



Incontro tecnico di presentazione dell'attività e dei primi risultati conseguiti

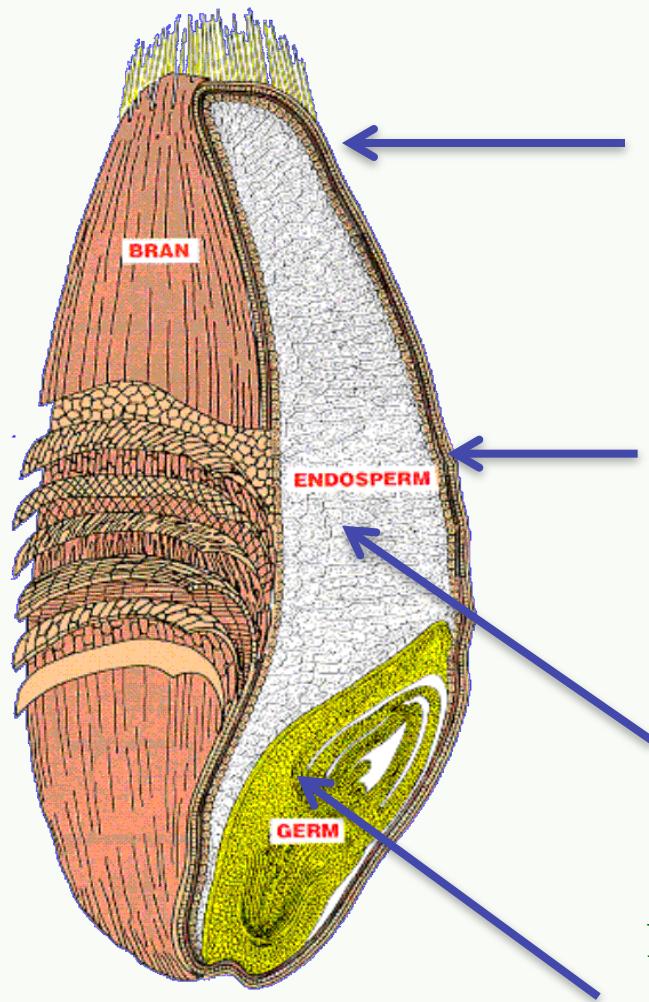
*Per il progetto Biovant N. 5004323 “Creazione di un
modello sostenibile di best practices per la valorizzazione
di varietà antiche di frumento tenero nella Regione
Emilia Romagna”*

“Alcuni risultati delle ricerche svolte sui grani antichi”

SELEZIONE DEI FRUMENTI

- Taglia ridotta (resistenza all' allettamento)
- Precocità
- Resistenza alle malattie fungine
- Resistenza a stress abiotici
- Qualità delle proteine
- Qualità dell' amido
- Indice di giallo
- Resa in farina e semola: peso di mille cariossidi e peso ettolitrico

LA CARIOSSIDE



PERICARPO e TEGUMENTI
SEMINALI 8-10 %
Fibra alimentare, minerali

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CRUSCA

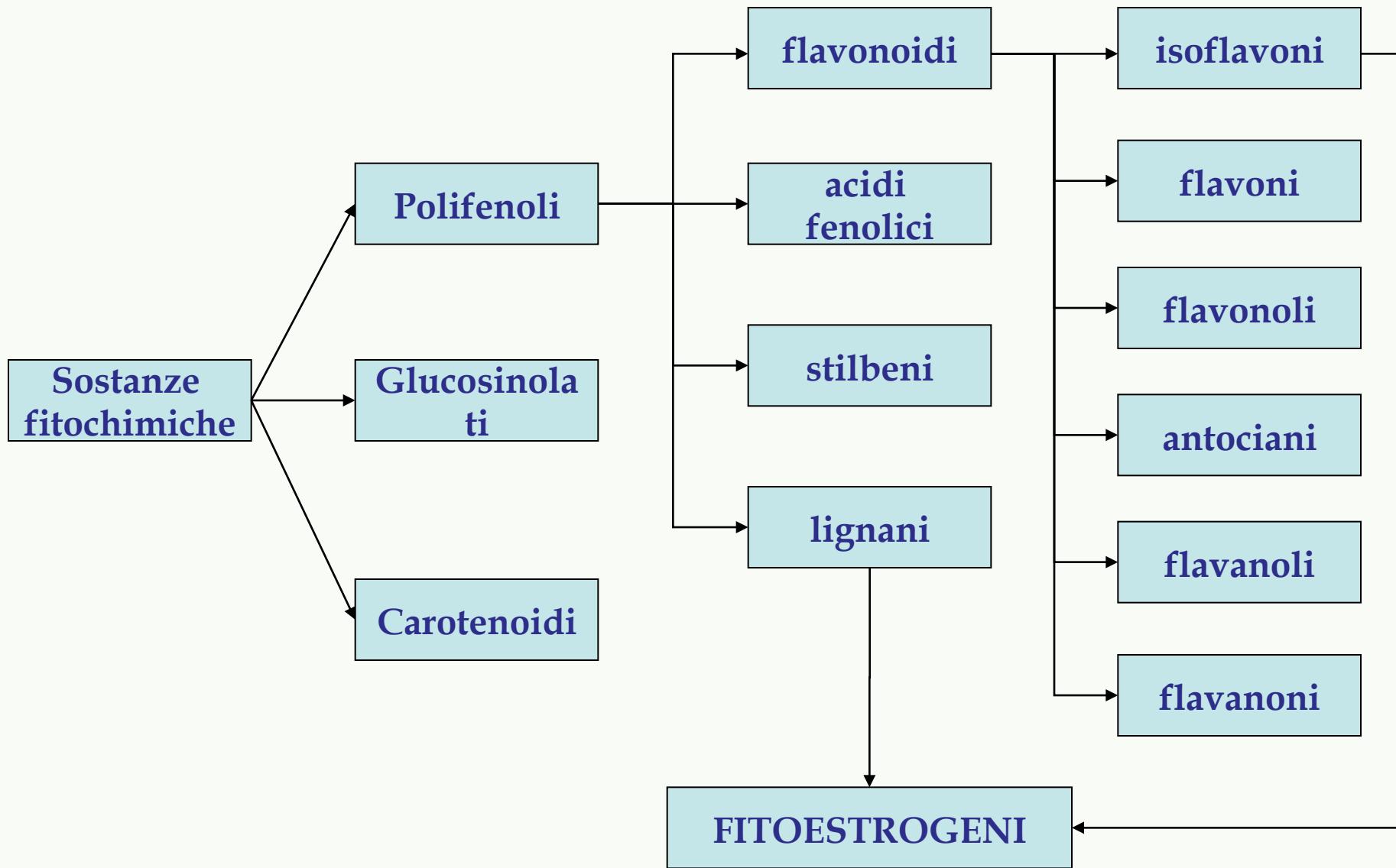
ALEURONE
Fibra alimentare
Proteine ad elevato valore
nutrizionale, minerali, lipidi

ENDOSPERMA
AMILACEO 87-89 %
Amido, proteine
di riserva , vit. B

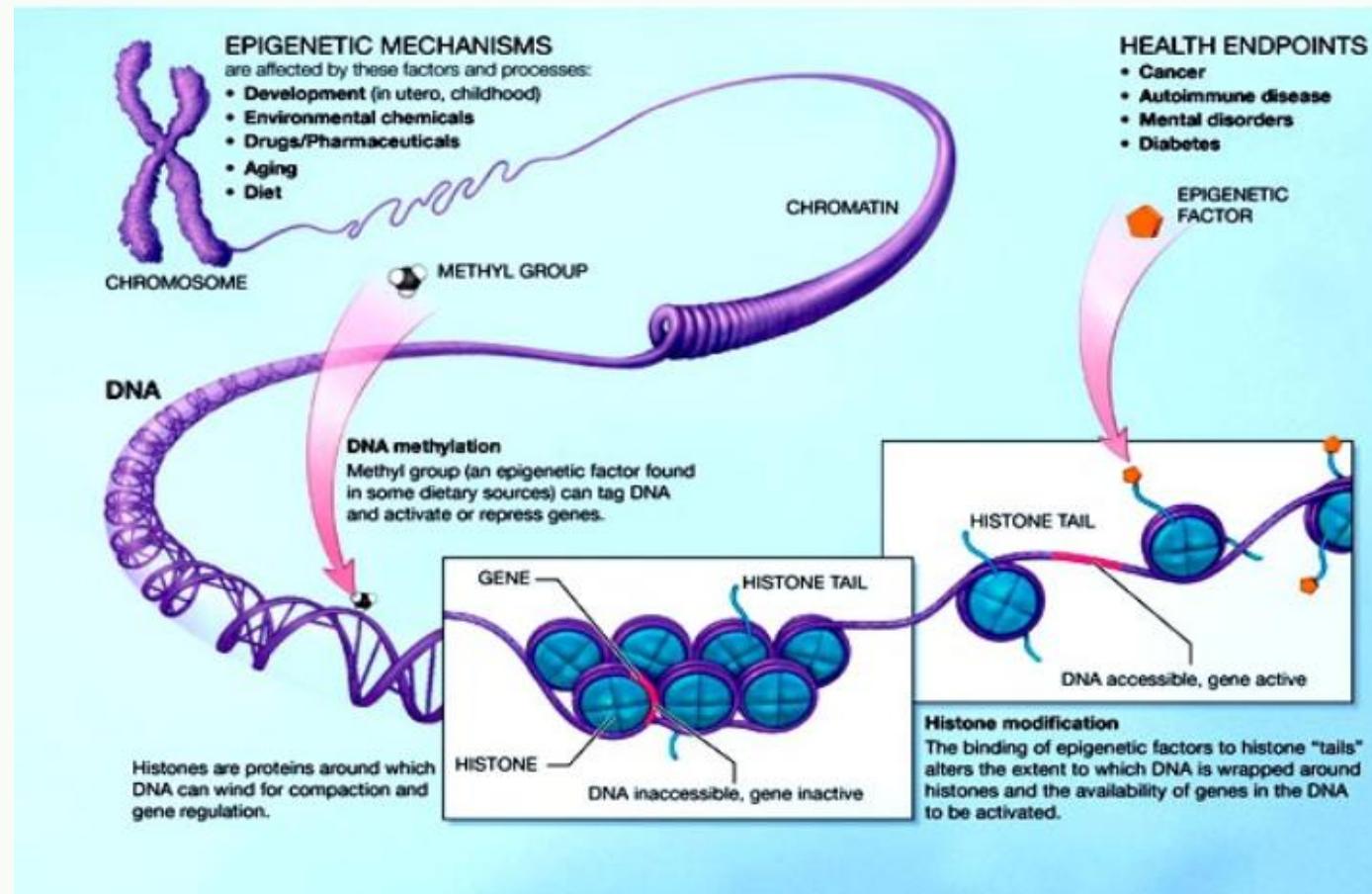
FARINA
SEMOLA

EMBRIONE - GERME 2-4 % in
peso Proteine solubili, lipidi,
enzimi, vit. B₁,B₆, ceneri

