Critical Evaluation of Coffee Pulp as an Innovative Antioxidant Dietary Fiber Ingredient: Nutritional Value, Functional Properties and Acute and Sub-chronic Toxicity

Silvia Cañas, Miguel Rebollo-Hernanz, Paz Cano-Muñoz, Yolanda Aguilera, Vanesa Benítez, Cheyenne Braojos, Andrea Gila-Díaz, Pilar Rodríguez-Rodríguez, Ignacio Monedo Cobeta, Ángel L. López de Pablo, M. Carmen González, Silvia M. Arribas and Maria A. Martin-Cabrejas

UAM
Universidad Autónoma de Madrid

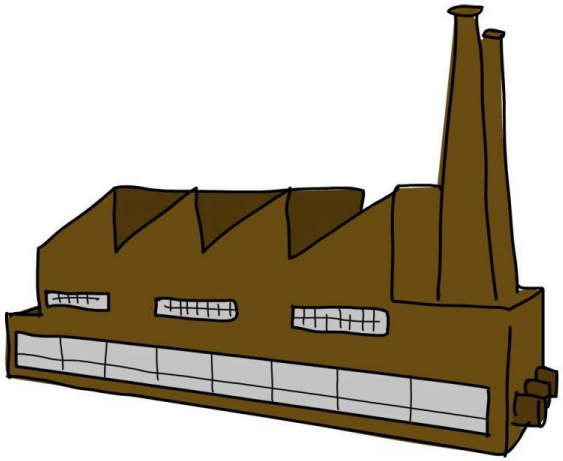
FACULTAD DE CIENCIAS
UNIVERSIDAD AUTÓNOMA DE MADRID

Facultad de Medicina

CIAL
INSTITUTO DE INVESTIGACIÓN EN CIENCIAS DE LA ALIMENTACIÓN

INTRODUCTION

The coffee processing industry produces high quantities of by-products every year, causing enormous economic and environmental problems when they are discarded to rivers.



INTRODUCTION

Coffee pulp is one of the by-products generated during coffee procesing.

Coffee pulp

Source of bioactive compounds

Dietary fiber

Phenolic compounds

This work aims to explore the chemical composition and functional properties of coffee pulp and validate its safety for use as a novel food ingredient.

RESULTS

- Coffee pulp contained a high amount of dietary fiber and presented a significant amount of total phenolic compounds. The antioxidant capacity of the coffee pulp was remarkably high.

- Physicochemical and techno-functional properties of coffee pulp were adequate.

- Coffee pulp was able to adsorb glucose and delay its diffusion, and to inhibit the activity of α-amylase, delaying the digestibility of starch.

RESULTS

Cholesterol and bile salts were able to bind to the coffee pulp, preventing its absorption, and pancreatic lipase was inhibited by coffee pulp.

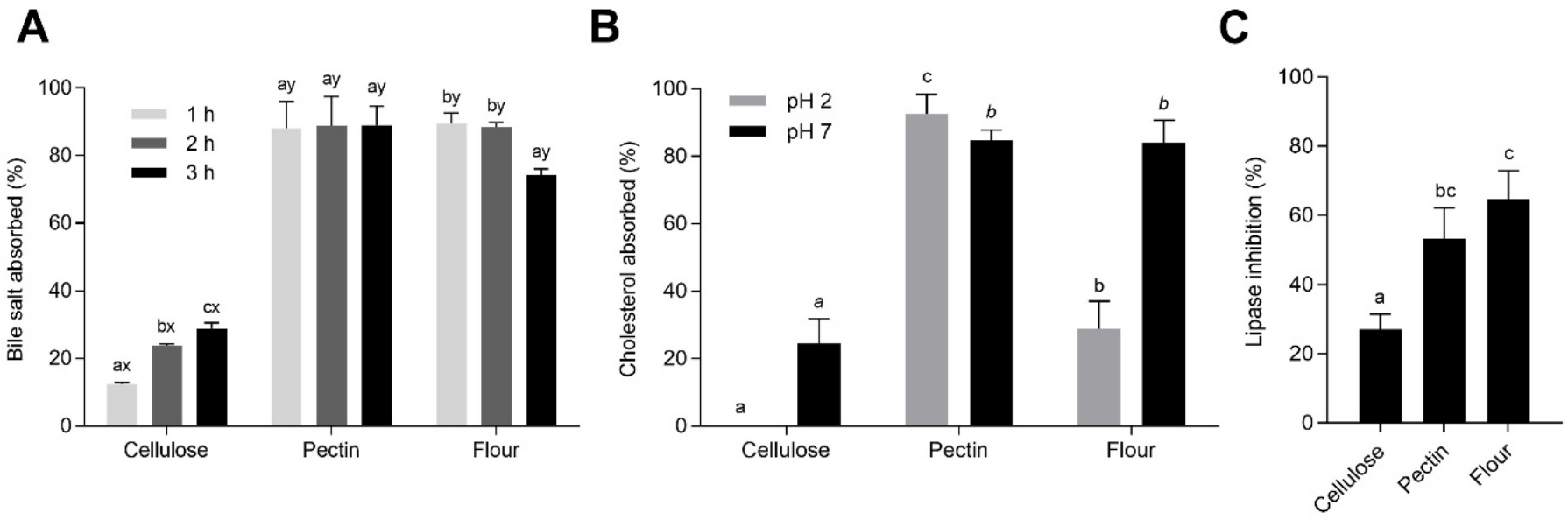


Figure 1. Effect of cellulose, pectin, and coffee pulp flour on cholesterol absorption capacity (%) at pH 2.0 and pH 7.0 (**A**), bile salts absorption capacity (%) after 1, 2, and 3 h of incubation (**B**), and pancreatic lipase activity (%) (**C**).

CONCLUSIONS

- Coffee pulp proved to be a source of insoluble dietary fiber.
- The physicochemical and techno-functional properties of the coffee pulp were adequate for food production.
- Coffee pulp contained many phenolic compounds with *in vitro* antioxidant capacity.
- The hypoglycemic effects associated with dietary fiber of coffee pulp may lead to a reduction in postprandial plasma glucose.
- Coffee pulp showed hypolipidemic effects through several mechanisms.
- The intake of acute and sub-chronic doses of coffee pulp showed no toxicity, abnormal behavior or mortality in mice.
- The coffee pulp could be validated as a new antioxidant dietary fiber, with hypoglycemic and hypoglycemic effects and good physicochemical and techno-functional properties, which would allow its incorporation into foods with potential health benefits.

Critical Evaluation of Coffee Pulp as an Innovative Antioxidant Dietary Fiber Ingredient: Nutritional Value, Functional Properties and Acute and Sub-chronic Toxicity

Silvia Cañas, Miguel Rebollo-Hernanz, Paz Cano-Muñoz, Yolanda Aguilera, Vanesa Benítez, Cheyenne Braojos, Andrea Gila-Díaz, Pilar Rodríguez-Rodríguez, Ignacio Monedo Cobeta, Ángel L. López de Pablo, M. Carmen González, Silvia M. Arribas and Maria A. Martin-Cabrejas

UAM
Universidad Autónoma de Madrid

FACULTAD DE CIENCIAS
UNIVERSIDAD AUTÓNOMA DE MADRID

Facultad de Medicina

CIAL
INSTITUTO DE INVESTIGACIÓN EN CIENCIAS DE LA ALIMENTACIÓN