



# ITALIAN PDO AND PGI NUTRITIONAL FOOTPRINT



In the 1° Scientific Symposium PDO and PGI Chain - ITALIA NEXT DOP -  
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Edited by:

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Credits:

Cards: PGI Carciofo Romanesco del Lazio, PGI Carciofo Brindisino, PDO Asparago Bianco di Bassano, PGI Asparago Bianco di Cimadolmo, PGI Asparago Verde di Altedo, PDO Fagioli Bianchi di Rotonda, PDO Fagiolo Cannellino di Atina, PGI Lenticchia di Castelluccio di Norcia, PGI Lenticchia di Onano, PGI Lenticchia di Altamura.

With contribution by: Altero Aguzzi, Francesca Antonazzi, Pasquale Buonocore, Paolo Gabrielli, Loretta Gambelli

Card: PGI Radicchio Rosso di Treviso and PGI Variegato di Castelfranco

Elena Azzini: [elena.azzini@crea.gov.it](mailto:elena.azzini@crea.gov.it)

Card: Traceability and Technology: the case of PGI Radicchio and Magnetic Resonance

Mena Ritota e Massimiliano Valentini: [mena.ritota@crea.gov.it](mailto:mena.ritota@crea.gov.it); [massimiliano.valentini@crea.gov.it](mailto:massimiliano.valentini@crea.gov.it).

PDO and PGI products are the heritage of our culture on food, agriculture, and land. We share a great knowledge on their organoleptic qualities – appearance, colour, taste – and their product specification and, often, we choose them for our traditional recipes. Nevertheless, we still have few information on their nutritional value and on their beneficial effect on our health. In fact, under a food and culture point of view, they play a pivotal role in promoting biodiversity and environmental sustainability, fundamental facets to encourage their consumption both in Italy and abroad.

## The PDO and PGI Nutritional Footprint

The cards show some of the outcomes of three different research\* projects on the nutritional facets and the bioactive compounds present in some Italian PDO and PGI products such as legumes, artichokes, asparagus, and radicchio.

The latter, enjoyed a metabolomic approach to gain the typical food footprint. Thanks to statistical model it is possible to recognize a PGI product from one that isn't and, moreover, to classify samples according to the different PGI cultivars.

\*Project EPI1000 “Implementazione di un percorso formativo e informativo finalizzato ad un approccio integrato epigenetico per la prevenzione nei 1000 giorni di vita” (“Training implementation aimed at an integrated epigenetic approach for prevention in the first 1000 days of life”) financed by the Ministry of Health.

\*“Biodiversità e agroalimentare; strumenti per descrivere la realtà italiana” BIOVITA (“Biodiversity and agri-food: tools to describe the Italian reality”), financed by the Ministry of Agricultural, Food and Forestry policies, (MiPAAF) with D.M. 3684/7303/08 del 13/06/2008.

\*Project PRAL 2003/04 “Identificazione, caratterizzazione nutrizionale ed effetto protettivo sulla salute dell'uomo di ecotipi leguminose di particolare interesse (Fagiolo Cannellino, Cicerchia, Lenticchia) coltivati nel Lazio e altri campionamenti” (“Identification, nutritional characterization and protective effect on human health of legumes ecotype of particular interest (Cannellino bean, cicerchia, lenticchia) grown in Lazio and other samplings”) Financed by the Economic and Employment Department, Regional Directorate of Agriculture of Lazio Region.

The samplings have been carried out in different years and the nutrients and bioactive compounds evaluated accordingly to the research projects targets.

## The future of the PDO and PGI products footprint

The nutritional footprint of PDO and PGI products will ease the promotion and consumption of these staples of the Italian culture on agriculture and food, both in Italy and abroad.

The cards “Nutritional Footprint” are a perfect example of the CREA- Food and Nutrition expertise and may build a solid base for more research in this direction.

# PDO and PGI ITALIAN PRODUCTS



-  PGI Carciofo Romanesco del Lazio
-  PGI Carciofo Brindisino
-  PDO Asparago Bianco di Bassano
-  PGI Asparago Bianco di Cimadolmo
-  PGI Asparago Verde di Altedo
-  PDO Fagioli Bianchi di Rotonda
-  PDO Fagiolo Cannellino di Atina
-  PGI Lenticchia di Castelluccio di Norcia
-  PGI Lenticchia di Onano
-  PGI Lenticchia di Altamura
-  PGI Radicchio di Rosso di Treviso
-  PGI Radicchio Variegato di Castelfranco

# PGI Carciofo Romanesco del Lazio



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## ORGANOLEPTIC QUALITIES

Also known as “Cimarolo” or “Mammola” the Carciofo Romanesco is the true king of the vegetable garden.

Its bracts, green in colour with violet streaks, are tender and fleshy.

Rounded and sturdy, with its typical hole on the top of its crown, has no thorns and a sweet, intense taste.

## IN SEASON

The PGI Carciofo Romanesco del Lazio is available from January to the end of May.

### Production area



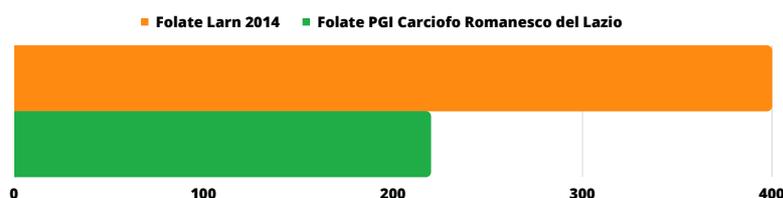
# NUTRITIONAL FOOTPRINT

1 serving= 200 g of cleaned artichokes

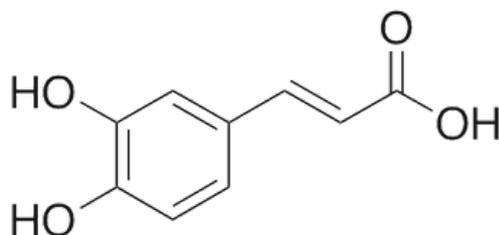
## NUTRITIONAL VALUES PER SERVING

Calories	96 Kcal
Protein	6.0 g
Total Fat	0.4 g
Carbohydrate	12.1 g
starch	9.2 g
sugars	2.9 g
Dietary fiber	11.0 g

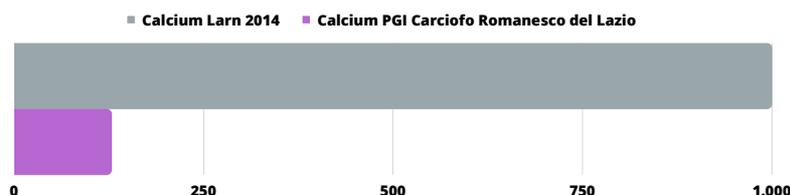
Rich in Folates = 286 µg/serving  
% Daily value: 71.5%



Caffeic acid: range 40.82- 82.35 mg/kg



Good Calcium content = 129 mg/serving  
% Daily value: 13%



Project EPI1000 "Implementazione di un percorso formativo e informativo finalizzato ad un approccio integrato epigenetico per la prevenzione nei 1000 giorni di vita" ("Training implementation aimed at an integrated epigenetic approach for prevention in the first 1000 days of life") financed by the Ministry of Health.