SOSTANZE BIOLOGICAMENTE ATTIVE PRESENTI NEGLI ALIMENTI DI ORIGINE VEGETALE



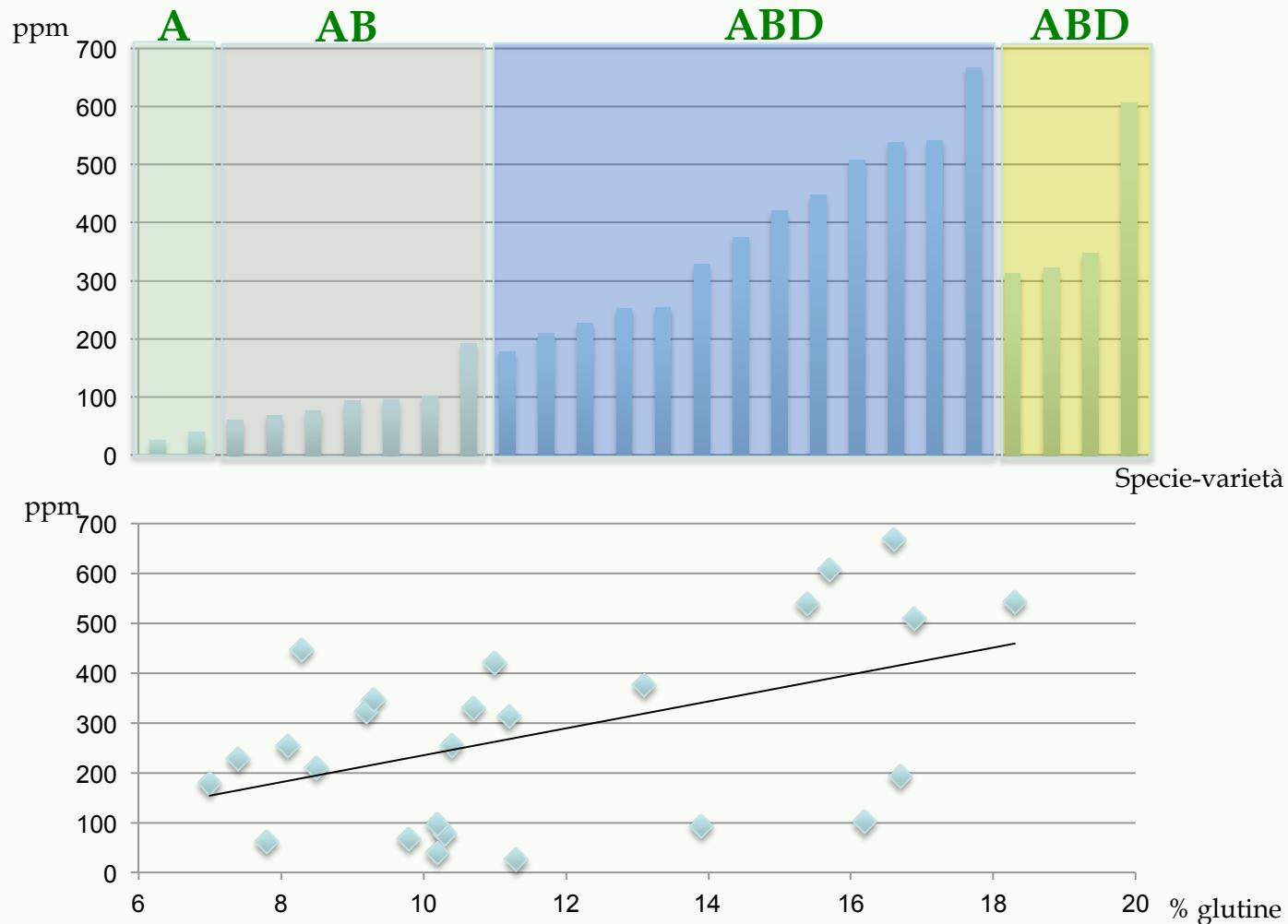
CIBO MODULATORE DELL'ESPRESSIONE DEI GENI FATTORI EPIGENETICI



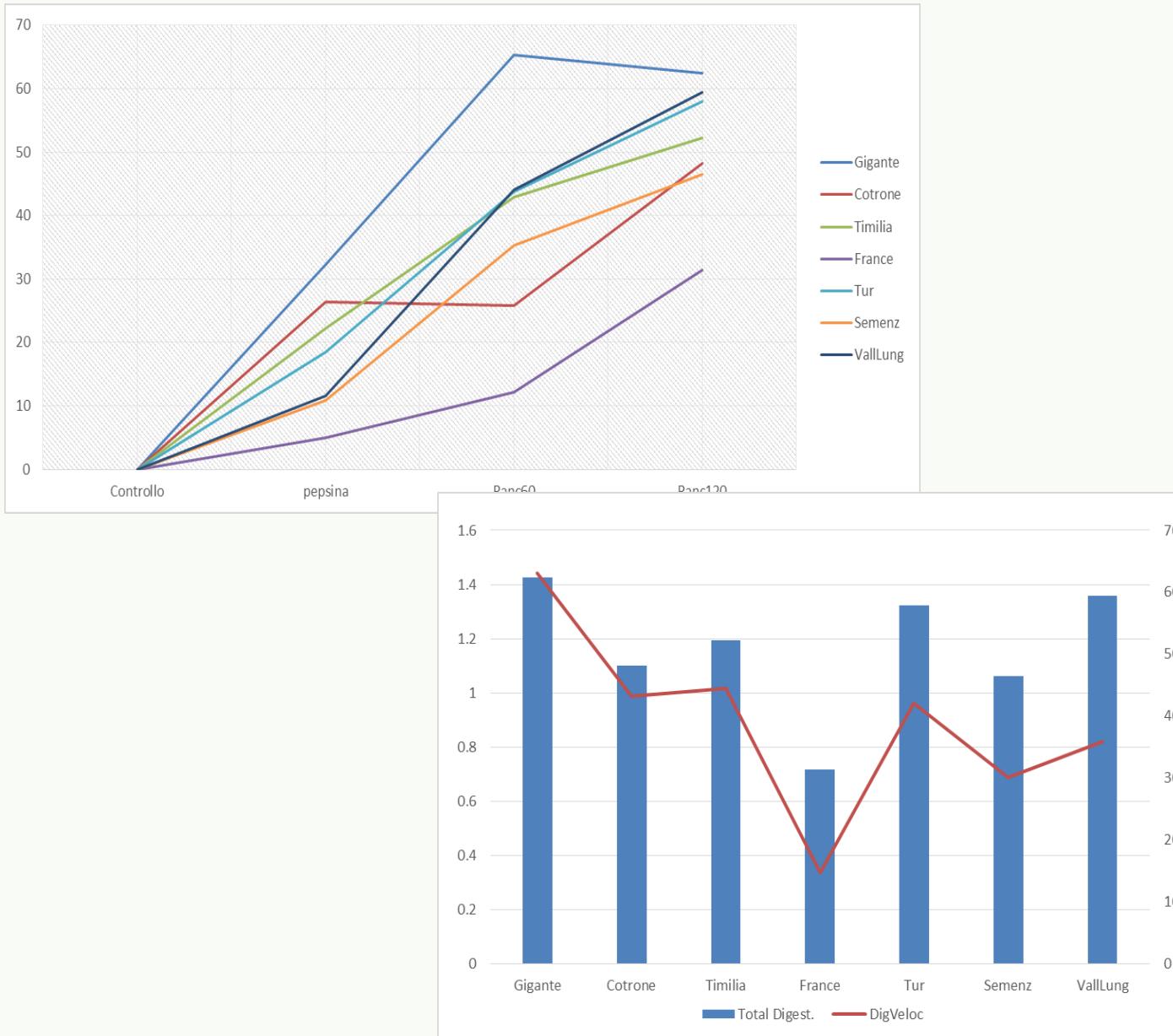
polyphenols are able to regulate the immune function and has been also demonstrated an effect on epigenetic mechanisms, it is possible to hypothesize that there exists a mediator role of epigenetic mechanisms in the modulation of the immune response by polyphenols.
A. Cuevas *et al.* *Nutrients.* 2013 Jul; 5(7): 2314–2332

REATTIVITÀ ALL' ANTICORPO G12

P. Gelinas & C. McKinnon. I.J.Food Sci. and Techn. 2016



DIGERIBILITÀ - PROVE IN VITRO



Effects of Short-Term Consumption of Bread Obtained by an Old Italian Grain Variety on Lipid, Inflammatory, and Hemorheological Variables: An Intervention Study

Francesco Sofi,^{1,2,3,4} Lisetta Ghiselli,^{4,5} Francesca Cesari,¹ Anna Maria Gori,^{1,2} Lucia Mannini,¹
Alessandro Casini,^{3,4} Concetta Vazzana,^{4,5} Vincenzo Vecchio,^{4,5} Gian Franco Gensini,^{1,2}
Rosanna Abbate,^{1,4} and Stefano Benedettelli^{4,5}

¹*Department of Medical and Surgical Critical Care, Thrombosis Centre, University of Florence, and ³Regional Agency for Nutrition, University Hospital of Careggi, Florence; ⁴Multidisciplinary Centre of Research on Food Sciences*

and ⁵Department of Agronomy and Land Management, University of Florence, Florence; and ²Don Carlo Gnocchi Foundation, Impruneta, Florence

Prove *in vivo*

20 soggetti clinicamente sani

[9 M; 11 F; età media: 39.5 anni (range: 21-61 anni)]

- 150 g/giorno di pane prodotto con la varietà Verna per 10 settimane (**Test period**)
- 10 settimane di “wash-out”
- 150 g/giorno di pane commerciale per 10 settimane (**Control period**)

Time points:

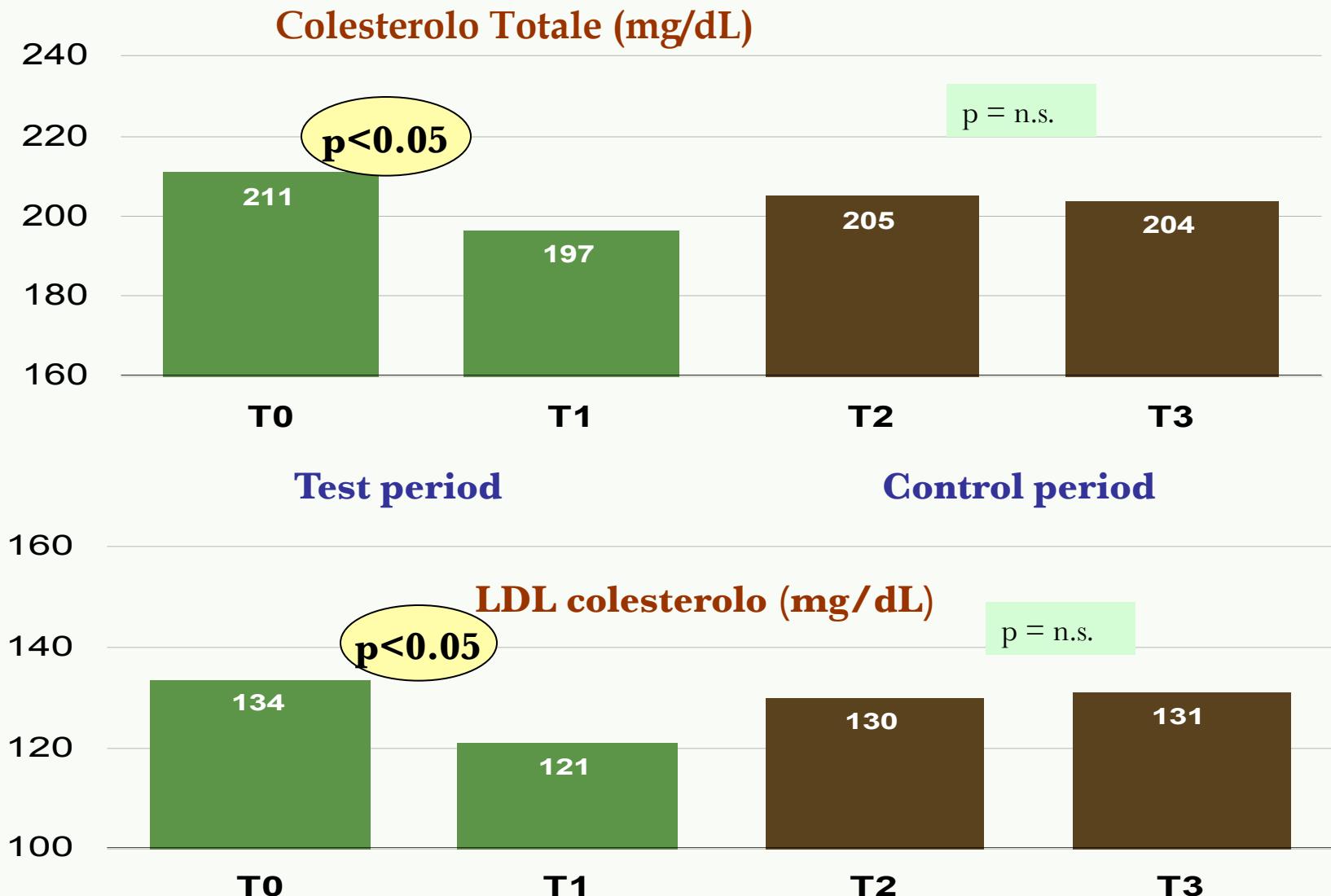
Inizio del periodo di Test (T0)

