

## Abstract

# Prediction of auxin response elements based on data fusion approach

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## Abstract

The plant hormone "auxin" is a key regulator of plant development and environmental responses. It has critical roles in directing plant cell division, differentiation, and elongation [1]. The identification of Auxin-response element (AuxRE) is one of the most important issues to understand the auxin regulation of gene expression. Over the past few years, a large number of motif identification tools have been developed. Despite this considerable efforts provided by computational biologists, building reliable models to predict regulatory elements has still been a difficult challenge [2, 3].

We propose in this work a data fusion approach for the prediction of AuxRE. Our method is based on the combined use of Dempster–Shafer evidence theory and fuzzy theory. Our method is based on a combination of predictions coming from two techniques commonly used in pattern finding: Overrepresented motifs and Linear Discriminant Analysis. The idea is to extract, for each method, some features and to combine it using the Dempster–Shafer (DS) rule, called orthogonal sum.

To evaluate our model, we have scanning the DORNROSCHE promoter by our model. All proven AuxRE present in the promoter has been detected. At the 0.9 threshold we have not false positive. The comparison of the results of our model and some previous motifs finding tools, show that our model can predict AuxRE more successfully than the other tools and produce less false positive. The comparison of the results before and after combination show the importance of Dempster–Shafer combination in the decrease of false positive and to improve the reliability of prediction. For an overall evaluation we have chosen to present the performance of our approach in comparison with other methods. Our method has the high degree of sensitivity (Sn) and Positive Predictive Value (PPV) with a value of 79 and 48.17, respectively.

## References

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