1st International Multidisciplinary Acorn as Food Workshop

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Use of Acorns in Food Industry

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Introduction

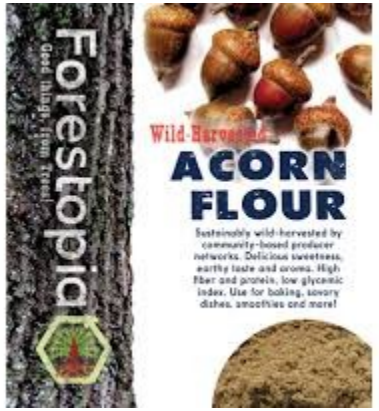
- Acorns are edible fruits of oak trees, with a hard shell, which belongs to the same family as the chestnut.
- Oak trees are named under the genus *Quercus* belongs to the *Fagaceae* family and there are more than 500 *Quercus* species identified
- Acorns are widely distributed in North America, North Africa, Asia, and Europe.
- Acorn has been used in the cuisine of many countries and civilizations around the world for thousands of years due to its high nutritional value, particularly during times of famine when economic situations are terrible,
- Besides the dietary facts acorns are used for ca

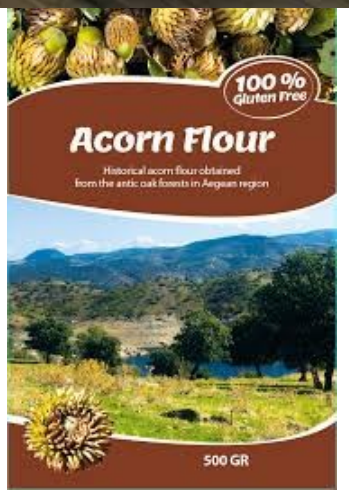
- It is rich in carbohydrates and unsaturated fatty acids, high in minerals (such as Ca, Fe,K, P, Mg)and vitamins (vitamins A and E)
- The protein fraction is gluten-free, an excellent source of dietary fiber, and high in antioxidants such as polyphenols, gallic acid, and tocopherols increases the potential of acorns as an alternative additive in the preparation of functional f

TABLE 1. ACORN COMPOSITION, 18 SPECIES (Bainbridge, 1985)

Variable	Percent(%)
Water	**8.7 - 44.6**
Fat	**1.1 - 31.3**
Protein	**2.3 - 8.6**
Fat	**1.1 - 31.3**
Carbohydrate	**32.7 - 89.7**
Tannin	**0.1 - 8.8**
Energy (Kcal/100 g)	**265 - 577**

- The acorns from many species of oaks are edible raw, just as they are harvested.
- However, tannins, which are important phenols, causes the bitterness can easily be leached from acorns
- Due to the variation in tannin content between species, European legislation only allows the use of holm oak acorns in food products.
- The process of acorn flour production involves, leaching, particle size reduction, drying and milling.





Processing of Acorns

- **Drying;** after the acorns are gathered, they need to be dried out well. Drying makes the shells easier to crack, and it helps the inner skin flake off of the nut better.
- **Shelling;** The outer shells of acorns must be removed by manually or mechanically
- **Winnowing;** process for to get rid of that papery inner skin that surrounds the acorn.
- **Grinding;** acorns are course grinded for leaching process
- **Leaching;** In order to remove the large amounts of tannins present in acorns, the process of leaching was applied. Generally water (cold/hot) is used for leaching.
- **Size Reduction;** after drying of leached acorn particles milling

Food Applications of Acorns

- For human consumption, acorns can be divided into three main categories: nuts, flour, and edible oil
- Sweet acorns can be roasted and consumed as a snack like chestnuts.
- Due to its high starch content, acorn flour is used as an additive in doughs and for making bread
- Given its nutritional properties, the addition of acorn flour to bread, cakes, pasta, and cookies results in products that are nutritionally better.

- In recent years, various studies have focused on different applications of acorns and their by-products in the food industry. These studies have led to the development of various products that include acorns in their formulation, such as yogurts, plant-based beverages, pâtés, ice creams, and infus·

Acorns in Scientific Literature

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Food Research International

Volume 166, April 2023, 112579

In vitro and *in vivo* glycemic responses and antioxidant potency of acorn and chickpea fortified gluten-free breads

Ippolyti Gkountenoudi-Eskitzi [a], Kali Kotsiou [a], Maria N. Irakli [b], Antonios Lazaridis [c], Costas G. Biliaderis [a], Athina Lazaridou [a]

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J Food Sci Technol (December 2023) 60(12):3082–3093
https://doi.org/10.1007/s13197-023-05852-7

ORIGINAL ARTICLE

Formulation development and characterization of plant-based alternatives to pâté using forest ingredients

Maria-Ioana Socaciu[1] · Cristina Anamaria Semeniuc[1] · Anda Elena Tanislav[1] · Elena Andruța Mureșan[1] · Andreea Pușcaș[1] · Alina Maria Truță[2] · Vlad Mureșan[1]

Revised: 4 September 2023 / Accepted: 14 September 2023 / Published online: 25 September 2023

Abstract Due to the expanding global population and envi- control sample, driven by its intensity decrease (less in that

Food Science & Nutrition

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ORIGINAL ARTICLE | Open Access

Nutritional composition and staling properties of gluten-free bread-added fermented acorn flour

Ayşe Levent, Kübra Aktas

First published: 26 Dece

SECTIONS

Heliyon

CellPress

Volume 5, Issue 8, August 2019, e02242

Effect of acorn flour on the physico-chemical and sensory properties of biscuits

Antonella Pasqualone [a], Fatima Z. Makhlouf [b], Malika Barkat [b], Graziana Difonzo [a], Carmine Summo [a], Giacomo Squeo [a], Francesco Caponio [a]

