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Xanthine oxidoreductase (XOR) in pea (*Pisum sativum* L.) leaves under abiotic stress conditions

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Introduction

Xanthine oxidoreductase (XOR) is an enzyme involved in the purine catabolism pathway that catalyzes the conversion of hypoxanthine and xanthine to uric acid which the concomitant formation of either NADH or superoxide radical ($O_2^{\bullet-}$). It plays an important role in nucleic acid degradation in all organisms being considered also a source of nitrogen in higher plants [1]. However, the involvement of XOR activity has been associated with other processes in higher plants such as nodule metabolism in legumes, leaf senescence, fruit development, as well as in the mechanism of plant response to pathogen microorganisms [2,3].

Materials and Methods

Plant material: Leaf of 3 week-old pea (*Pisum sativum*) plants under diverse stressful conditions

In-gel XOR activity assay and immunoblot analyses. See [4]

Northern blot analysis: See [5]

References

[1] Brychkova et al. (2008) *Plant Signal Behav*. **3:**999-1001.
[2] Han et al. (2020) *Rice (N Y)* **13:**16.
[3] Hofmann et al. (2016) *Plant Cell*. **28:1001**.
[4] Corpas et al (2008) J Plant Physiol. 165(13):1319-30.
[5] Sambrook et al (1989) 2nd ed. New York: Cold Spring Harbor Laboratory Press
[6] Corpas et al. (2008) *Plant Cell Physiol.* **49**: 1711-1722.

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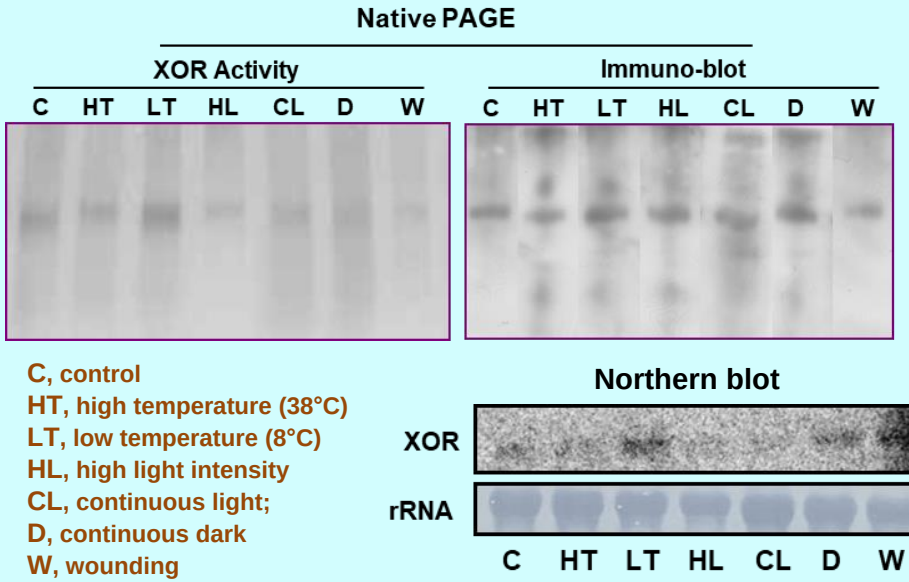
Results

Xanthine oxidoreductase (XOR) activity and gene expression in leaves from pea plants subjected to different abiotic stress conditions



Conclusions

- Pea XOR is modulated differentially under the six assayed stress conditions being the **low temperature** the situation which causes the highest differences of XOR activity and gene expression in comparison to untreated pea plants.
- These data are in good agreement with those data reported previously on the metabolism of reactive nitrogen species (RNS) in pea plants under the same experimental conditions [6] where the content of *S*-nitrosothiols and protein tyrosine nitration content, as well as *S*-nitrosoglutathione reductase and L-arginine-dependent NOS-like activities, were higher under low-temperature stress.