Fine periodo di Tast (T1)

Inizio periodo di controllo (T2)

Fine periodo di controllo (T3)

Profilo Lipidico



Sofi et al., J Med Food 2010



ORIGINAL ARTICLE

Characterization of Khorasan wheat (Kamut) and impact of a replacement diet on cardiovascular risk factors: cross-over dietary intervention study

F Sofi^{1,2,3,7,8}, A Whittaker^{4,7,8}, F Cesari², AM Gori², C Fiorillo⁵, M Becatti⁵, I Marotti⁶, G Dinelli⁶, A Casini^{1,7}, R Abbate^{2,7}, GF Gensini^{2,3} and S Benedettelli^{4,7}



Obiettivo

Studiare gli effetti di una dieta a base di frumento khorasan sui biomarcatori associati a malattie ateriosclerotiche e cardiovascolari.



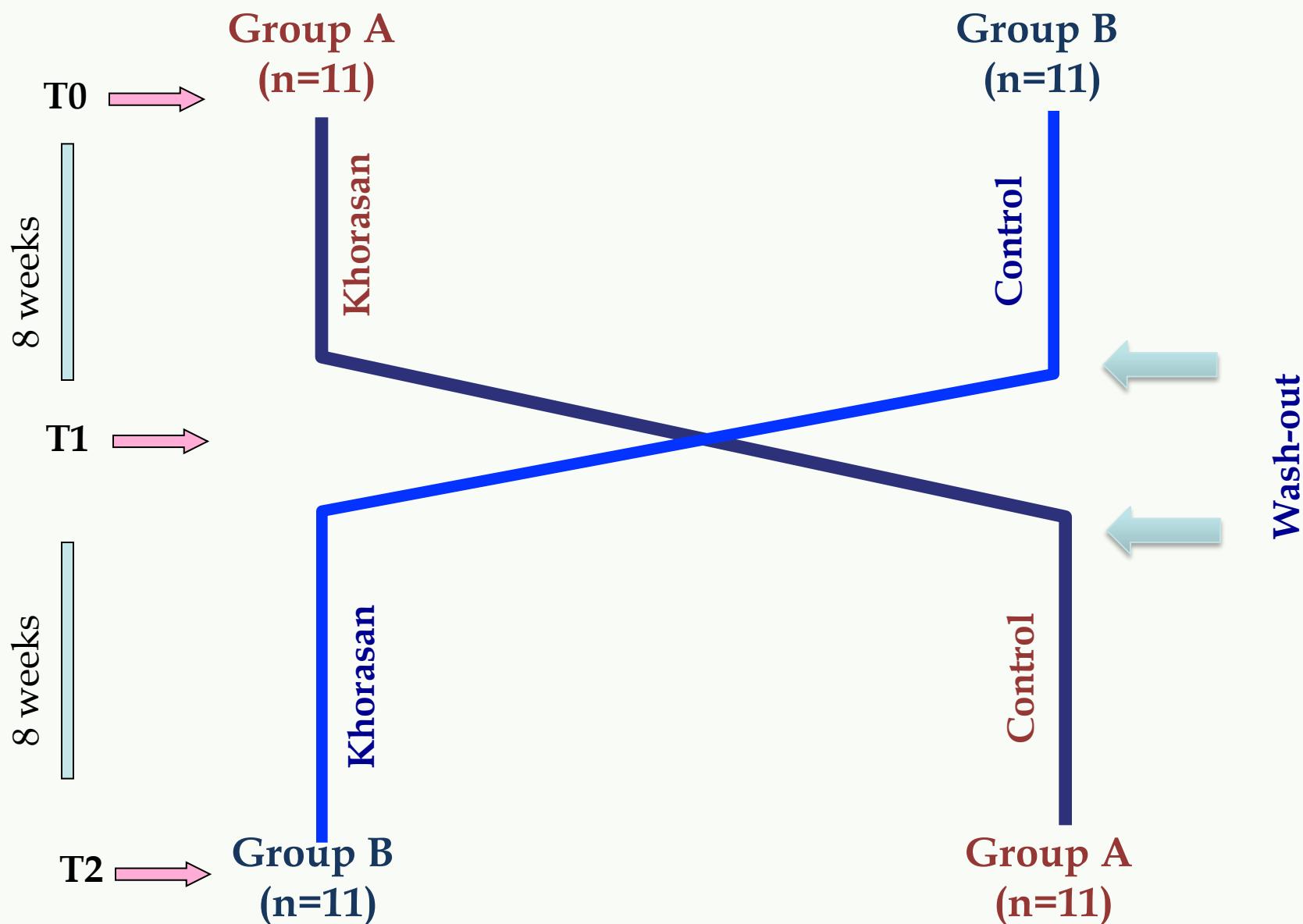
22 clinically healthy subjects

8 males / 14 females

Age: 50.5 (26-66) y

BMI: 23.2 +/- 3.6

Disegno sperimentale



Prodotti

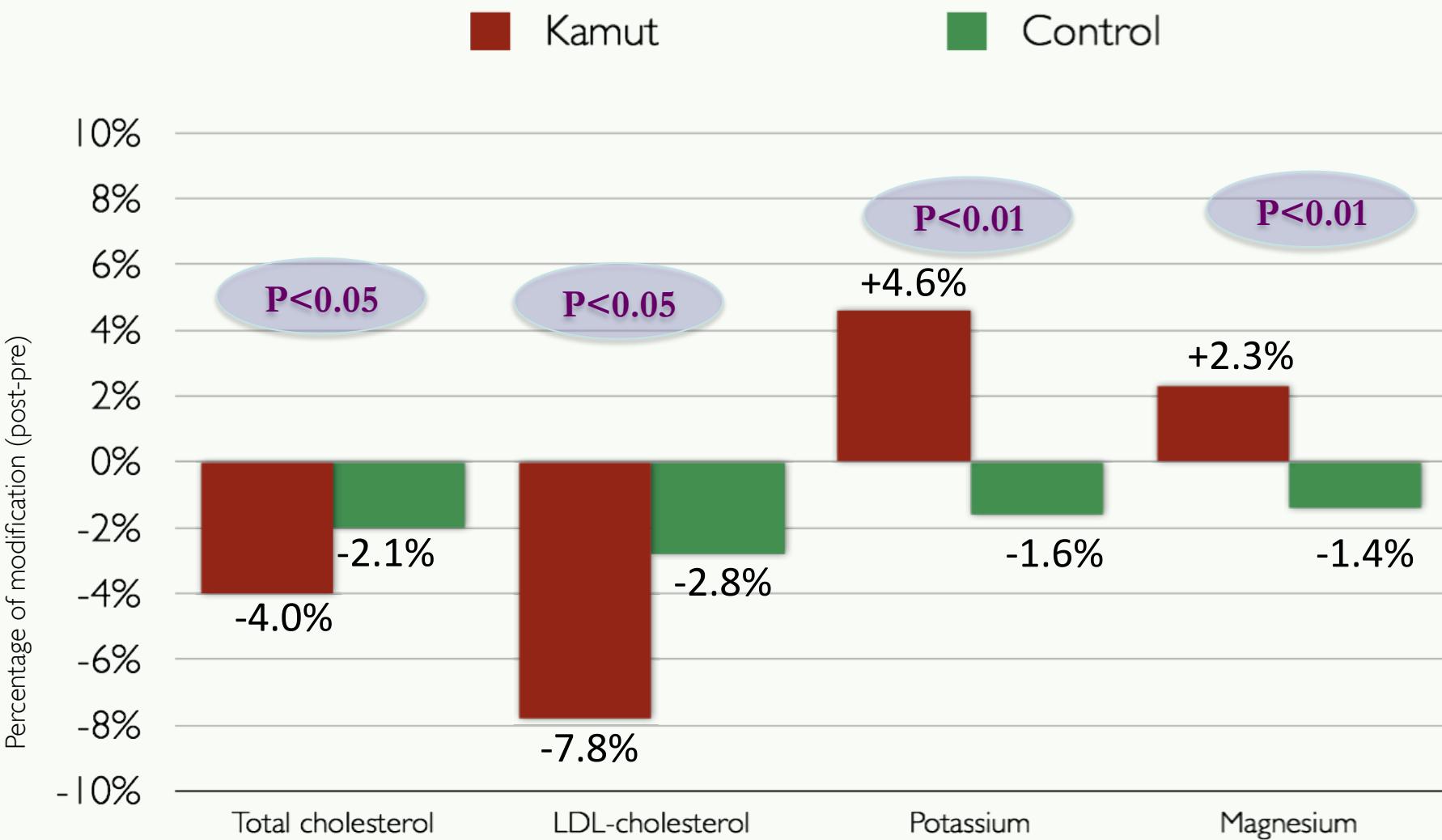


Caratteristica della semola e della farina

Variable	Khorasan (<i>Semolina</i>)	Control (<i>Semolina</i>)	P	Khorasan (<i>Flour</i>)	Control (<i>Flour</i>)	P
Potassium, mg/Kg	2817 ± 6.52	2393 ± 0.808	0.006	2663 ± 0.811	1553 ± 6.47	0.001
Magnesium, mg/Kg	909.57 ± 58.7	795.58 ± 50.1	0.003	889.03 ± 27.6	542.06 ± 28.9	0.001
Phosphorus, mg/Kg	2.98 ± 0.26	2.67 ± 0.62	0.001	2.85 ± 0.62	1.77 ± 0.84	0.02
Zinc, mg/Kg	25.19 ± 0.05	25.99 ± 0.09	0.02	24.95 ± 0.02	15.15 ± 0.05	0.001
Iron, mg/Kg	29.63 ± 0.24	28.02 ± 0.04	0.06	24.13 ± 0.04	20.42 ± 0.14	0.01
Selenium, mg/Kg	0.99 ± 0.04	0.92 ± 0.03	0.2	0.90 ± 0.008	0.74 ± 0.006	0.02
Vanadium, mg/Kg	1.01 ± 0.02	0.73 ± 0.008	0.005	0.98 ± 0.008	0.63 ± 0.004	0.0001

