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## Modulation of metabolic alterations of obese diabetic rats upon treatment with *Salacca zalacca* fruits extract using <sup>1</sup>H NMR-based metabolomics (Article)

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### Abstract

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Fruit of salak (*Salacca zalacca*) is traditionally used and commercialized as an antidiabetic agent. However, the scientific evidence to prove this traditional use is lacking. This research was aimed to evaluate the metabolic changes of obese - diabetic (OBDC) rats treated with *S. zalacca* fruit extract using proton-nuclear magnetic resonance (<sup>1</sup>H NMR)-based metabolomics approach. This research presents the first report on the in vitro antidiabetic effect of *S. zalacca* fruits extract using this approach. The obtained results indicated that the administration of 400 mg/kg bw of 60% ethanolic *S. zalacca* extract for 6 weeks significantly decreased the blood glucose level and normalized the blood lipid profile of the OBDC rats. The potential biomarkers in urine were 2-oxoglutarate, alanine, leucine, succinate 3-hydroxybutyrate, taurine, betaine, allantoin, acetate, dimethylamine, creatine, creatinine, glucose, phenyl-acetylglycine, and hippurate. Based on the data obtained, the 60% ethanolic extract could not fully improved the metabolic complications of diabetic rats. The extract of *S. zalacca* fruit was able to decrease the ketones bodies as 3-hydroxybutyrate and acetoacetate. It also improved energy metabolism, involving glucose, acetate, lactate, 2-hydroxybutyrate, 2-oxoglutarate, citrate, and succinate. Moreover, it decreased metabolites from gut microflora, including choline. This extract had significant effect on amino acid metabolism, metabolites from gut microflora, bile acid metabolism and creatine. The result can further support the traditional claims of *S. zalacca* fruits in management of diabetes. This finding might be valuable in understanding the molecular mechanism and pharmacological properties of this medicinal plant for managing diabetes mellitus. © 2020 Elsevier Ltd

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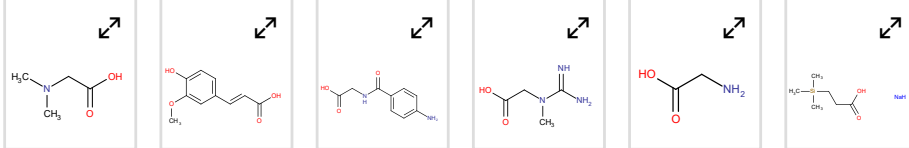
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