reduction in crude ash, total minerals and soluble sugars (Figs. 3 and 4) due to leaching. The oligosaccharides raffinose and stachyose, of particular interest due to its association with flatulence, were significantly reduced.
The drum-dried bean meals possessed neutral color (Figs. 5 and 6) and bland flavor, with the extract bean meals having a significantly lighter color. The potential of the drum-dried bean meals for weaning food formulations warrants further study.

REFERENCES