Sofi et al., Eur J Clin Nutr 2013

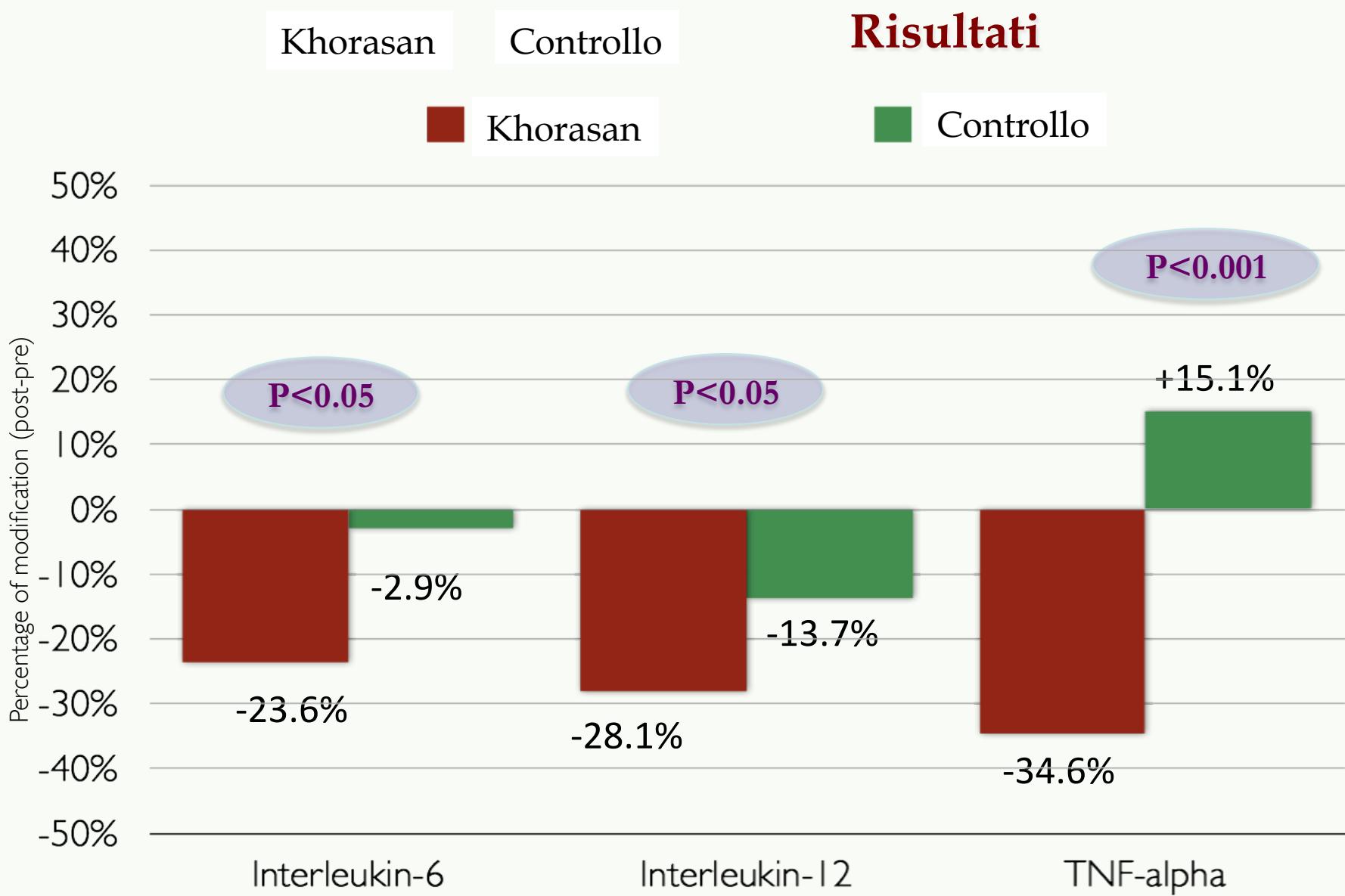
Risultati



General linear model for repeated measurements after
adjustment for age and gender

Sofi et al., Eur J Clin Nutr 2013

Risultati



General linear model for repeated measurements after adjustment for age and gender

Sofi et al., Eur J Clin Nutr 2013



Effect of *Triticum turgidum* subsp. *turanicum* wheat on irritable bowel syndrome: a double-blinded randomised dietary intervention trial

Francesco Sofi^{1,2,3,4*}, Anne Whittaker^{4,5}, Anna Maria Gori^{2,3}, Francesca Cesari², Elisabetta Surrenti⁶, Rosanna Abbate^{2,4}, Gian Franco Gensini^{2,3}, Stefano Benedettelli^{4,5} and Alessandro Casini^{1,2,4}

¹*Agency of Nutrition, Careggi University Hospital, Florence, Italy*

²*Department of Experimental and Clinical Medicine, University of Florence, Largo Brambilla 3, Florence 50134, Italy*

³*Don Carlo Gnocchi Foundation Florence, Florence, Italy*

⁴*Interdipartimental Center for Research on Food and Nutrition, University of Florence, Florence, Italy*

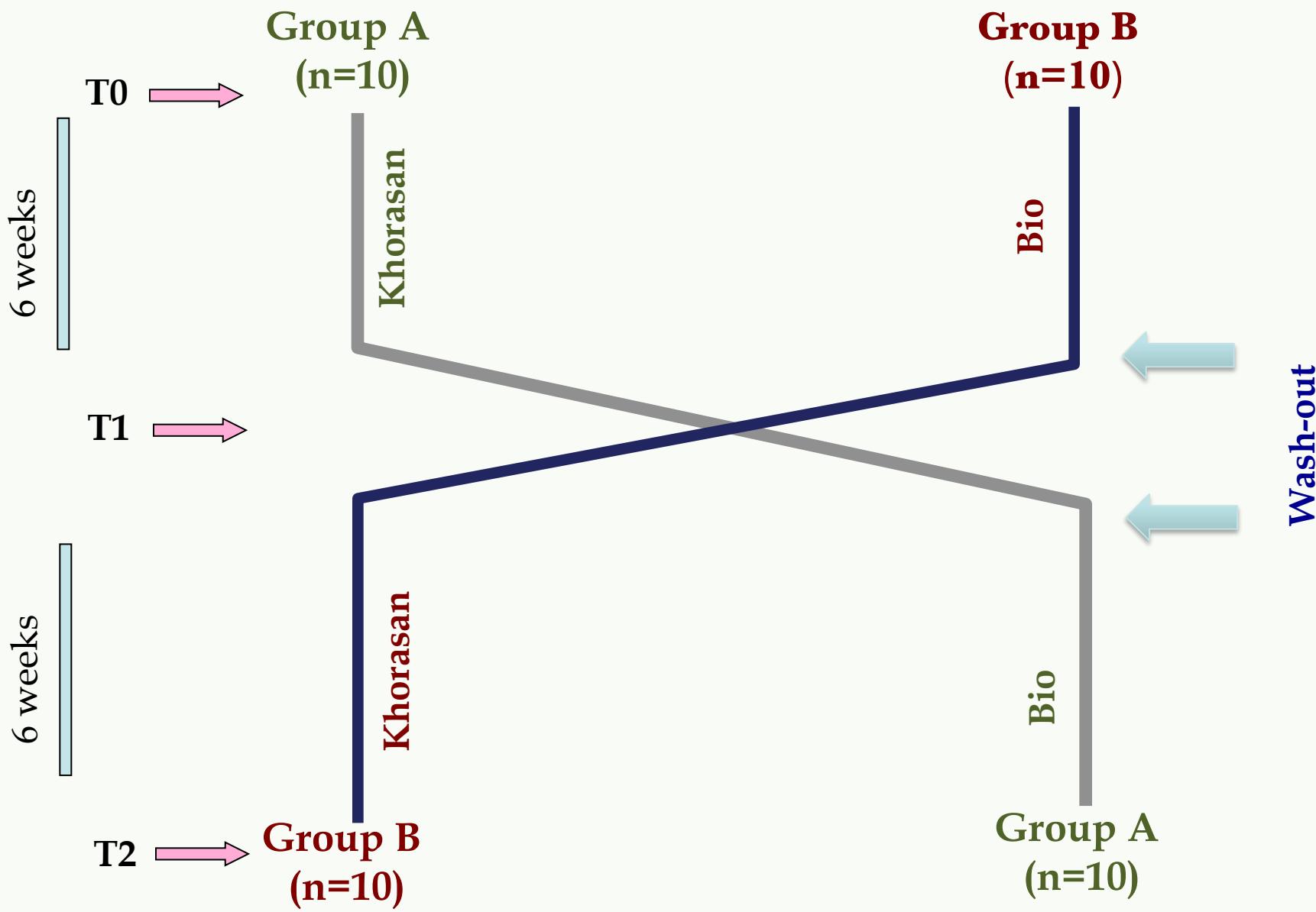
⁵*Department of Agrifood Production and Environmental Sciences, University of Florence, Florence, Italy*

⁶*Digestive Pathophysiology and Motility Unit, Careggi University Hospital, Florence, Italy*

Investigare se una dieda a base di frumento khorasan può migliorare:

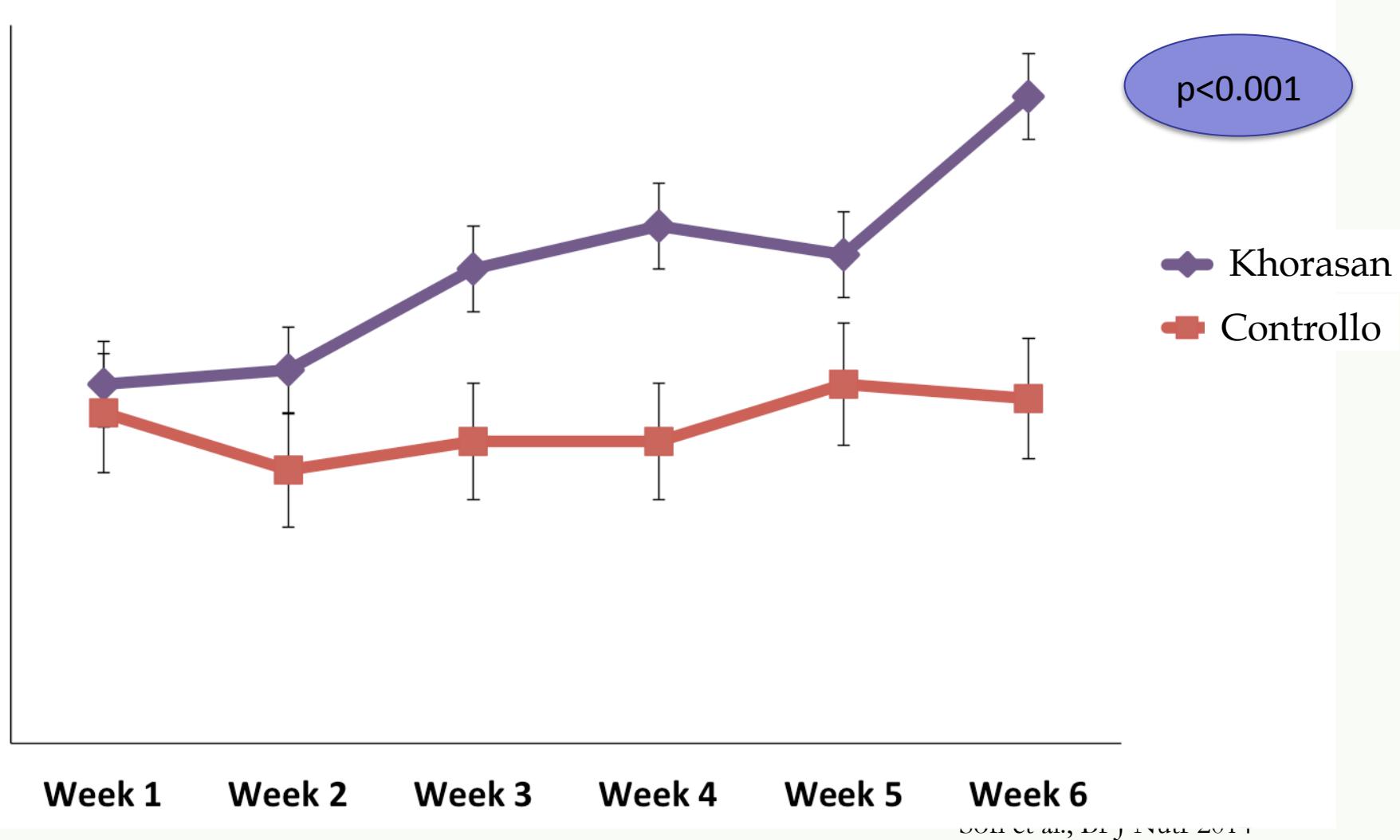
1. Sintomi gastrointestinali
2. Qualità delle vita
3. Parametri biochimici

