

Biogenic amines in fermented soy food consumed in Serbia

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INTRODUCTION & AIM

Fermented foods, including fermented soy products, are of particular concern regarding formation of biogenic amines (BA), which arise as a consequence of microbial activity.

HIS and TYR are of greatest toxicological importance due to their adverse effects on neurological and cardiovascular systems.

For healthy people, the threshold for such effects is 50 mg of HIS and 600 mg of TYR in one or daily dose.

METHOD

28 samples of fermented soy products (sauces, meat substitutes, milk substitutes, tofu, miso and other products) collected on Serbian market were analyzed for presence of BA by HPLC-UV method.

HIS	histamine	PUT	putrescine
TYR	tyramine	CAD	cadaverine
TRP	tryptamine	SPD	spermidine
PEA	phenylethylamine	SPM	spermine



RESULTS & DISCUSSION

At least one of targeted BA present in all except one sample (Fig. 1).
 Most frequent: PUT (71.4%) > TYR (64.3%) > PEA (57.1%) > HIS (39.3%).
 Concentration range - total BA: 10.9-2766 mg/kg.
 Most frequent presence and highest concentrations of HIS and TYR:
 sauce (63.6%, up to 503.7 mg/kg; 90.9%, up to 948 mg/kg)
 > tofu and related products (up to 100 and 83.3 mg/kg)
 >> dairy substitutes (PEA and PUT in low concentrations) (Fig. 2,3).
 Vasoactive BA (TRP, PEA, HIS, TYR): sauce (mean concentration ~ 500 mg/kg) > miso > tofu > meat substitutes > milk substitutes (Fig. 4).

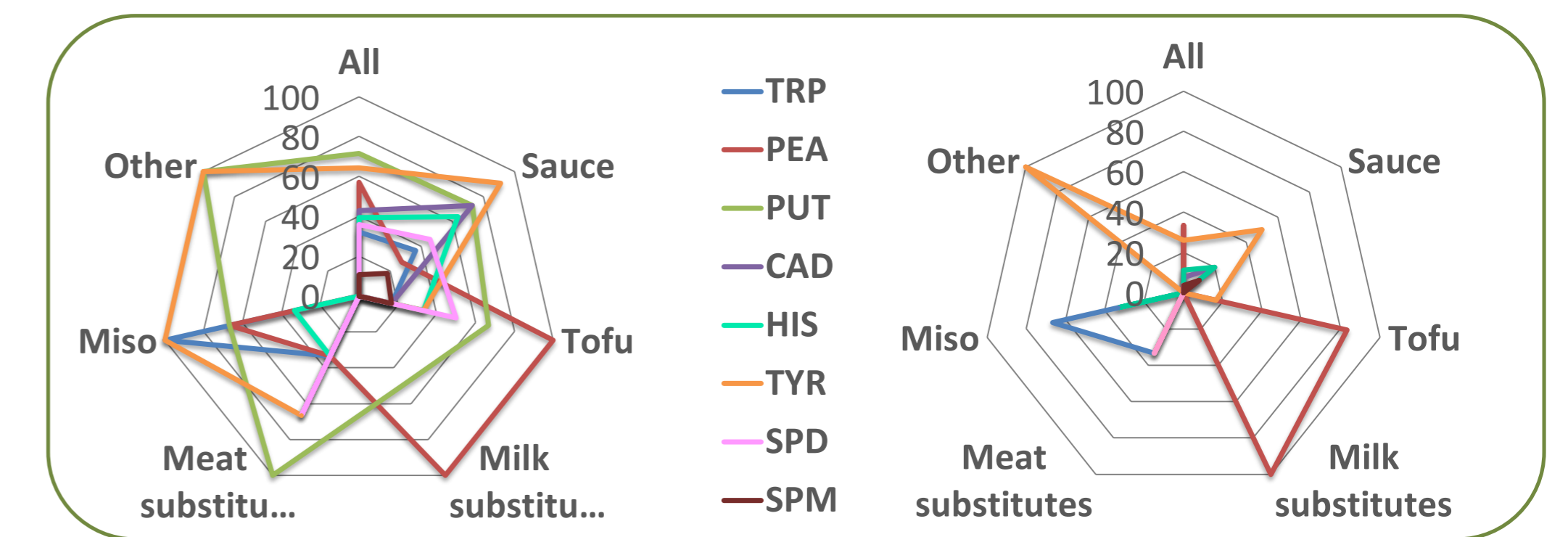


Figure 1. Proportion of samples (%) containing individual BA (left) in max concentration (right)