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Journal of Food Science

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Food Chemistry

Antioxidant Extracts from Acorns (*Quercus ilex* L.) Effectively Protect Ready-to-Eat (RTE) Chicken Patties Irrespective of Packaging Atmosphere

Valquíria C. S. Ferreira, David Morcuende, Silvia H. Hérnandez-López, Marta S. Madruga, Fábio A. P. Silva, Mario Estévez

First published: 13 February 2017 | https://doi.org/10.1111/1750-3841.13640 | Citations: 28

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J Food Sci Technol (September 2017) 54(10):3050–3057
DOI 10.1007/s13197-017-2740-3

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ORIGINAL ARTICLE

Acorn (*Quercus* spp.) as a novel source of oleic acid and tocopherols for livestock and humans: discrimination of selected species from Mediterranean forest

T. Akcan[1] · R. Gökçe[1] · M. Asensio[2] · M. Estévez[3] · D. Morcuende[3]

Food Measure (2018) 12:471–479
DOI 10.1007/s11694-017-9660-9

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ORIGINAL PAPER

Quercus based coffee-like beverage: effect of roasting process and functional characterization

Marta Coelho[1,2] · Sara Silva[1] · Luis Miguel Rodríguez-Alcalá[1] · Ana Oliveira[1] · Eduardo M. Costa[1] · André Borges[1] · Célia Martins[2] · António S. Rodrigues[2] · Maria Manuela E. Pintado[1]

Received: 23 February 2017 / Accepted: 3 October 2017 / Published online: 8 November 2017

Our research

LWT - Food Science and Technology 98 (2018) 477–484

Contents lists available at ScienceDirect

LWT - Food Science and Technology

journal homepage: www.elsevier.com/locate/lwt

Improving physicochemical, antioxidative and sensory quality of raw chicken meat by using acorn extracts

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In this study, the effectiveness of different acorns extracts on the physicochemical, antioxidative and sensory properties of chicken thigh meat during refrigerated storage.

According to the results the acorn extracts showed high efficiency as antioxidant against lipid and protein oxidation when compared to control

The addition of acorn extract did not affect negatively sensory characteristic (color, juiciness, astringency and overall acceptability) of chicken meat.

In addition, the panelists stated that they perceived oak wood charcoal aroma in the samples to which the extract was added.

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Revista Mexicana de Ingeniería Química

Exploring the impact of acorn extract on the quality and taste of beef meat burgers

Explorando el impacto del extracto de bellota en la calidad y sabor de las hamburguesas de carne de res

T. Akcan[1]*, O. Özünlü[2], H. Ergezer[2], R. Gökçe[1]
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- In this study it is explored the effects of extracts obtained from different on the quality of beef meat burgers.
- Incorporation of acorn extracts significantly increased pH values of the meat burgers
- Color values of the burgers did not change with the addition of extracts.
- Acorn extracts were found to be effective in preventing lipid and protein oxidation. It was
- Concluded that the extracts of acorn fruits have the potential to

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Contents lists available at ScienceDirect

International Journal of Gastronomy and Food Science

journal homepage: www.elsevier.com/locate/ijgfs

Acorn (*Quercus ithaburensis*) Flour's effect on the physicochemical, textural, and sensory characteristics of raw and cooked beef meatballs

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- This research focused on examining the physicochemical properties, cooking attributes, textural qualities, and sensory analyses of meatballs containing varying percentages (control - 0%, 3%, 6%, and 9%) of acorn flour.
- It was found that acorn flour was not effective in preventing lipid oxidation in raw and cooked meatballs during storage.
- It was found that the cooking efficiency, thickness increase, water holding capacity, and moisture retention values of the meatballs were improved when acorn flour was added.

- In general, as a result of the use of acorn flour in meatballs

Turkish Journal of Agriculture - Food Science and Technology, 12(2): 214-220, 2024
DOI: https://doi.org/10.24925/turjaf.v12i2.214-220.6548

Turkish Journal of Agriculture - Food Science and Technology

Available online, ISSN: 2148-127X | www.agrifoodscience.com | Turkish Science and Technology Publishing (TURSTEP)

The Effects of Acorn Flour on Some Quality Characteristics of Chicken Patties

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ARTICLE INFO

Research Article

ABSTRACT

The study was carried out to develop chicken patties by incorporating acorn flour as a meat replacer at 3%, 6%, and 9% levels in the formulation. For this purpose, the chemical (moisture, protein, fat, ash), pH, thiobarbituric acid (TBA), and color analyses in the raw and cooked chicken patties were

The study was carried out to develop chicken patties by incorporating acorn flour as a meat replacer at 3%, 6%, and 9% levels in the formulation. The addition of acorn flour contents in chicken patties improved functional and cooking properties, decreased cooking loss, and increased moisture and fat retention. The use of acorn flour improved the quality parameters of patties, but the addition of acorn flour resulted in a darker color in patties. The use of acorn flour in chicken meatballs did not negatively affect sensory properties except color. In conclusion, acorn flour can be used as a filler and binder in chicken patties.

Conclusion

- In recent years, there has been renewed interest in acorns as a potential food source due to their nutritional content and potential environmental benefits. As acorns are a natural and sustainable food source, their use in gastronomy could help to reduce our reliance on other, more resource-intensive food sources.
- In terms of its implications for gastronomy, acorn flour can be used as a gluten-free alternative to wheat flour in a wide range of dishes.
- Overall, the use of acorn flour in food industry could provide both culinary and health benefits, and it may be worth exploring further.

Everything started with an acorn

Selected References

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