LARN. Livelli di Assunzione di Riferimento di Nutrienti ed energia per la popolazione italiana. IV Revisione della Società Italiana della Nutrizione Umana. 2014.

## MICRONUTRIENTS PER SERVING

Iron	2.2 mg
Phosphorus	140.0 mg
Vitamin C	22.0 mg

## ANTI-WASTE RECIPE

Use the discarded bracts for an infusion full of vitamins, with antioxidant, detoxing and digestive properties to benefit the liver. How to do it: bring to the boil 200 ml of water, add the bracts, and leave them to infuse for ten minutes. Good to drink after lunch and dinner.

# PGI Carciofo Brindisino

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## ORGANOLEPTIC QUALITIES

Tender, savory and fleshy the Carciofo Brindisino production starts early: the mild climate brings this vegetable to the market in October.

The outer bracts are green with violet streaks with a little thorn on their top, the inner ones are white-greenish with few violet shades.

## IN SEASON

The PGI Carciofo Brindisino is available from November to the end of May.

### Production area



# NUTRITIONAL FOOTPRINT

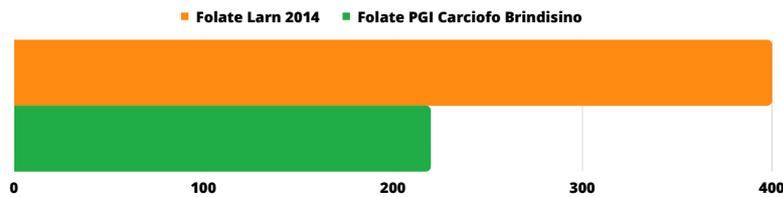
1 serving= 200 g of cleaned artichokes

## NUTRITIONAL VALUES PER SERVING

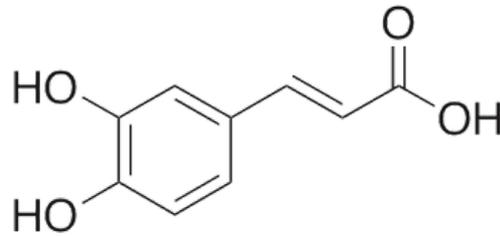
Calories	99.7 Kcal
Protein	5.0 g
Total Fat	0.4 g
Carbohydrate	13.4 g
starch	10.2 g
sugars	3.2 g
Dietary fiber	11.0 g

Ricch in Folates = 220 µg/serving

% Daily value: 55%



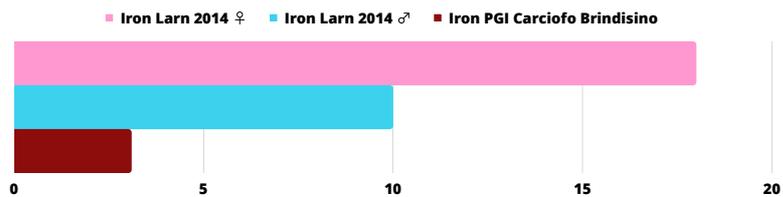
Caffeic acid: range 55.72- 90.35 mg/kg



Good Iron content = 3.1 mg/serving

Women % Daily value: 17%

Men % Daily value: 31%



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## MICRONUTRIENTS PER SERVING

Calcium	100.0 mg
Magnesium	70.0 mg
Zinc	0.8 mg
Copper	120.0 mg

## ANTI-WASTE RECIPE

The Carciofo Brindisino thorny leaves are not suitable for cooking.

Remove their thorns, slice them finely and enjoy their qualities and crunchiness in a salad dressed with the finest extra virgin olive oil.

# PDO Asparago Bianco di Bassano



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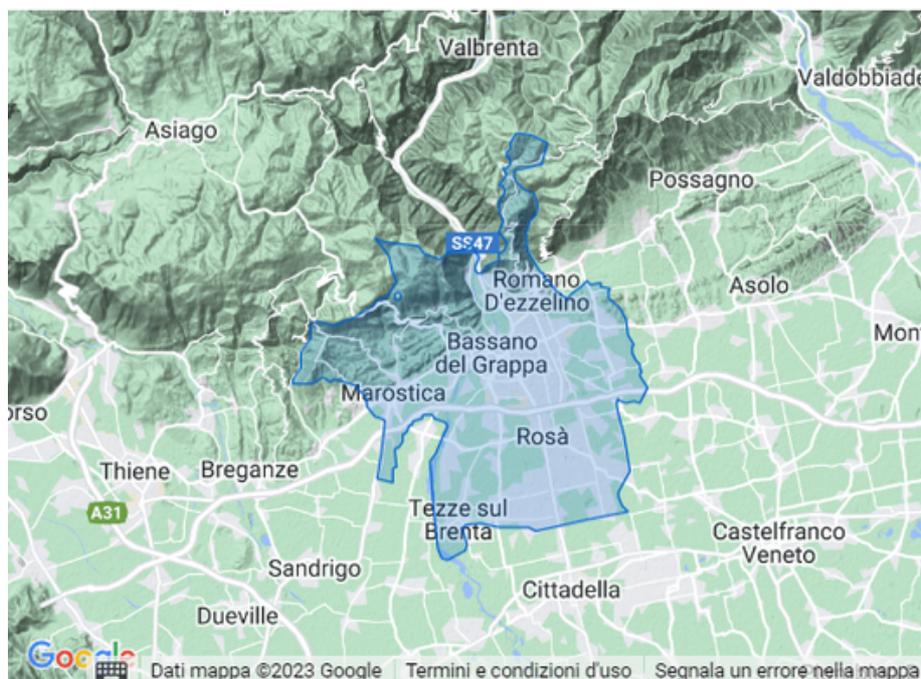
## ORGANOLEPTIC QUALITIES

Harvested at the crack of dawn to ensure the best possible quality of the product, the PDO Asparago Bianco di Bassano is easily recognizable: sparkling white with pink streaks, when fresh is crispy, tender and not fibrous at all and sweeter if compared with other kind of asparagus. Rich in fibers, its shoot has diuretic, detoxing, laxative and digestive properties.

## IN SEASON

The PDO Asparago Bianco di Bassano is available from April to the end of May.