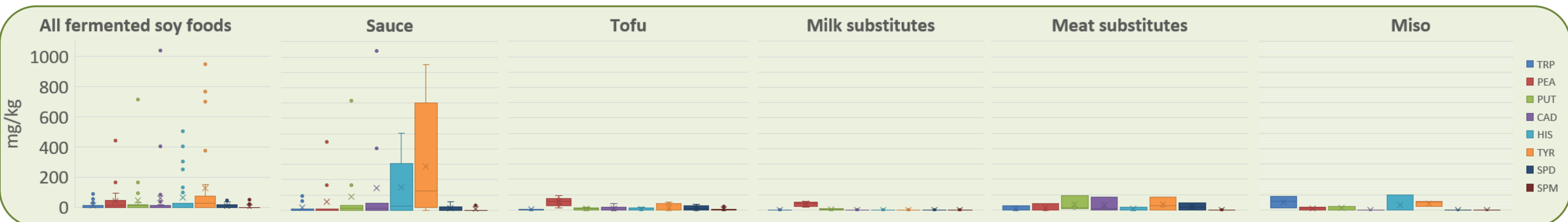


Figure 2. Box-Whisker plot of concentrations of individual BA in different ferment soy foods

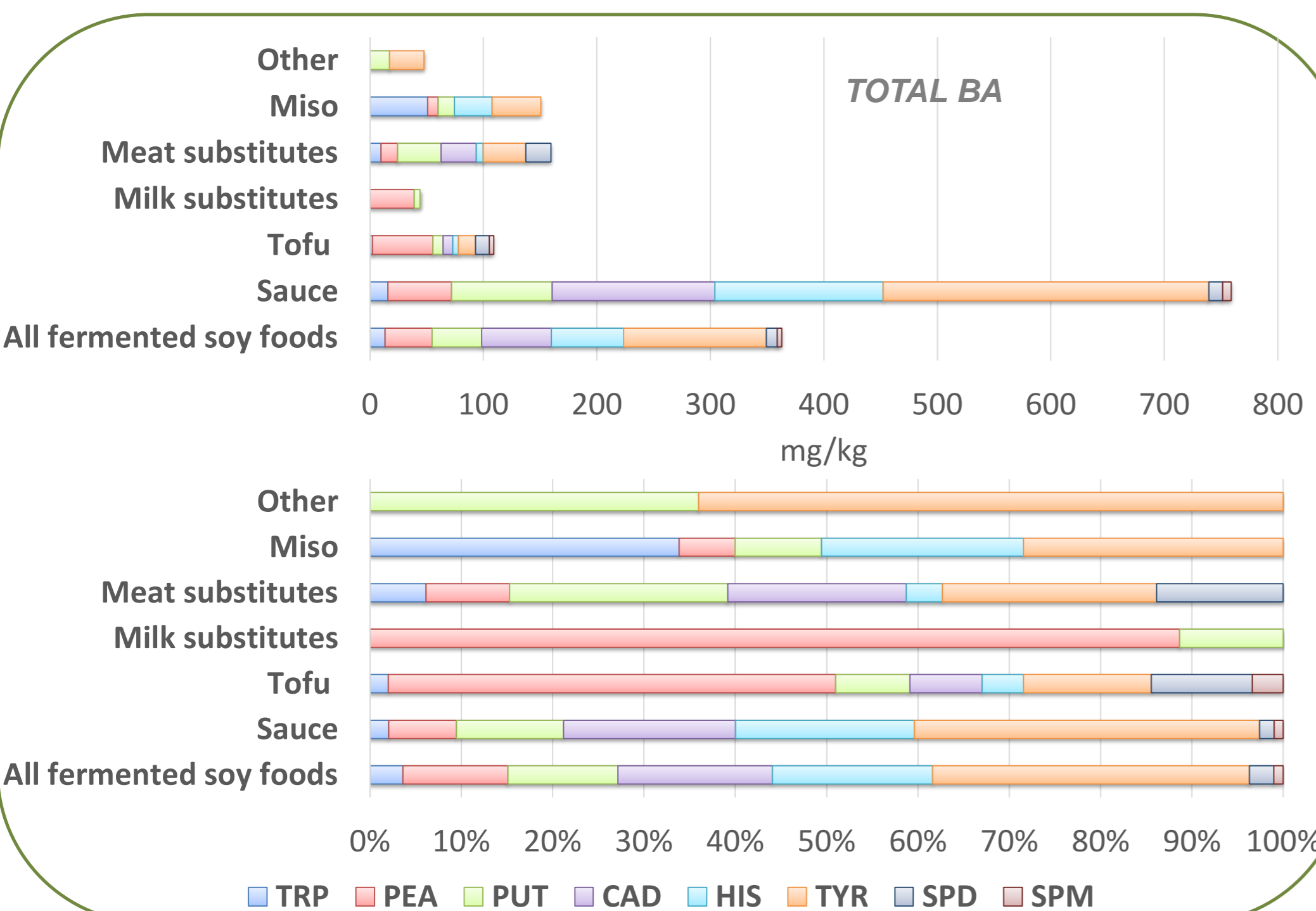


Figure 3. Mean concentrations (mg/kg) (left) / proportions (%) (right) of individual BA in different ferment soy foods

