

INTERAKCIJE H2S I NO U PRIJENOSU SIGNALA U LISTOVIMA UROČNJAKA (*Arabidopsis thaliana* L.) I PAPRIKE (*Capsicum annuum* L.)

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INTERAKCIJE H_2S I NO U PRIJENOSU SIGNALA U LISTOVIMA UROČNJAKA (*Arabidopsis thaliana* L.) I PAPRIKE (*Capsicum annuum* L.)

Miroslav Lisjak, dipl.inž. ⁽¹⁾

Disertacija ⁽²⁾

U ovome je istraživanju provedena serija pokusa s više genotipova uročnjaka (*Arabidopsis thaliana* L.) i paprike (*Capsicum annuum* L.) u kontroliranim uvjetima klima komore, s ciljem utvrđivanja fiziološke uloge H_2S u biljkama i njegovoga potencijalnoga djelovanja kao signalne komponente, naročito u interakciji s NO signalnim putevima. Poseban je naglasak stavljen na mehanizam rada puči i prijenos signala u njihovom otvaranju i zatvaranju. Također, istraživana je učinak tretmana biljaka paprike s H_2S u uvjetima solnoga stresa. Kod obje biljne vrste utvrđeno je da primjenjeni donori, H_2S , NaHS i GYY4137, inhibiraju zatvaranje puči, smanjujući akumulaciju NO , za koju je dokazano da se javlja pri tretmanu puči s donorom SNP ili s ABA. Djelovanje NO i H_2S bilo je suprotno i u reakciji biljaka paprike na solni stres, pri čemu je povećana antioksidativna aktivnost u listu, utvrđena nakon tretmana s H_2S , naročito s NaHS. Također, GYY4137 se može smatrati prikladnim donorom H_2S za istraživanje funkcija H_2S u biljkama. Rezultati istraživanja ukazuju na interakcije H_2S i NO u staničnome prijenosu signala u biljkama, kako u normalnim uvjetima, tako i kod solnoga stresa. Daljnja istraživanja takvoga tipa trebala bi još preciznije definirati funkcije H_2S u biljnome metabolizmu, zbog potencijalne praktične vrijednosti tih spoznaja za povećanje otpornosti biljaka na stres i poboljšanje njihove produktivnosti.

Ključne riječi: H_2S , NO , ABA, stanični prijenos signala, puči, solni stres, antioksidativni odgovor, uročnjak, paprika

H_2S AND NO SIGNALING INTERACTIONS IN THALE CRESS (*Arabidopsis thaliana* L.) AND PEPPER (*Capsicum annuum* L.) LEAVES

Doctoral thesis

This research comprehends a set of experiments with several thale cress (*Arabidopsis thaliana* L.) and pepper (*Capsicum annuum* L.) genotypes in controlled conditions using growth chambers, with the aim of determining the physiological role of hydrogen sulfide (H_2S) in plants, as well as its potential effect as a signaling compound, particularly in potential interaction with nitric oxide (NO) signaling pathways. Special emphasis was focused on stomatal mechanisms and signaling in their opening and closing. Moreover, the effect of treatment of pepper plants with H_2S was investigated in salt stress conditions. It was established that the applied H_2S donors, NaHS and GYY4137, inhibit stomata closing in both plant species through the reduction of NO accumulation in stomata, which was proven to occur in SNP or ABA treatment. The effects of NO and H_2S were opposite those in pepper plants response to salt stress as well, with increased antioxidative activity in leaf obtained after H_2S treatments, and with NaHS in particular. In addition, GYY4137 could be considered as a convenient H_2S donor for research into H_2S functions in plants. The results point out the interactions of H_2S and NO in plant cell signaling in both normal and salt stress conditions. Further research of this type should uncover H_2S functions in plant metabolism more precisely, especially considering the potential practical value of this knowledge for plant stress resistance improvement and their productivity enhancement.

Key-words: H_2S , NO , ABA, cell signaling, stomata, salt stress, antioxidative response, thale cress, pepper

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