### Production Area



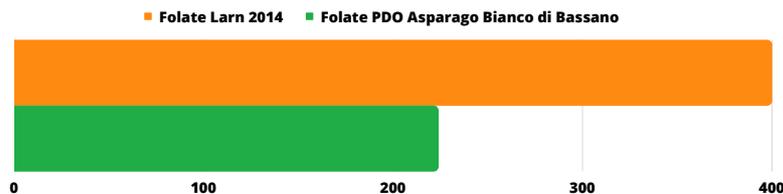
# NUTRITIONAL FOOTPRINT

1 serving= 200 gr of cleaned asparagus

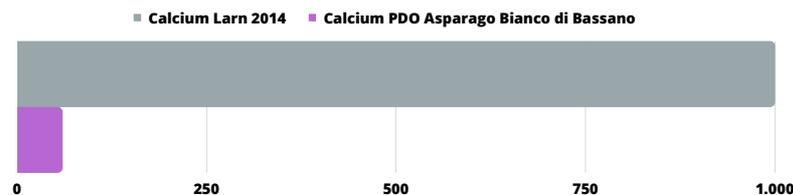
## NUTRITIONAL VALUES PER SERVING

Calories	82 Kcal
Protein	12.4 g
Total Fat	0.6 g
Carbohydrate	4.0 g
starch	0 g
sugars	4.0 g
Dietary fiber	6.0 g

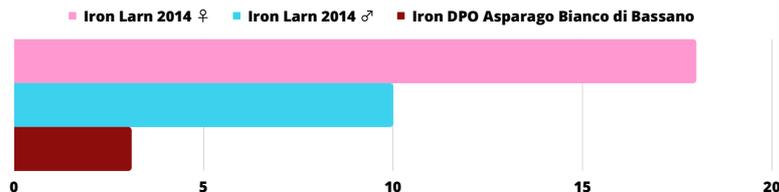
Rich in Folates = 224 µg/serving  
% Daily value: 56%



Good Calcium content = 60 mg/serving  
% Daily value: 6%



Good Iron content = 3.1 mg/serving  
Women % Daily value: 17%  
Men % Daily value: 31%



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## MICRONUTRIENTS PER SERVING

Potassium	500.0 mg
Vitamin C	11.0 mg
Vitamin A	50.0 mcg retinol equivalents

## SERVING SUGGESTION

The best way to fully enjoy the PDO Asparago Bianco di Bassano is to eat it when is in season. In order to preserve the organoleptic qualities, it is best to steam the asparagus or to boil them in a narrow pot with a tiny bit of salted water, with their tips upward and out of the water. Dress the asparagus with Italian extra virgin olive oil, salt and pepper and enjoy them also with whole-meal bread and cheese.

# PGI Asparago Bianco di Cimadolmo



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## ORGANOLEPTIC QUALITIES

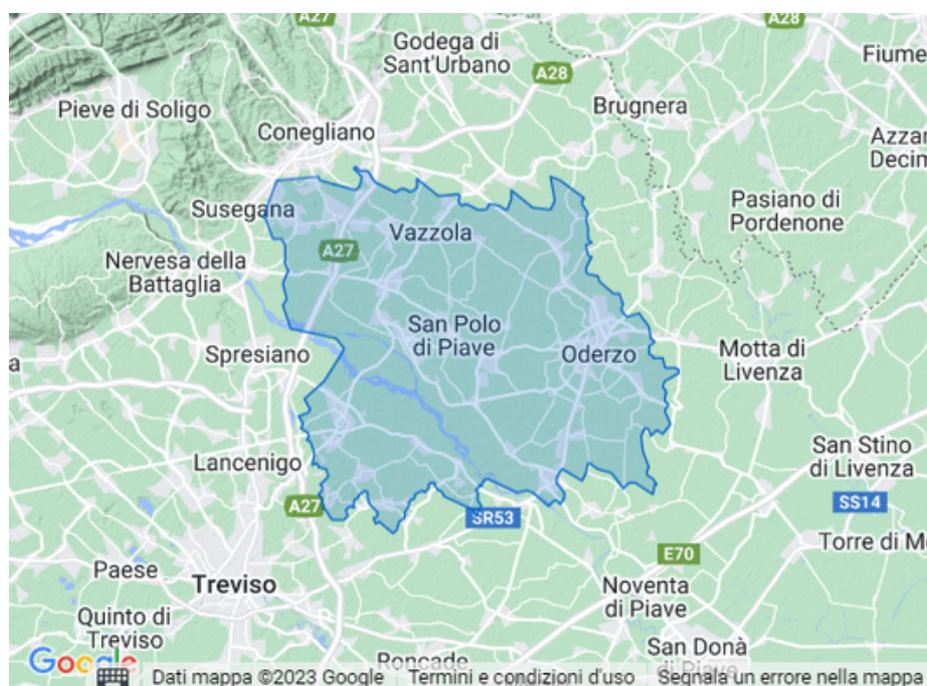
With a fresh and delicate taste, its characteristic white, elongated shoot make it unmistakable.

A mildly damp climate is responsible for the quick growth of this asparagus, known for its tenderness and lack of fibrosity.

## IN SEASON

The PGI Asparago Bianco di Cimadolmo is available from April to May.

## Production area



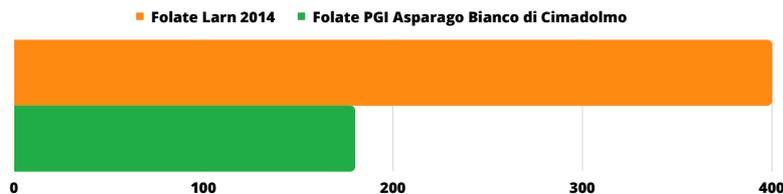
# NUTRITIONAL FOOTPRINT

1 serving= 200 g of cleaned asparagus

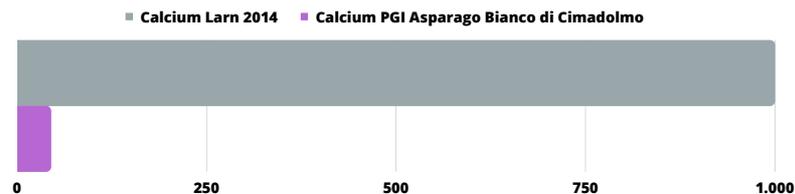
## NUTRITIONAL VALUES PER SERVING

Calories	107 Kcal
Protein	10.4 g
Total Fat	0.8 g
Carbohydrate	13.0 g
starch	0.8 g
sugars	12.2 g
Dietary fiber	4.4 g

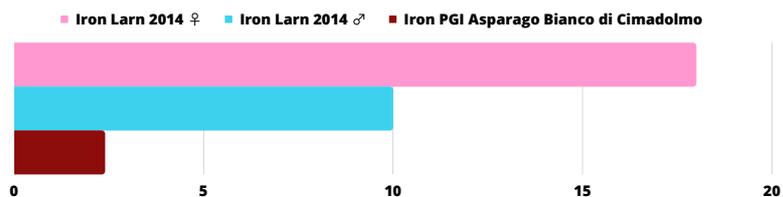
Rich in Folate = 180 µg/serving  
% Daily value: 45%



Good Calcium content = 45 mg/serving  
% Daily value: 4.5%



Good Iron content = 2.4 mg/serving  
Women % Daily value: 13%  
Men % Daily value: 24%



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## MICRONUTRIENTS PER SERVING

Potassium	560.0 mg
Vitamin C	9.0 mg
Vitamin A	45.0 mcg retinol equivalents

## SERVING SUGGESTIONS

The PGI Asparago Bianco di Cimadolmo is very easily spoilt. They can be stored in the fridge for four to five days and the sooner you eat them, the better, not to lose their taste and nutritional qualities. They make a perfect side dish and are perfect in traditional recipes such as "eggs and asparagus" or "asparagus risotto". It is possible to eat them raw, finely sliced and dressed with extra virgin olive oil, lemon juice and salt. In fact, this is the best way to preserve their nutritional value.

# PGI Asparago Verde di Altedo



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## ORGANOLEPTIC QUALITIES

Soil and a damp, foggy climate, such as the one of the Bassa Padana, are the key ingredients of the unique organoleptic properties of the Asparago Verde di Altedo. The stem is white; its bright green shoot is tender, and the sturdy tip is slightly curved on top. Rich in fiber, it helps the intestine and has diuretic properties.

