

Title: **Short-chain fatty acids determination in biological samples from rats fed different high-fat diets.**

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Short-chain fatty acids (SCFAs) are the final products of fermentation of the fiber by the bacterial flora found in the intestine. Normally the concentrations of these acids are in a constant proportion but diets with high-fat content and low fiber can lead to a change in the microbial flora and a mismatch of concentrations of these acids. This mishap is dangerous because the SCFAs interfere in some routes of metabolism, such as that of insulin, so they can cause health problems such as insulin resistance or diabetes. In order to study the ability to reverse some effects of an unhealthy diet, in this work a nutritional intervention with inulin, resistant starch or fagomine has been done in rats fed a high-fat diet and compared to a pure high-fat diet and a standard diet. In this study, first the *in vivo* experiment has been carried out. Next, several biometric parameters such as body weight or chow intake have been done. Then, SCFA have been analyzed by GC-FID in cecal content. Finally, a method to analyse these SCFAs in plasma has been tuned up. The nutritional intervention with inulin has shown the biggest differences with respect to the high-fat diet, in concrete, the body weight has been lower and very similar to that of the standard group and the caecum size has been higher due to a higher metabolic activity. Moreover, the amount of SCFAs has been reduced, fact that may indicate that the caecum size increase is due to a higher residue content more than an increase of the microbial flora.

Keywords: Short-chain fatty acids, insulin resistance, inulin, resistant starch, fagomine, gut microbiota