Disegno sperimentale



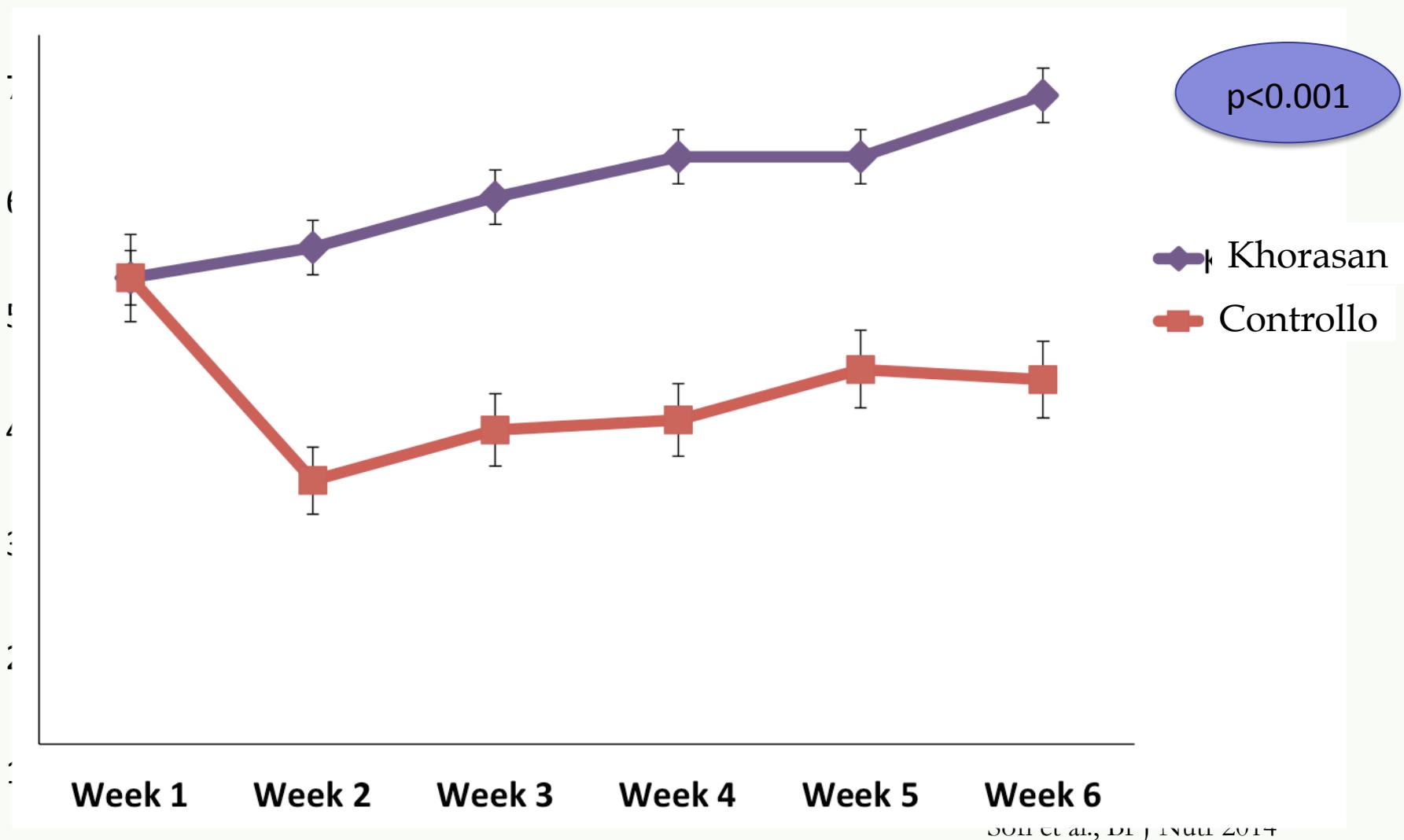
Risultati

DOLORI ADDOMINALI (1=forti dolori; 7=assenza di dolori)



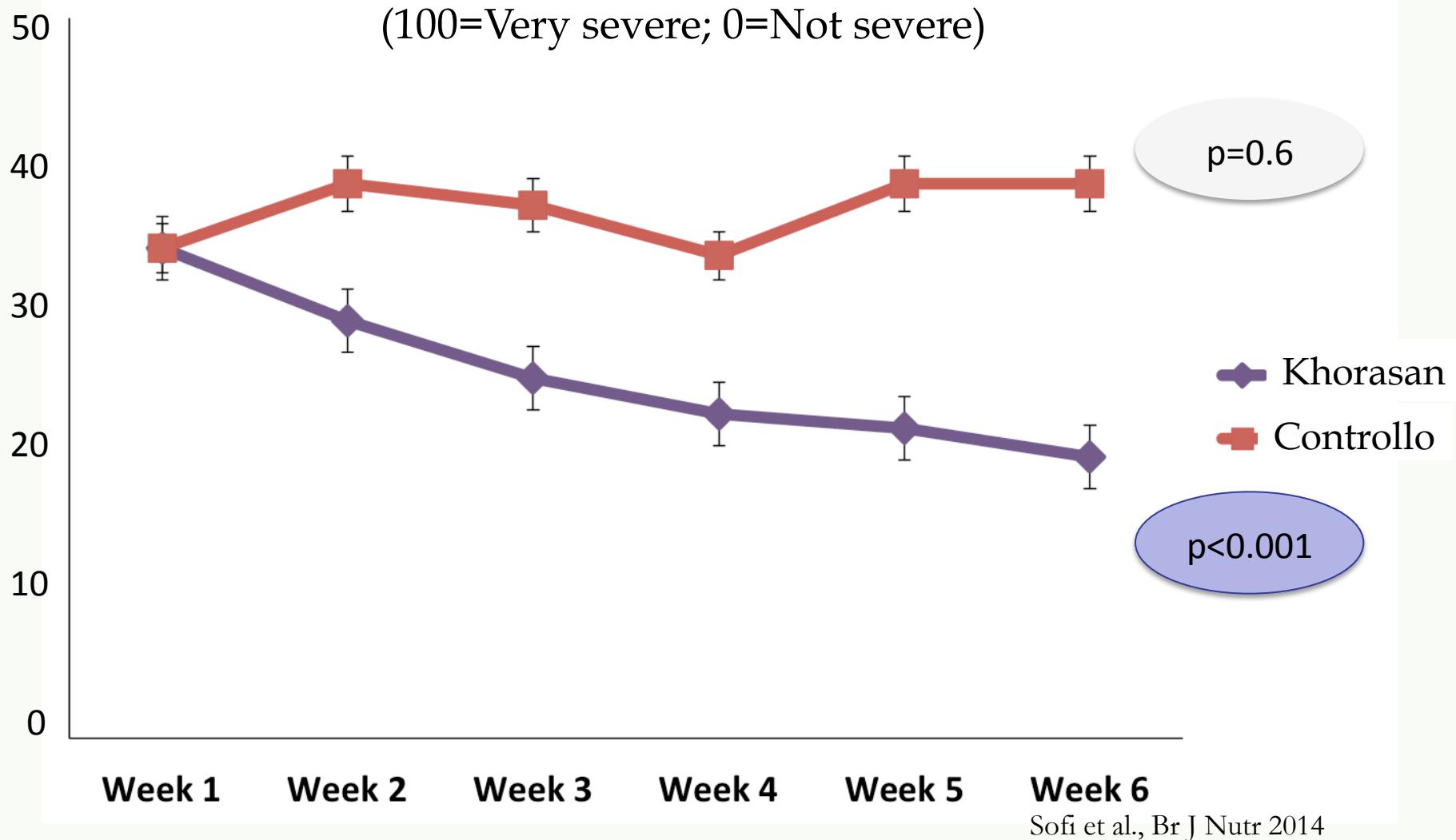
Resultati

Severità del Gonfiore (1=Gonfiore Acuto; 7=Assenza di Gonfiore)



Risultati

Qualità della vita





Article

An Organic Khorasan Wheat-Based Replacement Diet Improves Risk Profile of Patients with Acute Coronary Syndrome: A Randomized Crossover Trial

Anne Whittaker ¹, Francesco Sofi ^{2,3,4,*}, Maria Luisa Eliana Luisi ⁴, Elena Rafanelli ⁴,
Claudia Fiorillo ⁵, Matteo Becatti ⁵, Rosanna Abbate ³, Alessandro Casini ², Gian Franco Gensini ³
and Stefano Benedettelli ¹

Obiettivo

Studiare l'effetto di una dieta a base di grano Khorasan sul profilo biochimico di pazienti con sindrome coronaria acuta

22 pazienti con diagnosi di sindrome acuta coronarica A (16 infartuti; 6 angina istabile)

