Acorn: A fruit with applications in the food industry

Mariana P Pereira[1], Leandro Oliveira[2]

[1] Mestre em Ciências do Consumo e Nutrição |
[2] Universidade Católica Portuguesa, CBQF - Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia (ESB)

Introduction

- Acorns are rich in starch, essential amino acids, fatty acids, vitamins, minerals and polyphenols.
- As a gluten-free product, acorn floor is raising interest by celiac consumers as a substitute for other flours.
- In Portugal, it is estimated that about 55% of acorns are wasted, which amounts to around 13.3 million euros.

Objectives

Provide an overview of the applications of the functional properties of acorn and by-products of interest to the food industry, as well as highlight some of the current uses of the acorn in it.

Methods

A bibliographic review was carried out in databases: Pubmed, ScienceDirect, Elsevier, Scientific Repositories of Open Access of Portugal in Portuguese and English, using the words: acorn, acorn flour, acorn and nutraceutical, acorn and food industry, acorn applications. Another source of information was used like some companies websites. This research has been limited to the year 2000 to 2018.

Results and Conclusions

Acorn flour have attractive properties for the food industry, and its incorporation can **improve the nutritional and rheological characteristics of some food products** [1,2].

- **Lipid Absorption Capacity** → Stabilize texture; Control emulsions
- **Water Holding Capacity** → Increase viscosity; Prevent synergism
- **Antioxidant Activity** → Avoid lipid oxidation; Extend shelf-life

Nutritional Composition (% dry matter):

- ✓ **High starch** content + carbohydrates (~70%)
- ✓ **High fiber** content (~2%)
- ✓ **Low protein** content (gluten free) (~12%)
- ✓ **High MUFA + PUFA** lipidic content (~1,35%)

Industrial usages of acorn flour

Breads

cakes

Cookies and biscuits

Hot beverages

Spread creams

Selected bibliography:

1. Vinha AF, Barreira JCM, Costa ASG, Oliveira MBPP. A New Age for Quercus spp. Fruits: Review on Nutritional and Phytochemical Composition and Related Biological Activities of Acorns. *Compr Rev Food Sci Food Saf*. 2016;15(6):947-981. doi:10.1111/1541-4337.12220
2. Tadayoni M, Sheikh-Zeinoddin M, Soleimanian-Zad S. Isolation of bioactive polysaccharide from acorn and evaluation of its functional properties. *Int J Biol Macromol*. 2015;72:179-184. doi:10.1016/j.ijbiomac.2014.08.015

Many thanks to:

innovation track

CATÓLICA ESCOLA SUPERIOR DE BIOTECNOLOGIA PORTO

European Commission

Horizon 2020 European Union funding for Research & Innovation