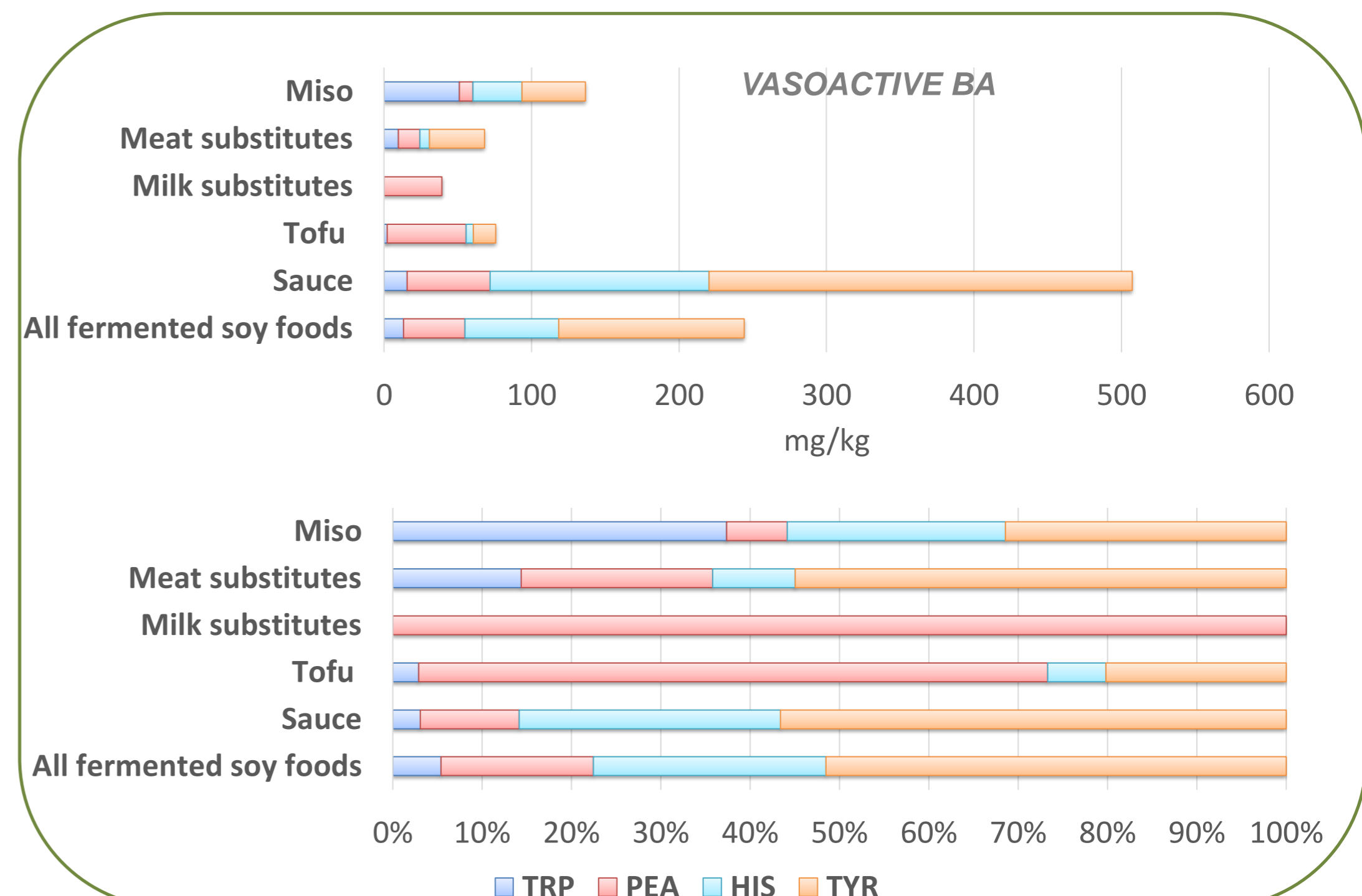


Figure 4. Mean concentrations (mg/kg) (left) / proportions (%) (right) of individual vasoactive BA in different ferment soy foods

CONCLUSION

The mere presence of HIS could pose risk for individuals with HIS intolerance - they should be informed about potentially risky food, including fermented soy foods. In healthy people, small portions of fermented soy foods could be a good protective strategy for lowering exposure and probability of consequent risk.

FUTURE WORK / REFERENCES

Assessment of human health acute risk of BA through soy fermented foods.