## IN SEASON

The PGI Asparago Verde di Altedo is available from April to the end of June.

### Production area



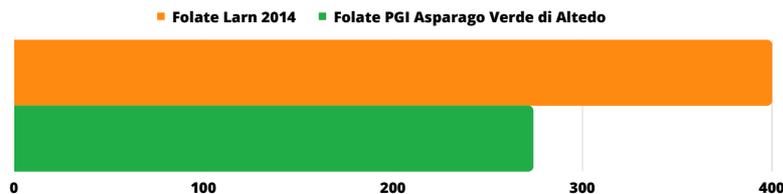
# NUTRITIONAL FOOTPRINT

1 serving= 200 g of cleaned asparagus

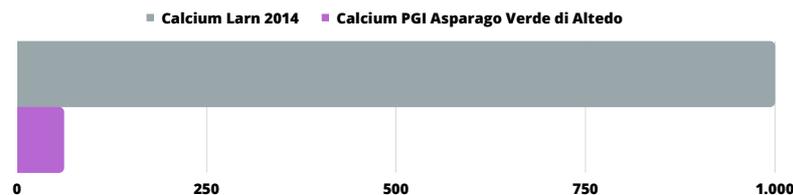
## NUTRITIONAL VALUES PER SERVING

Calories	134 Kcal
Protein	14.4 g
Total Fat	0.8 g
Carbohydrate	16.6 g
starch	0 g
sugars	16.6 g
Dietary fiber	3.6 g

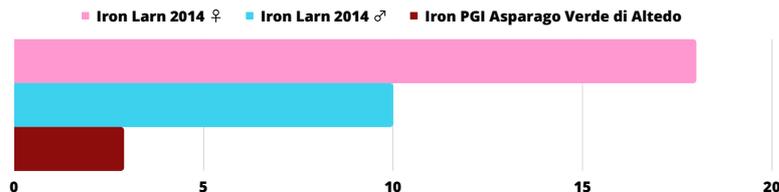
Rich in Folate = 274 µg/serving  
% Daily value: 68%



Good Calcium Content = 62 mg/serving  
% Daily value: 6.2%



Good iron content = 2.9 mg/serving  
Women % Daily value: 16%  
Men % Daily value: 29%



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## MICRONUTRIENTS PER SERVING

Potassium	421.0 mg
Vitamin C	60.0 mg
Vitamin A	350.0 mcg retinol equivalents

## ANTI-WASTE RECIPE

Asparagus stems are very fibrous and difficult to chew so they are often binned. Take note of these simple recipes not to waste them:

- They can be boiled with other vegetables for a tasty stock
- For a quick pate with toasted bread, steam and blend them with extra virgin olive oil and spreadable cheese
- Boil the stems in shallow water, slice them finely on a leek, onion and potato puree.

# PDO Fagioli Bianchi di Rotonda



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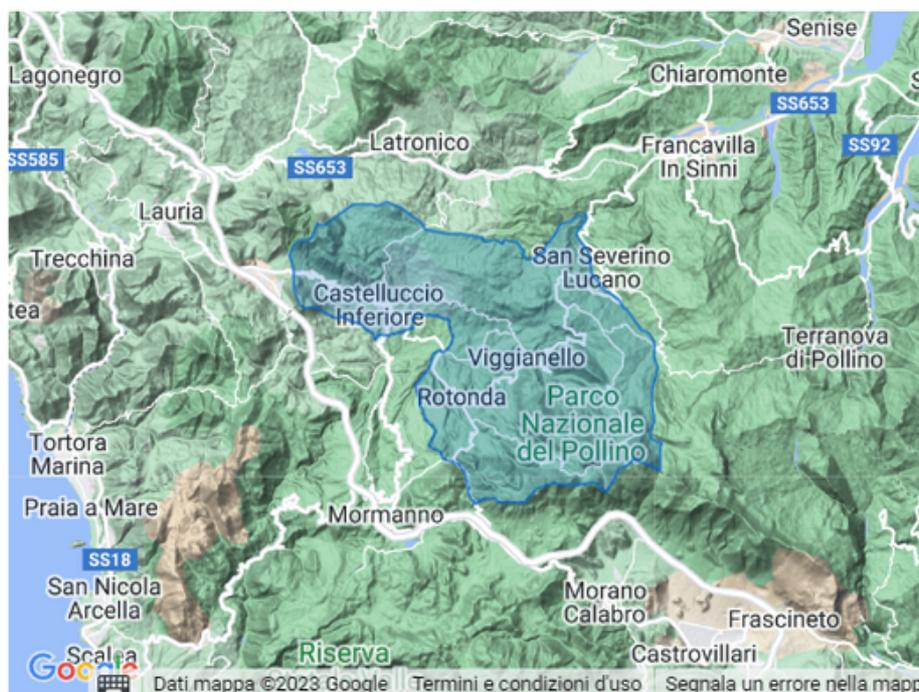
## ORGANOLEPTIC QUALITIES

The PDO Fagioli Bianchi di Rotonda have a high protein grain, almost the 27% of the dried product, thanks to a fertile soil where the plants grow, rich in nitrogen and sulfur. Their pod is white to ivory yellow. These beans quickly cook thanks to their thin skin, given by a low limestone ground.

## IN SEASON

The PDO Fagioli Bianchi di Rotonda, dried, are available all year round.

### Production area



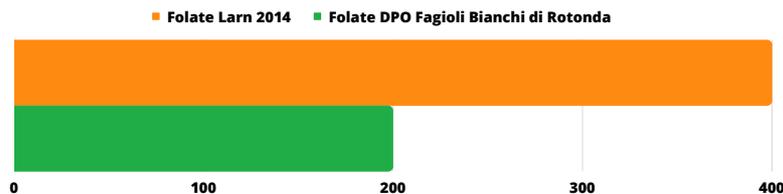
# NUTRITIONAL FOOTPRINT

1 serving= 50 g of dried beans

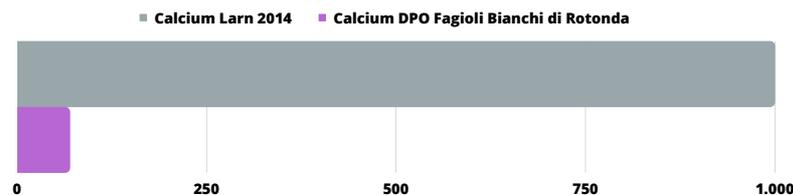
## NUTRITIONAL VALUES PER SERVING

Calories	158 Kcal
Protein	13.0 g
Total Fat	0.6 g
Carbohydrate	21.7 g
starch	18.3 g
sugars	2.4 g
Dietary fiber	8.3 g

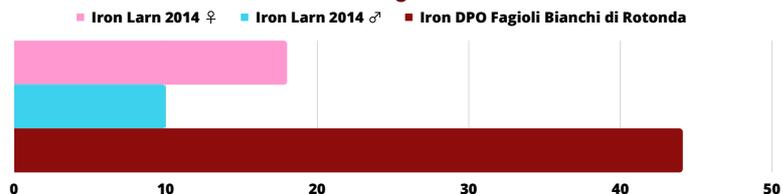
Rich in Folates = 376 µg/serving  
% Daily value: 94%



Good Calcium content = 67 mg/serving  
% Daily value: 6.7%



Rich in Iron = 34.1 mg/serving  
Women % Daily value: 189%  
Men % Daily value: 341%



Project PRAL 2003/04 "Identificazione, caratterizzazione nutrizionale ed effetto protettivo sulla salute dell'uomo di ecotipi leguminose di particolare interesse (Fagiolo Cannellino, Cicerchia, Lenticchia) coltivati nel Lazio e altri campionamenti" ("Identification, nutritional characterization and protective effect on human health of legumes ecotype of particular interest (Cannellino bean, cicerchia, lenticchia) grown in Lazio and other samplings") Financed by the Economic and Employment Department, Regional Directorate of Agriculture of Lazio Region.