Variabili

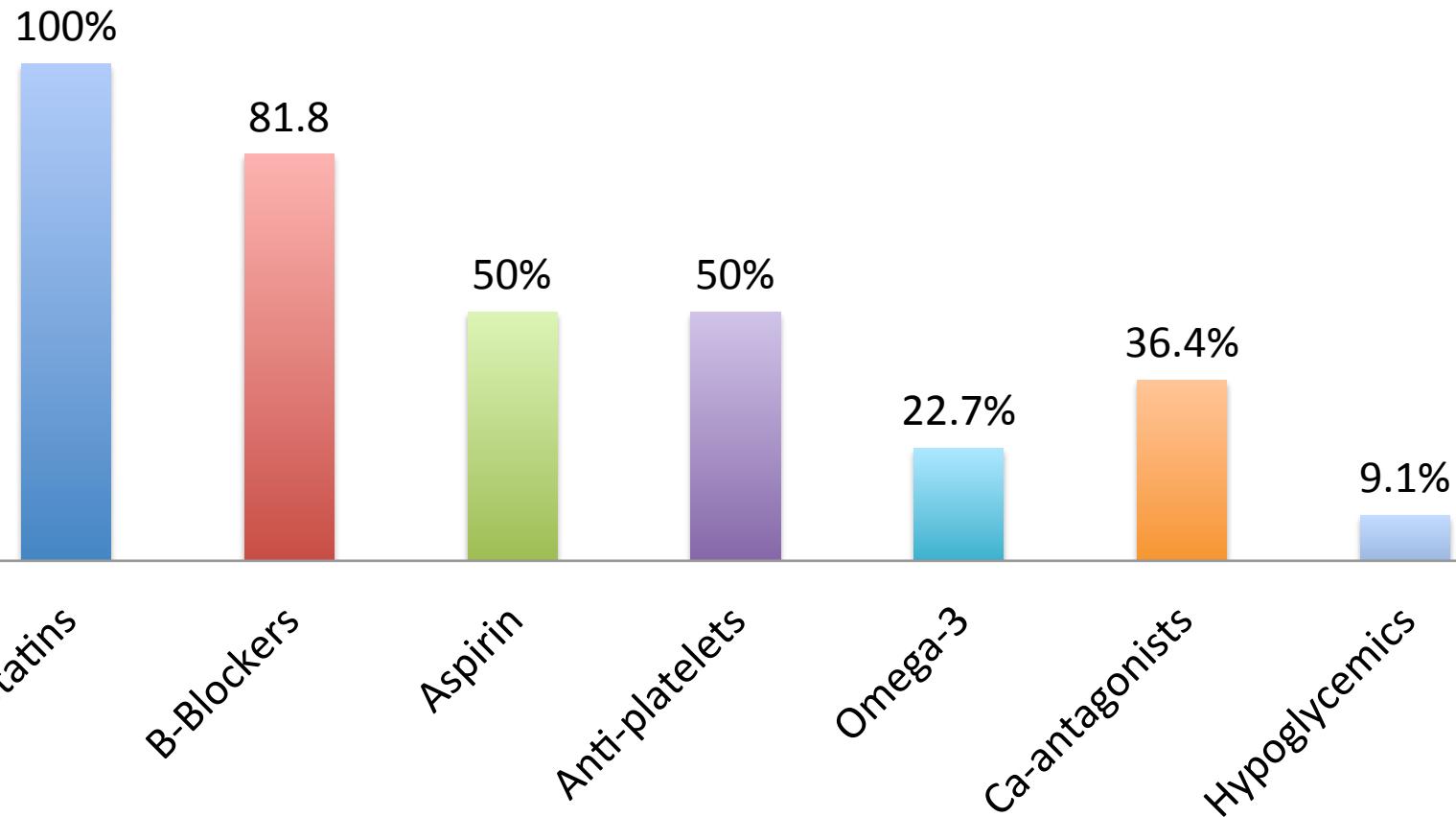
Età media	61 (47-75)
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Uomini/Donne	13 / 9
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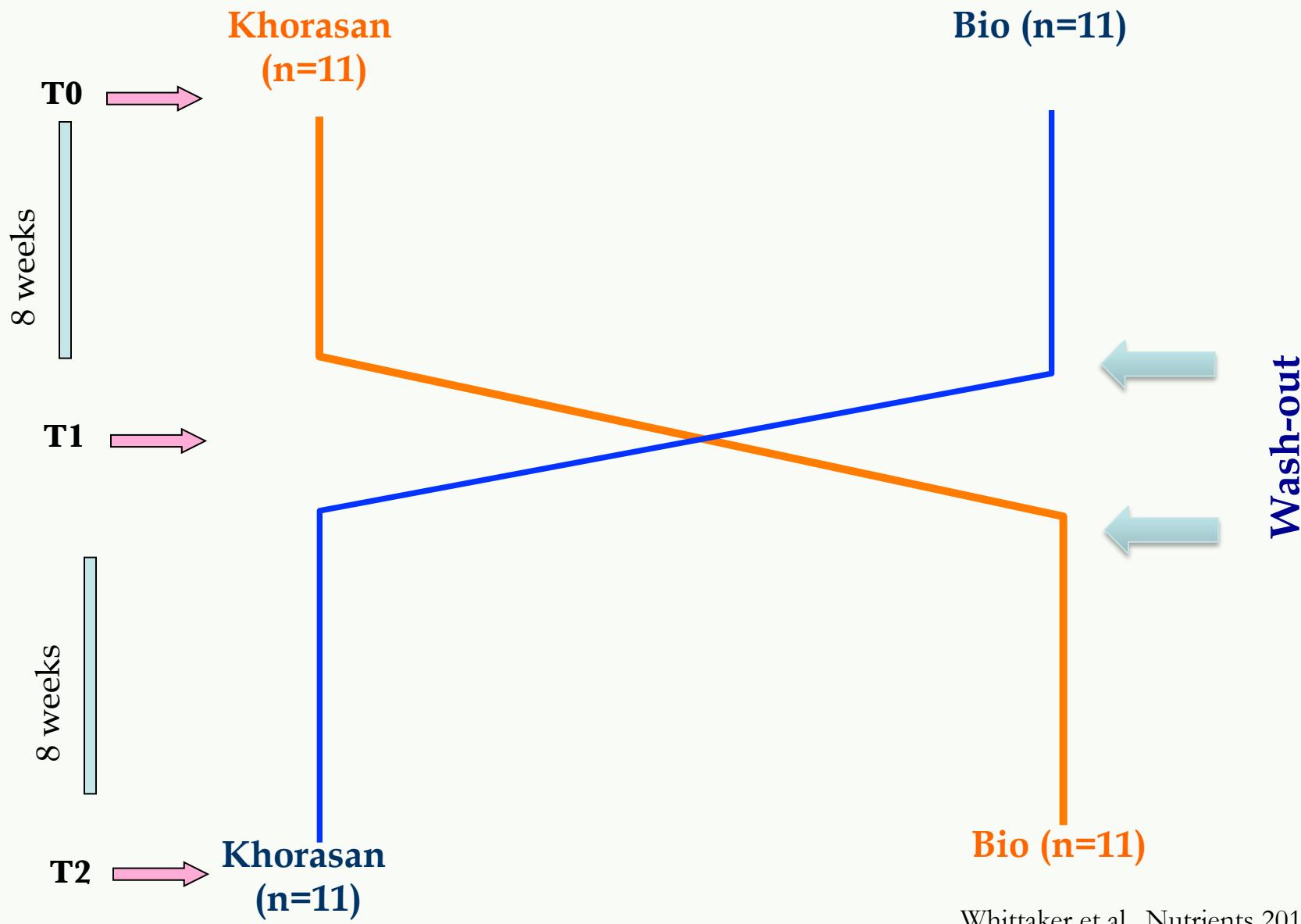
Indice di massa corporea kg/m² media ± SD	26.9 ± 4.8
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Stile di vita sedentario, n (%)	9 (40.9%)
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Medications



