

# Book of Abstracts



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# Book of Abstracts

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## Assessing the iron chelation capacity of caprine casein phosphopeptides

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This research investigated the feasibility of using goat phosphoserine rich peptides, isolated by calcium and ethanol precipitation from a caseinate digest, as an iron fortification ingredient in nutritional foods. Resonant soft X-ray scattering data obtained at the Advanced Light Source provided evidence that the phosphoserine rich sequences within the casein are important for iron chelation as iron was shown to bind to casein proteins in the same location as calcium, namely the phosphoserine clusters. The effect of potential industrial processing conditions, including heating, cooling, holding time and processing order, on iron binding by the isolates were investigated. The maximum iron binding capacity of the peptides was additionally characterised as a function of expected end product formulation variations in a model milk system. It was found that goat peptide isolates were able to bind  $54.37 \pm 0.50$  mg Fe/ g protein compared to goat milk of  $3.8 \pm 0.01$  mg Fe/ g protein indicating that the isolation does increase the iron binding. However the >13 fold increase in iron binding does not seem to be solely explained by an increase in the phosphoserine concentration in the isolated fraction. When the iron binding is normalised on a serine basis the data shows that the ability of serine to participate in iron binding increases by 325%. This indicates that other mechanisms such as a reduction in steric hindrance are possibly involved.

**Keywords:** Caprine; phosphopeptide; iron

## Assessment of the effect of different deficit irrigation strategies on polyphenolic compounds of olives (cv. “Cobrançosa”)

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Olive tree (*Olea europaea* L.) is one of the most important fruit trees of Mediterranean countries due its food products, table olives and olive oil that are well known by its high biophenol contents. Different water regimes affect the general development and the composition of olive fruit [1] leading to slight changes in the taste of the resulting oil [2] Particular attention has been given to the changes in phenolic compounds. Although this is not a general effect and responses may differ in relation to the genotype, generally olives harvested from irrigated trees show a lower accumulation of total phenols [3]. Contrasting evidence has not completely clarified the relation between water availability and the oleuropein content in the drupes [4]. This study was undertaken to assess the effect of different deficit irrigation strategies on polyphenolic compounds of olives.

Field trials took place in a typical olive growing area of Northeast Portugal region, Vilarica Valley (“Terra Quente Transmontana”), in 2013 year in an irrigated olive orchard with “Cobrançosa Transmontana” cultivar. Four irrigation regimes were applied: i) a well irrigated treatment (T1), that received a seasonal equivalent water amount to satisfied crop evapotranspiration (100%ET<sub>c</sub>), irrigated on the two sides; three deficit irrigation treatment: two sustained deficit irrigation treatment: ii) irrigated with 40% T1 on two side (SDI<sub>40</sub>) and iii) irrigated with 75% T1 on two side 75% (SDI<sub>75</sub>) and a four treatment iv) Partial Root Drying System (PRD<sub>100</sub>), irrigated with 100% of T1 on one side, switching every 15 days.

Total content of polyphenols (TP) and ortho-diphenols decreased during maturation and were affected by irrigation treatment (p<0.05). At the first picking date, with maturation index (IM) = 0, no significant differences were observed in TP between deficit irrigation treatments, with 19,072; 19,275 and 19,439 mg GAE kg<sup>-1</sup> dw for SDI<sub>40</sub>; SDI<sub>75</sub> and PRD<sub>100</sub>, respectively. The differences were only observed between these and T1 treatment (100%ET<sub>c</sub>) that showed the lower values (15,270 mg GAE kg<sup>-1</sup> dw). Curiously, at the harvest (IM = 3.2-3.5) the highest values of TP were observed in SDI<sub>40</sub> treatment with significant differences. TP in the others treatments decreased and weren't no different. Concerning to individual phenolic compounds, oleuropein and verbascoside are the most representative in all treatments. Olives with higher values (149.96 µg.g<sup>-1</sup> dw) of oleuropein were submitted to the higher level of water deficit (SDI<sub>40</sub>), followed by treatments SDI<sub>75</sub> (143.55 µg.g<sup>-1</sup> dw), PRD<sub>100</sub> (125.78 µg.g<sup>-1</sup> dw) and finally by 100% ET<sub>c</sub> (122.53 µg.g<sup>-1</sup> dw). Verbascoside was the main hydroxycinnamic acid present in olives, with the higher values observed in treatments with low irrigation (SDI<sub>40</sub> and PRD<sub>100</sub>). The content of the individual phenolic compounds including phenolic alcohols, and secoiridoids were affected by irrigation, being lower with the increase of the amount of water applied.

**Keywords:** Olives, Deficit irrigation, Sustained Irrigation, Partial Root Drying System, Phenolic compounds, Oleuropein, Verbascoside

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