



- Home
- Latest Issue
- Previous Issues
- Instructions to Authors
- Guidelines for Referees
- Related Journals
- Announcements
- Web Links

- About us
- Info for Authors
- Feedback
- 
- 
- 



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## Biochemical Properties of Soluble and Bound Peroxidases from Artichoke Heads and Leaves

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### Summary

Soluble (SP), ionically bound (IBP) and covalently bound (CBP) peroxidases (POD) from artichoke leaves and heads have been characterized for the main biochemical parameters. The three PODs, in both leaves and heads, showed the major apparent catalytic efficiency ( $v_{\max,app}/K_{m,app}$ ) towards ferulic acid, even though, in some cases, they showed higher affinity ( $K_{m,app}$ ) for other substrates. In leaves, SP and IBP showed higher  $K_{m,app}$  for ferulic and chlorogenic acids, and CBP for ferulic and caffeic acids. In heads, SP showed higher  $K_{m,app}$  for chlorogenic acid, IBP for caffeic and ferulic acids, and CBP for ferulic acid. It was shown that pH optimum for PODs ranged between 5.0 and 6.0 in leaves. In heads, pH optimum for SP and IBP was 5.5, while CBP presented a very low activity in a wide pH range. All PODs showed high

thermal stability but different ability to regenerate: the bound forms were more able to regenerate than the soluble one. The results obtained show that (i) CBP from heads is able to work under very different cellular conditions, (ii) all PODs, in both tissues, have a high apparent catalytic efficiency for ferulic acid, which could explain the effective involvement of POD in lignin biosynthesis, (iii) in heads, high  $K_{m,app}$  of SP for chlorogenic acid, particularly abundant in artichoke, could justify the possible involvement of PODs in browning mechanism, and (iv) in heat-processed artichoke, the ability of PODs to regenerate could contribute to oxidation and loss of product quality.

*Key words:* artichoke (*Cynara cardunculus*), soluble and bound peroxidases, characterization, thermostability, regeneration, browning

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