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## MICRONUTRIENTS PER SERVING

Magnesium	155.0 mg
Zinc	16.1 mg
Copper	1.8 mg

## SERVING SUGGESTION

The PDO Fagioli Bianchi di Rotonda can be also purchased fresh in their pods and can be stored in the fridge for a few days.

They can be enjoyed at their best with escarole, cabbage and potatoes or in traditional recipes such as the "Minestra impastata" and "Fagioli and scorza" (pork rind).

# PDO Fagiolo Cannellino di Atina



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## ORGANOLEPTIC QUALITIES

The “Atina white gold” has a highly digestible, matt white, thin skin.

It doesn't need to be soaked before cooking as its consistency is tender and very soft thanks to the soil composition, of alluvial origin and rich in manganese, typical of the production site.

## IN SEASON

The PDO Fagiolo Cannellino di Atina, dried, is available all year round.

### Production area



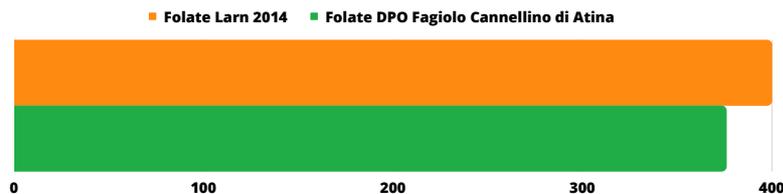
# NUTRITIONAL FOOTPRINT

1 serving= 50 g of dried beans

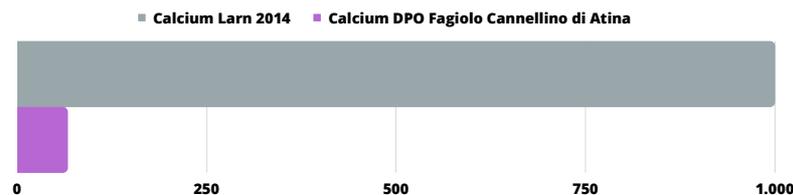
## NUTRITIONAL VALUES PER SERVING

Calories	159 Kcal
Protein	14.0 g
Total Fat	0.5 g
Carbohydrate	20.7 g
starch	17.8 g
sugars	2.9 g
Dietary fiber	7.3 g

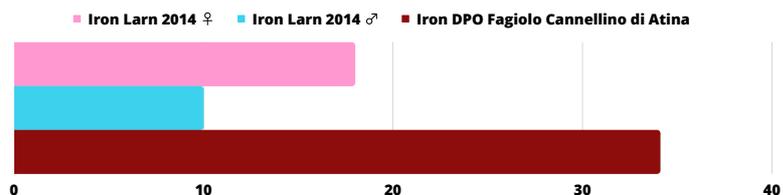
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## PAPPAFUOCCHIE

### INGREDIENTS:

- PDO Fagioli Cannellini di Atina, 200 gr
- Extra Virgin Olive Oil, to taste
- Flour, 300 gr
- Water, to taste
- Salt, to taste
- Tomato puree, 200 gr
- Garlic, onion, celery, chili pepper, to taste

Make the pasta mixing the flour with a bit of water, then cut in stripes and cut the stripes to form the maltagliati. Cook the beans with plenty of water together with the garlic, celery and salt. In a separate pan lightly fry the onion with the garlic and celery, then add the tomato puree and season to taste with chili pepper. Lastly add the beans, drained, and the pasta. Let the Pappafuocchie rest for a while in a terracotta pot and serve it hot.

### SERVING SUGGESTION

The PDO Fagiolo Cannellino di Atina is a key ingredient in many traditional recipes as the Pappafuocchie, a pasta dish with beans and a spicy tomato sauce. Due to its tenderness, the Fagiolo Cannellino is also perfect for puddings, such as chocolate beans mousse.

# PGI Lenticchia di Castelluccio di Norcia



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## ORGANOLEPTIC QUALITIES

The people of Castelluccio call it “Lénta” as it is their par excellence product.

Its colour may vary, from dark green to light brown with darker streaks, its skin is thin and soft and the taste truly deep.

## IN SEASON

The PGI Lenticchia di Castelluccio di Norcia, dried, is available all year round.

### Production area



# NUTRITIONAL FOOTPRINT

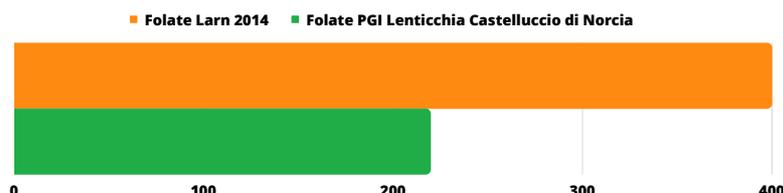
1 serving= 50 g of dried lentils

## NUTRITIONAL VALUES PER SERVING

Calories	166 Kcal
Protein	11.2 g
Total Fat	0.8 g
Carbohydrate	25.0 g
starch	22.5 g
sugars	2.5g
Dietary fiber	6.1 g

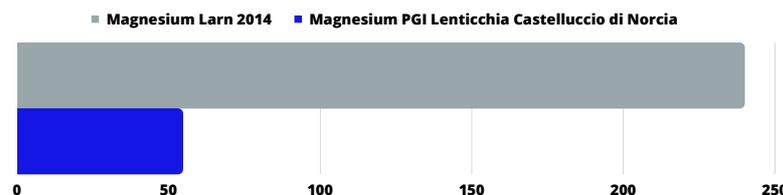
Rich in Folates= 220 µg/serving

% Daily intake: 55%



Good Magnesium content = 54.7 mg/serving

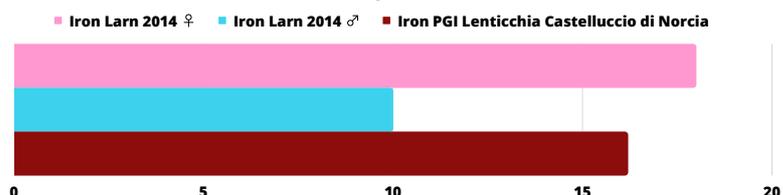
% Daily intake: 23%



Rich in Iron= 18.1 mg/serving

Women % Daily intake: 100%

Men % Daily intake: 181%



Project PRAL 2003/04 "Identificazione, caratterizzazione nutrizionale ed effetto protettivo sulla salute dell'uomo di ecotipi leguminose di particolare interesse (Fagiolo Cannellino, Cicerchia, Lenticchia) coltivati nel Lazio e altri campionamenti" ("Identification, nutritional characterization and protective effect on human health of legumes ecotype of particular interest (Cannellino bean, cicerchia, lenticchia) grown in Lazio and other samplings") Financed by the Economic and Employment Department, Regional Directorate of Agriculture of Lazio Region.

