Some physicochemical and functional properties of pea, chickpea and lentil whole flours

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Abstract

The objective of this study was to evaluate the Physicochemical and functional properties of whole flour legumes. Phenolic content, flavonoid content and antioxidant activity of pea, chickpea and lentil flours were evaluated. The physicochemical and functional properties of their whole flours were determined. Lentil had the highest phenolic content and the highest antioxidant activity, followed by pea end chickpea. The proximate composition of the three legumes was comparable. The three flours had good functional properties. Thus, the study indicated that pea, chickpea and lentil whole flours would have great potential in various food applications.

Keywords

Whole legume flours
Polyphenols
Antioxidant
Functional properties
Potential

Introduction

Legumes are produced and consumed widely throughout the world (Tharanathan and Mahadevamma, 2003). They are vital food resources which contribute to the nutritional wellbeing of diverse human diets (Uebersax and Occen, 2003). Dry Legumes or pulses are the edible seeds of plants in the legume family and include dry bean, pea, lentil and chickpea. The term pulses excludes grain legumes used for oil extraction (soybean, peanut) and those harvested green (green pea, green bean) (McCrory et al., 2010). Legumes are recognized for their superior nutritional profile as they are low in fat, high in protein, high in dietary fiber and a source of micronutrients and phytochemicals. Their nutritional characteristics have been associated with a reduction in the incidence of various cancers, LDL cholesterol, type-2 diabetes and heart disease (Bassett et al., 2010; Roy et al., 2010; Cryne et al., 2012). Although, total human food consumption of legumes globally has risen over the last four decades, this has been driven primarily by population growth. Unfortunately, Global average per capita consumption of legumes is on the decline (Watts, 2011). Finding new uses and creating new demand is critical to the success of the legume industry. New demand will come mainly from a sea-change of focus from marketing legumes as commodities to highlighting and promoting their use as higher value food ingredients. As consumers have become increasingly discriminating and health conscious, they are demanding tasty and convenient food products that provide additional nutritional and health benefits (Bassett et al., 2010). The food processing industry is increasingly interested in the potential to incorporate novel ingredients, such as legumes, into food products for nutritional purposes, including their high protein and fiber content, gluten-free status, low glycemic index, antioxidant levels, as well as functional properties like water binding and fat absorption. Health and nutrition present an enormous opportunity for the legume sector in coming years (Watts, 2011). A need exists for up-to-date information on novel and emerging technologies for the processing of whole legumes, techniques for fractionating legumes into ingredients, and the functional and nutritional properties of legumes and legume fractions, as well as novel and potential applications (Bassett et al., 2010).

Several studies on legumes have been conducted (Khattab et al., 2009; Sreerama et al., 2012a; Sreerama et al., 2012b; Wani et al., 2013). While few works on local legumes (Algeria) have been reported, Such as composition (Amir et al., 2007) and therapeutic effects (Boudjou et al., 2013). There is, however, no information on the physicochemical and functional properties of Algerian legume flours. On the other hand, many studies have been conducted on functional properties of whole legume

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