

Determination of functional properties of cocoa waste from concentrated cocoa drink

ABSTRACT

Recovery of phenolic content from waste is one of the main concerns for any possible applications. This study was done to investigate and explore the functional properties of cocoa waste (CW) from espresso cocoa production. The total phenolic content (TPC), total flavonoid content (TFC), 2,2-diphenyl-1-picrylhydrazyl scavenging assay (DPPH), metal (Fe²⁺) chelating activity was determined. Parameters include water holding capacity (WHC), oil holding capacity (OHC), swelling capacity (SWC), proximate compositions, total dietary fiber (TDF), insoluble dietary fiber (IDF) and soluble dietary fiber (SDF) were also determined. As a reference spent coffee ground (SCG) was also studied under all parameters. Two solvents, ethanol and water were used to extract the bioactive compounds from CW. The ethanol-CW extract was found to contain significantly the highest ($p < 0.05$) TPC and TFC with 52.3 mg GAE/ml sample and 84.36 mg Quercetin/ml sample respectively. This was correlated to its high ($p < 0.05$) antioxidant activities in DPPH ($IC_{50} 3.58 \pm 0.07$ mg/ml) and metal chelating activity ($IC_{50} 2.32 \pm 0.09$ μ g/ml). Positive correlations ranging from $r^2 = 0.82$ to 0.98 were established between the phytochemicals and antioxidant activities of all extracts. All samples displayed significantly ($p < 0.05$) high WHC and SWC, in relevance to their high ($p < 0.05$) TDF which were over 60% of 100 g dry matter. CW exhibited significantly high ($p < 0.05$) IDF/SDF ratio, in contrast to SCG with also high protein content of 13%. This study indicates that CW has a potential as a source of natural antioxidant and phytochemical in functional food development and intermediate food ingredient.

Keyword: Cocoa waste; Spent coffee grounds; Antioxidant; Ethanol extract; Water extract