LARN. Livelli di Assunzione di Riferimento di Nutrienti ed energia per la popolazione italiana. IV Revisione della Società Italiana della Nutrizione Umana. 2014.

## MICRONUTRIENTS PER SERVING

Calcium	42.6 mg
Zinc	2.7 mg
Phosphorus	262.1 mg
Potassium	464.5 mg
Copper	0.6 mg

## SERVING SUGGESTION

Unlike other pulses, the PGI Lenticchia di Castelluccio di Norcia has a very thin, tough skin that allow to cook it without soaking it first, bringing the cooking time to a mere 25 minutes. Once cooked, these lentils are perfect for a salad or a main course with other cereals.

# PGI Lenticchia di Onano



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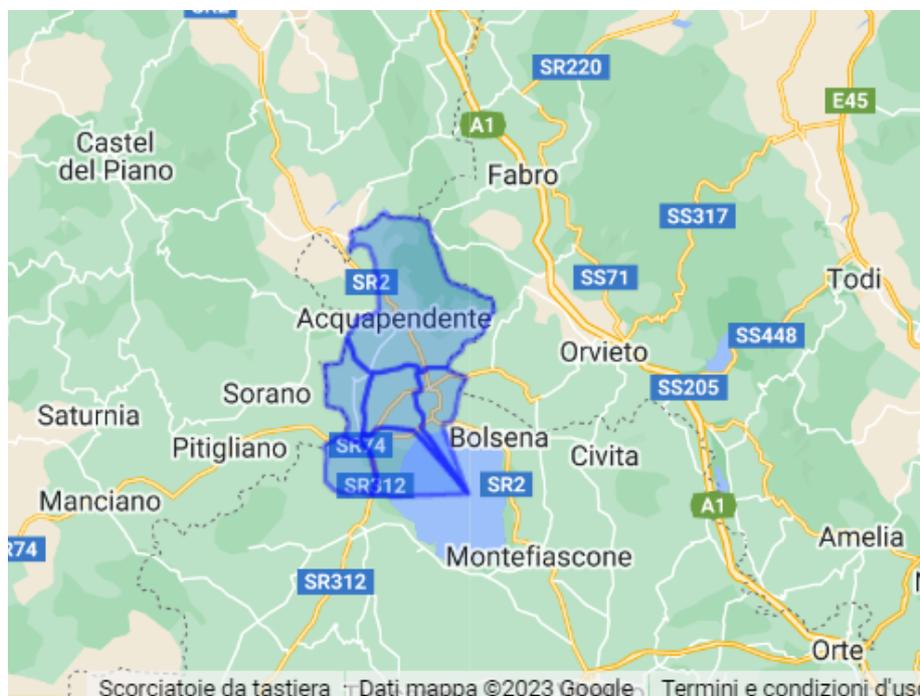
## ORGANOLEPTIC QUALITIES

This renown pulse, beloved by popes and cardinals alike, is the true cultural and agri-cultural symbol of the local community. Lightly brown-greenish, variable in its intensity and marbling, it enjoys an extremely thin skin that doesn't require soaking. Its soft, creamy consistency is permeated by an aroma of hay and herbs.

## IN SEASON

The PGI Lenticchia di Onano, dried, is available all year round.

### Production area



# NUTRITIONAL FOOTPRINT

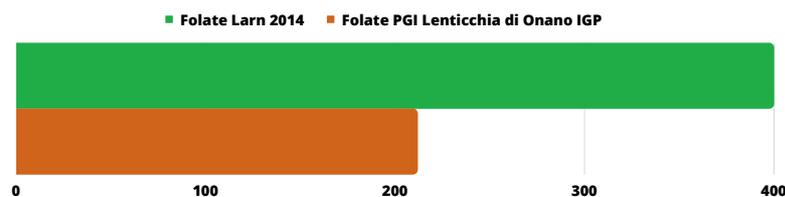
1 serving= 50 g of dried lentils

## NUTRITIONAL VALUES PER SERVING

Calories	166 Kcal
Protein	11.9 g
Total Fat	0.5 g
Carbohydrate	25.5 g
starch	23.0 g
sugars	2.5g
Dietary fiber	4.7 g

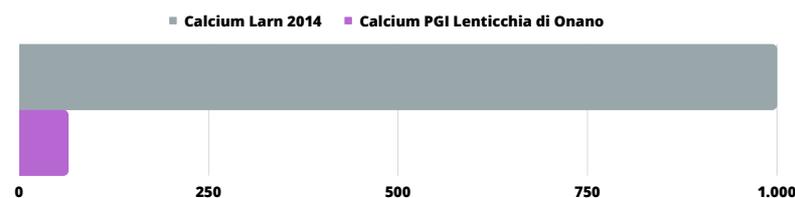
Rich in Folates = 212 µg/serving

% Daily intake: 53%



Good Calcium content = 65.2 mg/serving

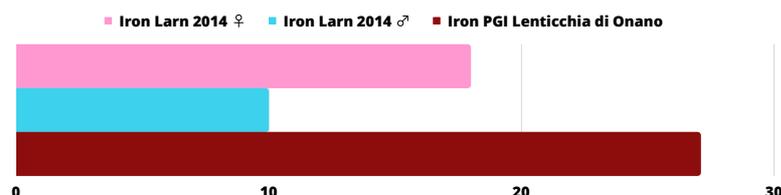
% Daily intake: 6.5%



Rich in Iron = 27.1 mg/serving

Women % Daily intake: 150%

Men % Daily intake: 271%



Project PRAL 2003/04 "Identificazione, caratterizzazione nutrizionale ed effetto protettivo sulla salute dell'uomo di ecotipi leguminose di particolare interesse (Fagiolo Cannellino, Cicerchia, Lenticchia) coltivati nel Lazio e altri campionamenti" ("Identification, nutritional characterization and protective effect on human health of legumes ecotype of particular interest (Cannellino bean, cicerchia, lenticchia) grown in Lazio and other samplings") Financed by the Economic and Employment Department, Regional Directorate of Agriculture of Lazio Region.

LARN. Livelli di Assunzione di Riferimento di Nutrienti ed energia per la popolazione italiana. IV Revisione della Società Italiana della Nutrizione Umana. 2014.

## MICRONUTRIENTS PER SERVING

Manganese	0.8 mg
Zinc	2.2 mg
Phosphorus	240.5 mg
Potassium	500.4 mg
Copper	0.6 mg

## SERVING SUGGESTION

Sweet and dainty, the PGI Lenticchia di Onano is perfect for soups, with fresh or dried pasta or as a side dish, simply dressed with extra virgin olive oil, garlic, carrots, celery, and a touch of tomato.

# PGI Lenticchia di Altamura



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## ORGANOLEPTIC QUALITIES

The PGI Lenticchia di Altamura is known to be a product of the local “family farm” economy. The colour of its skin may vary from green to brown and it won't overcook. Its aroma is unmistakable and its taste intense.