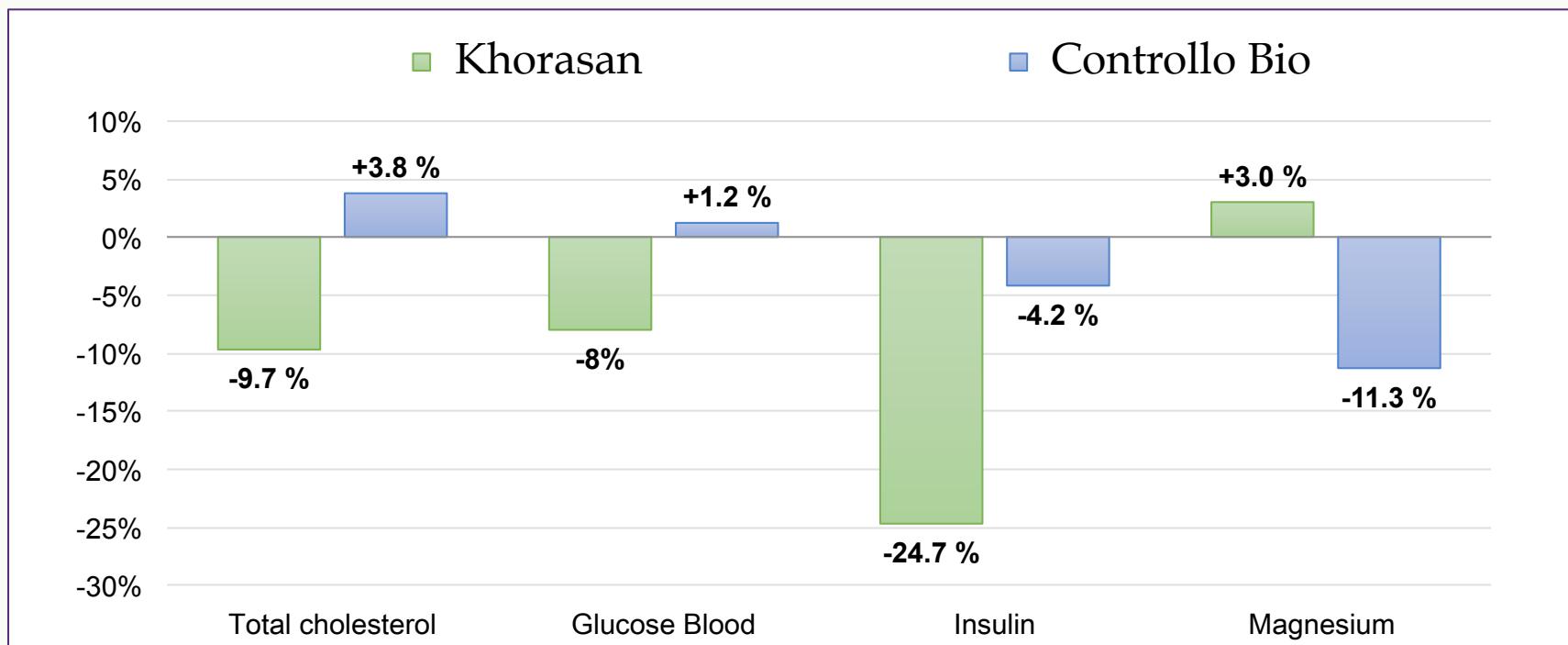
Disegno sperimentale



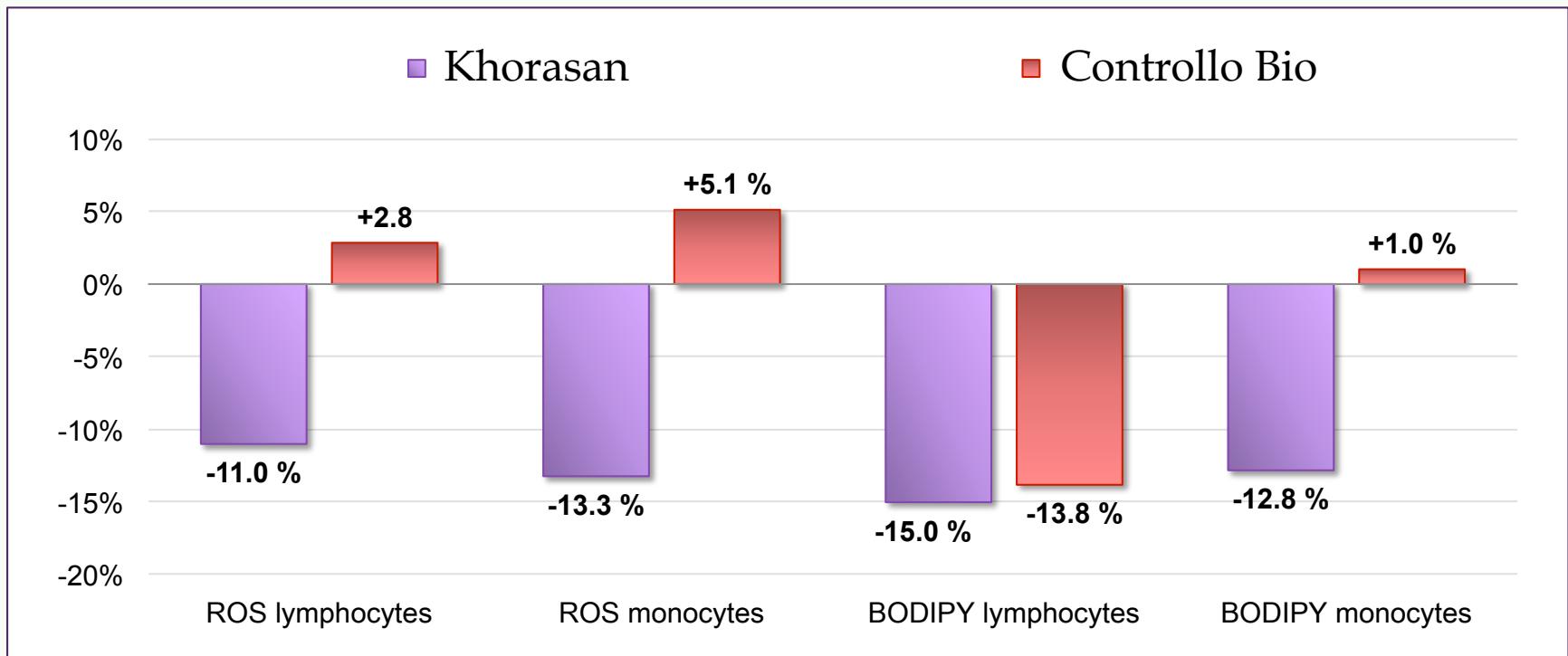
Modifica del profilo Biochimico

Khorasan

Controllo Bio



Modifica del profilo Ossidativo





Secondary prevention of patients with diabetes: is there a role for Khorasan wheat (Kamut®) products?

Sofi F*, Dinu MR*, Whittaker A°, Gori AM*,
Cesari F*, Becatti M^, Fiorillo C^, Casini A*,
Benedettelli S°

*Department of Experimental and Clinical Medicine, University of Florence; Unit of Clinical Nutrition, Careggi University Hospital, Florence, Italy; ° Department of Agrifood Production and Environmental Sciences, University of Florence; ^Department of Clinical and Experimental Biomedical Sciences, University of Florence

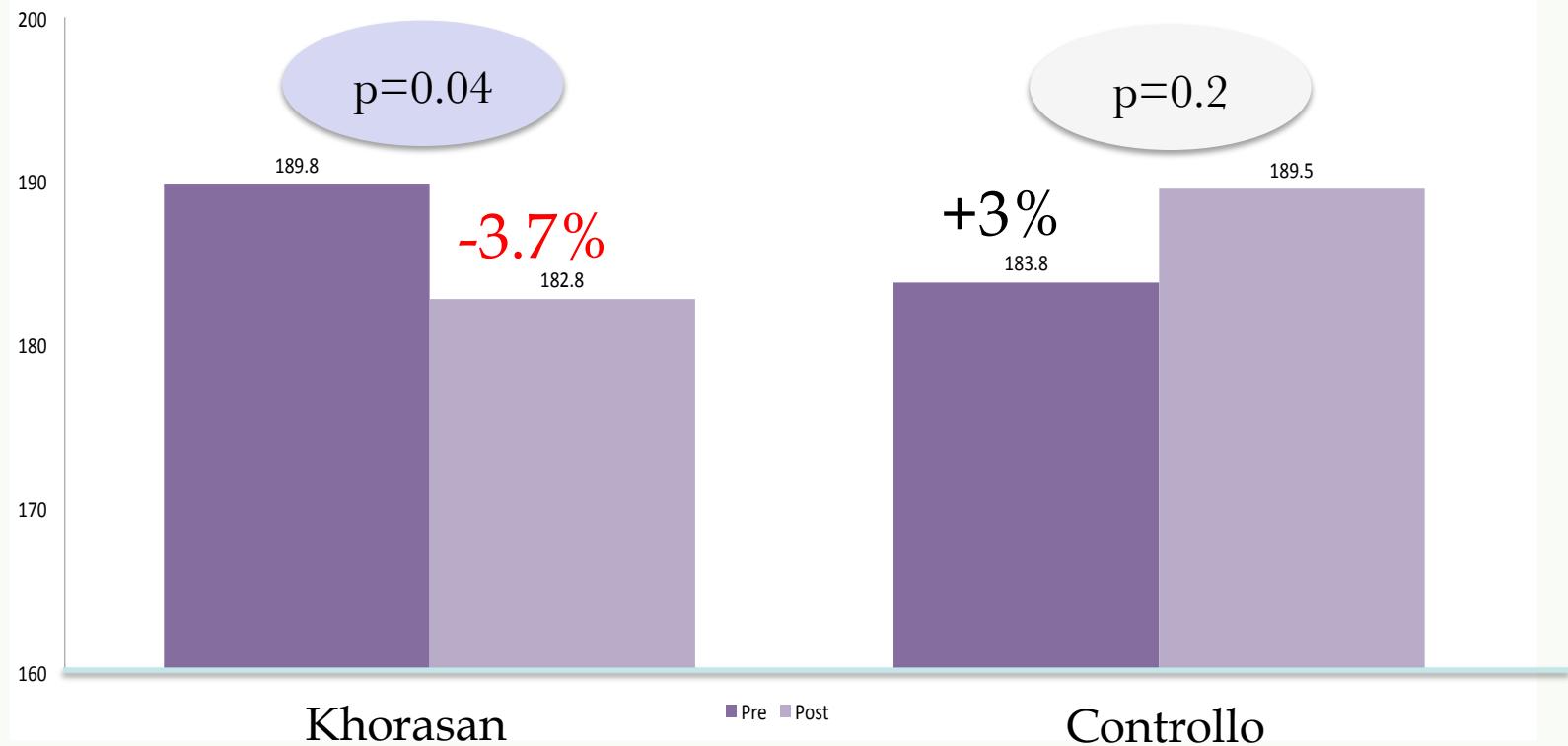
21 pazienti con diagnosticato il diabete

Variable

Age, yrs, median (range)	65 (42-84)
Males/Females	14 / 7
Body Mass Index, kg/m², mean ± SD	27.9 ± 4
Hypertension, n (%)	8 (38.1%)
Smoking habit, n (%)	5 (23.8%)
Dyslipidemia, n (%)	7 (33.3%)

Risultati

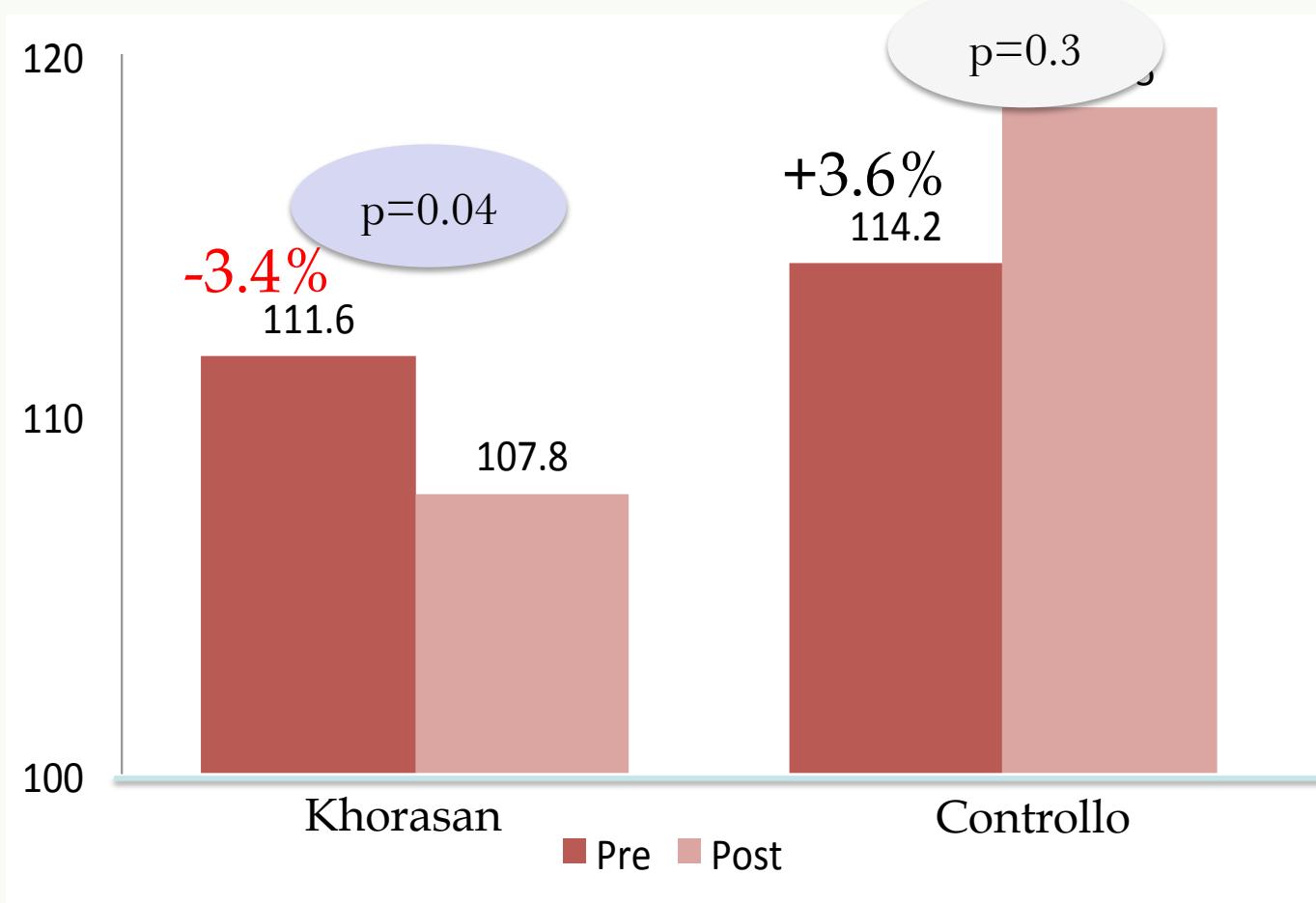
Colesterolo Totale, mg/dL



General linear model adjusted for age, gender, BMI, hypertension, diet score, and anti-diabetic drugs