## IN SEASON

The PGI Lenticchia di Altamura, dried, is available all year round.

### Production area



# NUTRITIONAL FOOTPRINT

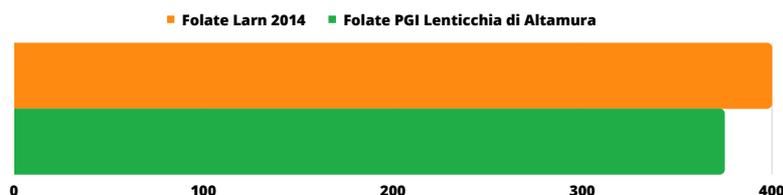
1 serving= 50 g of dried lentils

## NUTRITIONAL VALUES PER SERVING

Calories	177 Kcal
Protein	13.0 g
Total Fat	0.8 g
Carbohydrate	26.8 g
starch	24.3 g
sugars	2.5 g
Dietary fiber	4.0 g

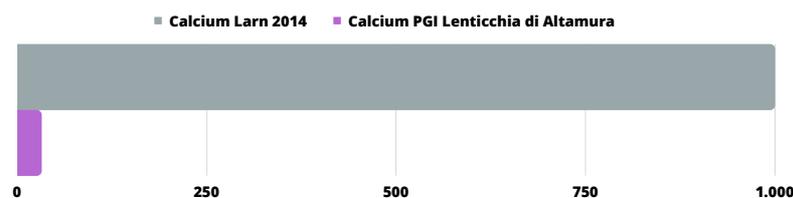
Rich in Folates= 375 µg/serving

% Daily intake: 94%



Good Calcium content = 32.5 mg/serving

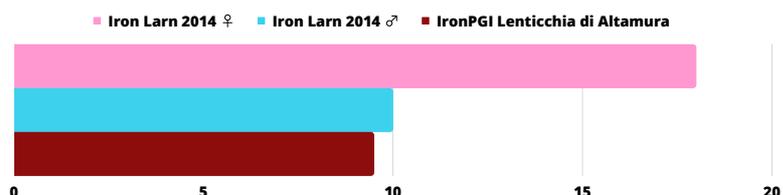
% Daily intake: 3%



Rich in Iron = 9.5 mg/serving

Women % Daily intake: 53%

Men % Daily intake: 95%



Project PRAL 2003/04 "Identificazione, caratterizzazione nutrizionale ed effetto protettivo sulla salute dell'uomo di ecotipi leguminose di particolare interesse (Fagiolo Cannellino, Cicerchia, Lenticchia) coltivati nel Lazio e altri campionamenti" ("Identification, nutritional characterization and protective effect on human health of legumes ecotype of particular interest (Cannellino bean, cicerchia, lenticchia) grown in Lazio and other samplings") Financed by the Economic and Employment Department, Regional Directorate of Agriculture of Lazio Region.

LARN. Livelli di Assunzione di Riferimento di Nutrienti ed energia per la popolazione italiana. IV Revisione della Società Italiana della Nutrizione Umana. 2014.

## MICRONUTRIENTS PER SERVING

Magnesium	80.0 mg
Zinc	2.0 mg
Copper	0.49 mg

## SERVING SUGGESTION

Given its size and thick skin, these lentils need to be soaked for a couple of hours before cooking. After a long, slow cooking are perfect for soups such as minestrone. Perfect, as well, with tomato puree and bay leaves, to highlight their complex aroma.



All Dietary Guidelines recommend the daily consumption of fruit and vegetables (at least 5 portions a day), mainly in season, as it eases both food variety and a good organoleptic and nutritional quality. Choosing seasonal products also means saving money and reducing environmental impact of the cultivation as well as the supply chain.

The Radicchio of Treviso and the Variegato of Castelfranco, particularly resistant to low temperatures, are available all year round and for this reason, they represent a very interesting culture. They are, as well, an important source of micronutrients useful for the winter when vegetables are scarce.

Assessing their nutritional and health specificity make them easily recognizable and allow their promotion in Italy and Europe.

The Radicchio Rosso di Treviso and the Variegato di Castelfranco hold both cultural and economical value. Their typicality stems from an array of factors, environmental, productive, and cultural, bonded to the terroir and so to an entire community with its traditions, knowledge, and expertise.

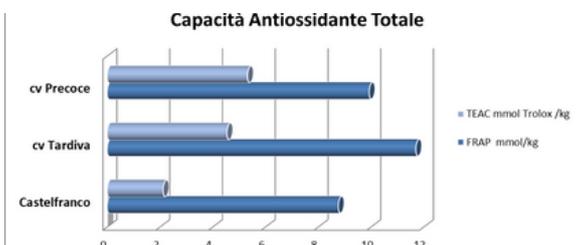
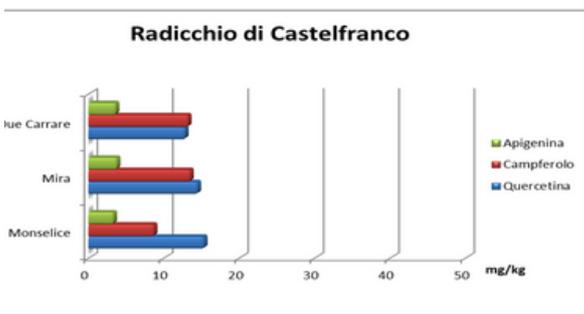
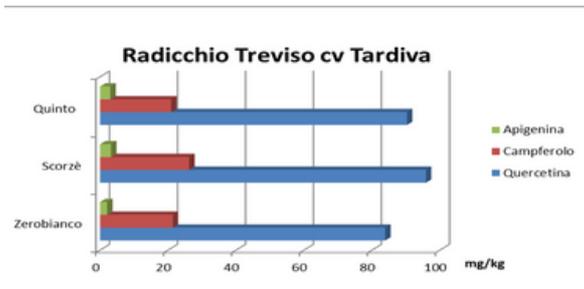
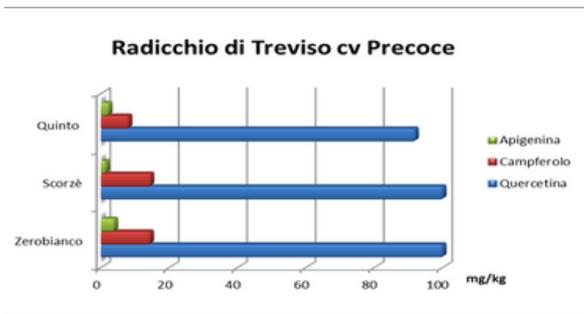


[www.fioridivernata.tv/prodotti-territorio/](http://www.fioridivernata.tv/prodotti-territorio/)

## Food composition database

The caloric intake of the Radicchio Rosso di Treviso and of the Variegato di Castelfranco is generally low. They mainly hold water, mineral salts, vitamins and fiber which act as a body bioregulator.





## The BIOVITA\* Project outcomes

The consumption of radicchio contributes to a relevant intake of minerals but, above all, of many compounds able to carry out mandatory biological activities and to provide a protective effect or specific functional values to the different Radicchio varieties. Our results show a moderate variability in the different kinds of Radicchio, not only about the anthocyanin content (which gives the Radicchio di Treviso its characteristic red color and the red spots to the Castelfranco one), but also in other bioactive molecules content (flavonoids, ascorbic acid and carotenoids) linked to the climatic facets of their geographical area and to different cultivars farming methods.

Another motivating result concerns the antioxidant plants potential due to the anthocyanins and to a synergic effect of the bioactive molecules which make the Radicchio a particularly interesting plant, from a nutritional and healthy perspective.

## Quality starts from the ingredients

These productions are a true PGI excellence and meet, as well, the “hedonistic” quality of foods: landscapes, traditions, quality and safety.

So, the recipes can become a sensorial experience, a place of the heart where the extra virgin olive oil combines with land, taste, and the traditional Mediterranean lifestyle.

## Raw, cooked, processed



\*Funded by the Ministry of Agricultural, Food and Forestry policies, BIOVITA Project "Biodiversity and Agrifood: tools to describe the Italian reality" (D.M. 3684/7303/08 del 13/06/2008)

<http://www.scienzaegoverno.org/article/progetto-biovita-contributi-alla-salvaguardia-della-biodiversita-agricoltura>

## Traceability and technology: the case of PGI Radicchio and Magnetic Resonance

M. Ritota, M. Valentini  
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Traceability and PDO and PGI foods is one of main target in applied research.

Among many analytical techniques, Nuclear Magnetic Resonance (NMR) spectroscopy is one of the most impressive.

### PROJECT AIM

In the study we used the NMR and multivariate statistical tools in order to identify metabolic markers related to the production area and to the overall quality.



Set apart the PGI and non-PGI Radicchio



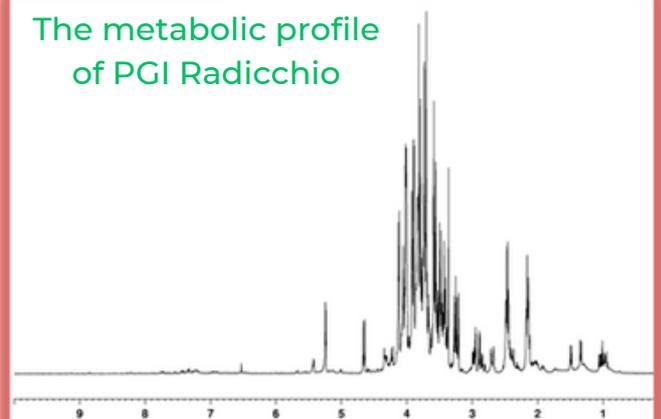
The NMR spectrometer

NMR spectroscopy can identify in few minutes the main components of any food metabolic profile, made by 50 to 80 circa low molecular weight molecules.

The metabolic profile depends on both the genotype and the phenotype; the latter is the combination of cultivation practice and the production area.

The metabolic profile is a complex mixture of molecules, influenced by the genotype and the phenotype. A combination of several metabolites can be used for the traceability

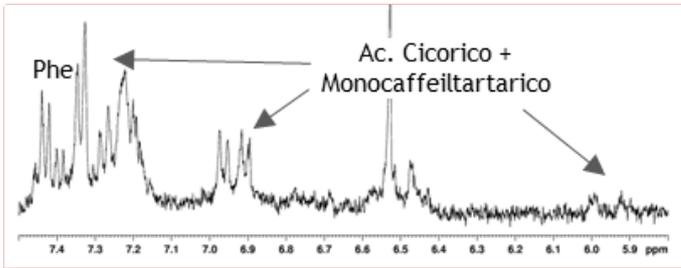
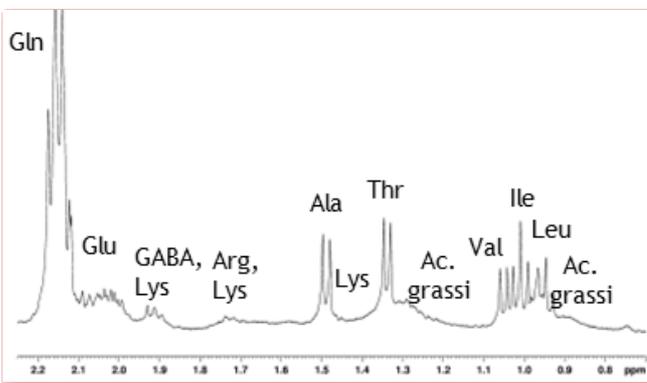
The metabolic profile of PGI Radicchio



## METABOLIC PROFILE of RADICCHIO

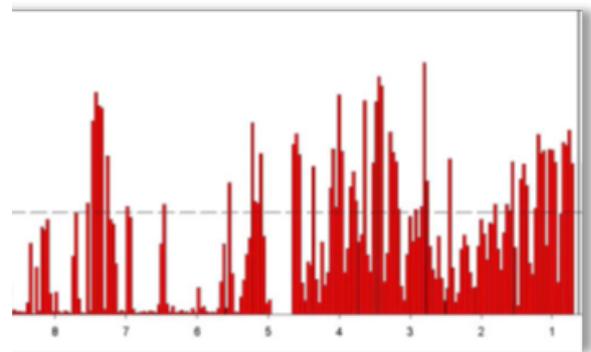
Expansion of the metabolic profile of Radicchio obtained by NMR, which reveals the presence and the amount of some relevant molecules, as aminoacids and fatty acids.

...and antioxidants molecules as well, *i.e.* hydroxycinnamic acids.

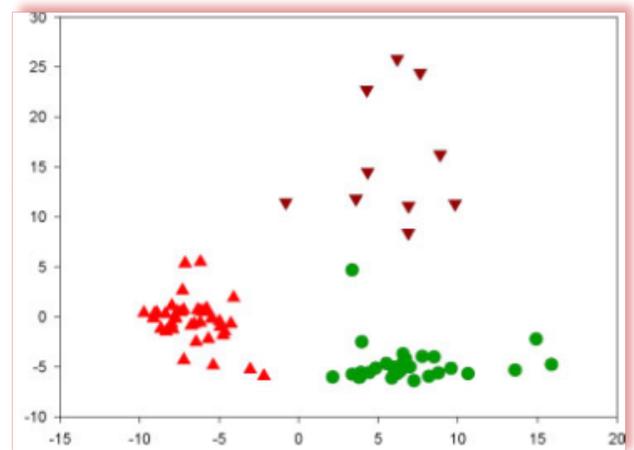


## STATISTICAL ANALYSIS

Graph reporting the relevance of the various metabolites.



The 2D-plot reports the separation, and thus the traceability, of the PGI Radicchio di Treviso (dark red triangles), of the PGI Radicchio Variegato di Castelfranco (green circles) and of the non-PGI commercial equivalent (pale red triangles).



TRACEABILITY OF PGI AND PDO FOODS IS MANDATORY FOR THEIR VALORIZATION, AND NMR SPECTROSCOPY HAS PROVEN TO BE A VERY USEFUL TOOL FOR THE PGI RADICCHIO

These results were gained during the project "Biodiversità e agroalimentare; strumenti per descrivere la realtà italiana" BIOVITA, funded by the Ministero delle politiche agricole alimentari e forestali (MiPAAF) D.M. 3684/7303/08 del 13/06/2008.