Risultati

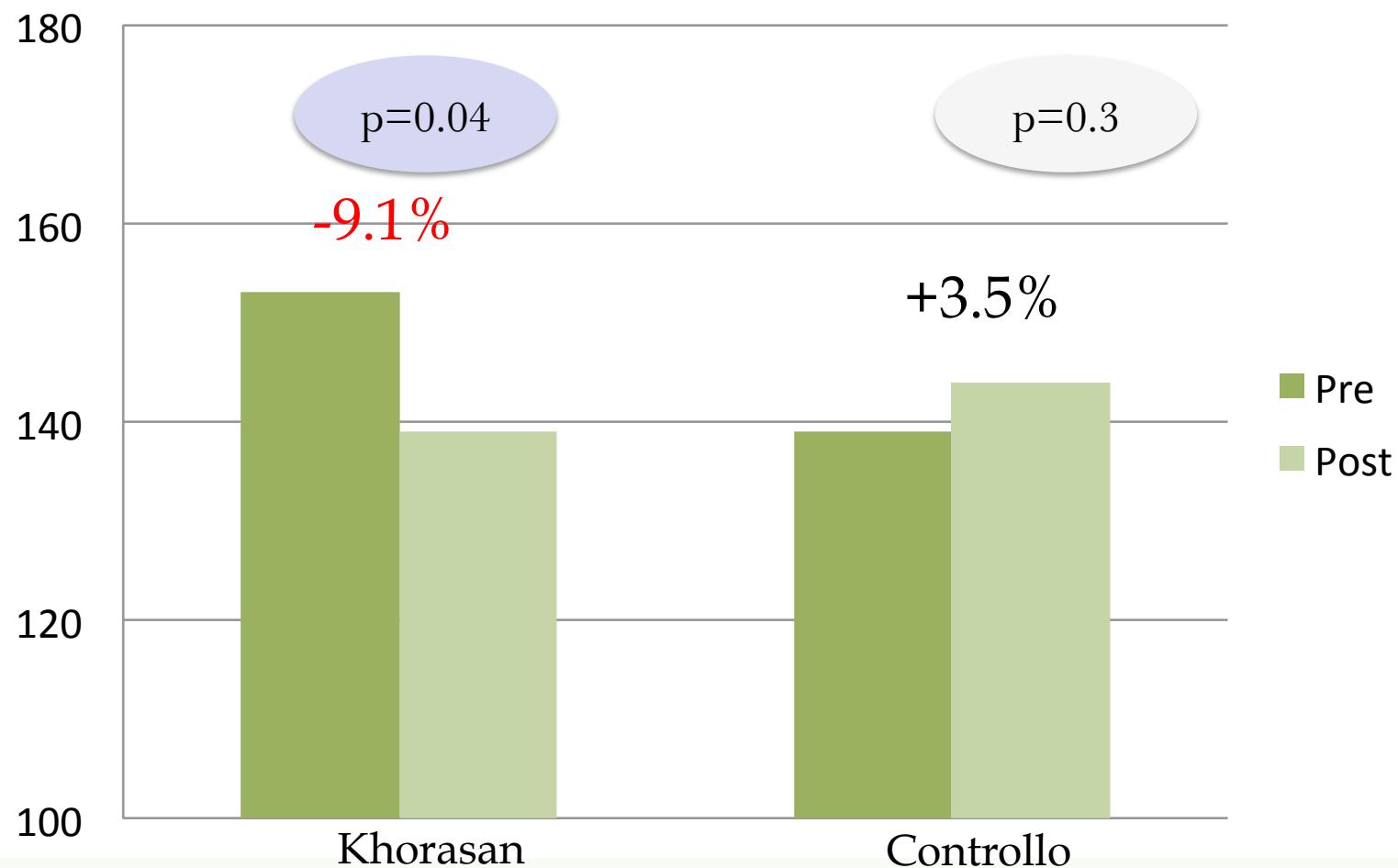
LDL-colesterolo, mg/dL



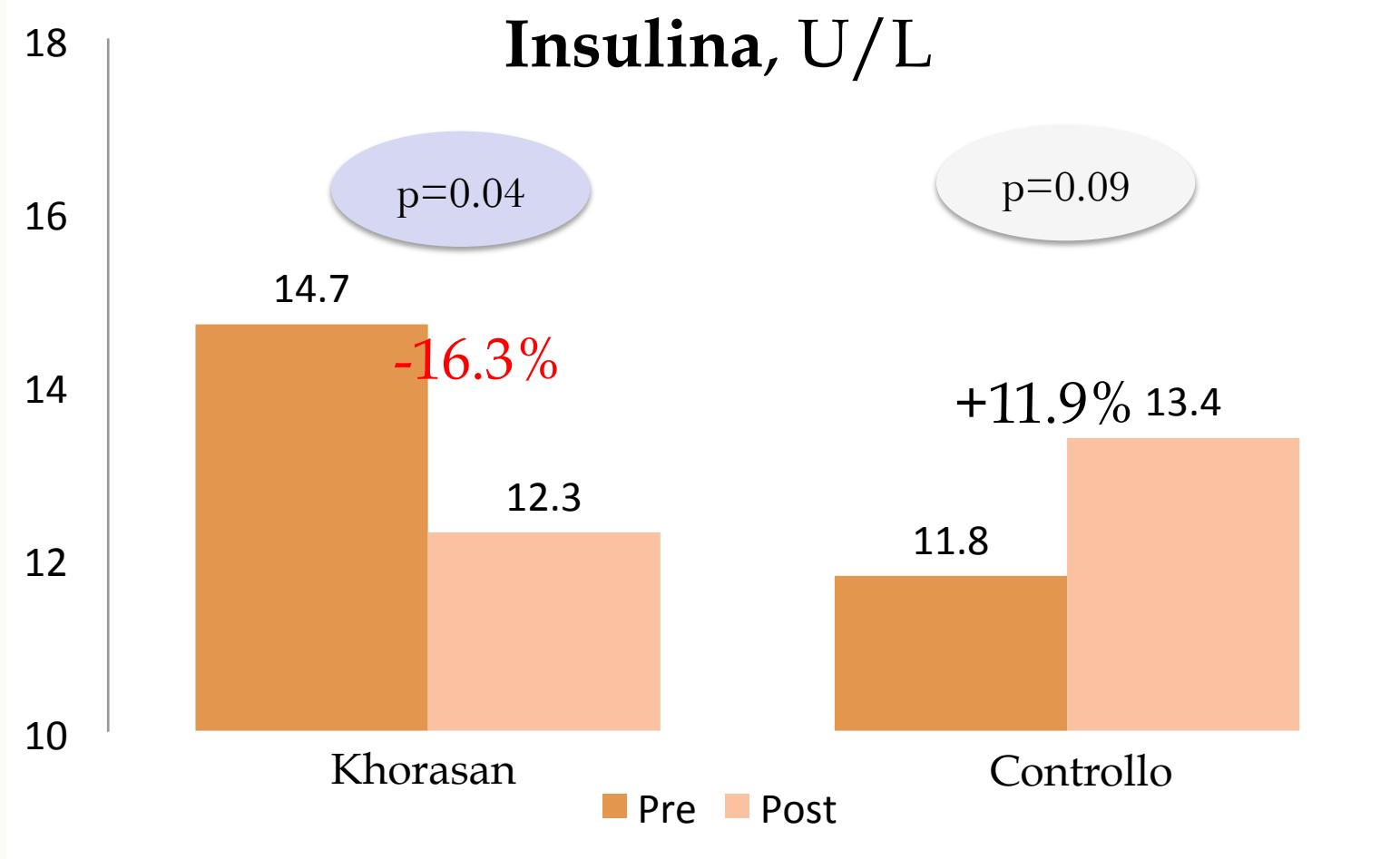
General linear model adjusted for age, gender, BMI, hypertension, diet score, and anti-diabetic drugs

Risultati

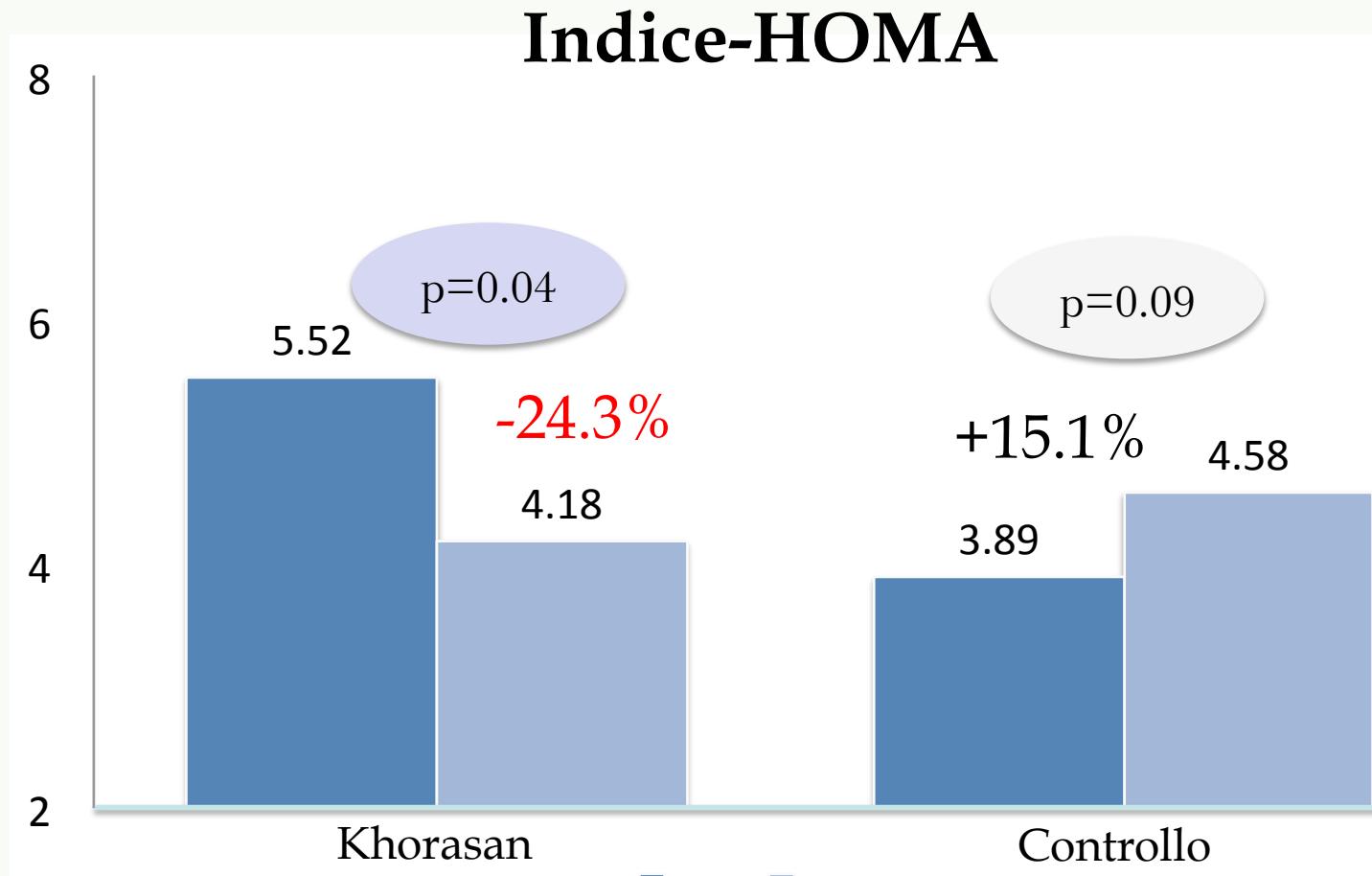
Glucosio nel sangue, g/L



Risultati



General linear model adjusted for age, gender, BMI, hypertension, diet score, and anti-diabetic drugs



General linear model adjusted for age, gender, BMI, hypertension, diet score, and anti-diabetic drugs

PROSPETTIVE FUTURE

- Valutazione delle interazioni genotipo-varietà x ambiente;
- Identificazione dei genotipi parentali in base alle caratteristiche produttive, tecnologiche e nutraceutiche;
- Costituzione del nucleo evolutivo, capace di generare nuove varietà popolazioni, adatte all'ambiente e ai cambiamenti climatici;
- Breeding partecipativo.





GRAZIE PER LA VOSTRA ATTENZIONE