

STUDY ON THE EFFECT OF PROCESSED MILK PROTEIN ON ANGIOTENSIN CONVERTING ENZYME ACTIVITY IN RATS

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ABSTRACT

Milk peptides are known to have antihypertensive effects by inhibiting the Angiotensin Converting Enzyme (ACE) and thereby inhibiting the formation of angiotensin II (ANG II). Due to lack of available literature pertaining to SAARC countries including Sri Lanka on antihypertensive effects of milk proteins, this study was carried out to investigate the effects of milk proteins and curd on ACE activity and their effects on lipid profile using *Wistar* rats.

Milk and curd of a commercially available local brand was used in all the experiments. Protein fractions of milk and curd were isolated and separated using SDS PAGE electrophoresis. Results revealed that the ACE inhibiting activity due to in-vitro digested products, curd, milk, whole casein, whole whey, α -casein, β -casein and κ -casein were 78.98%, 48.09%, 83.6%, 53.5%, 43.2%, 82.1% and 80.1% respectively. Prior to enzymatic digestion, ACE inhibiting activity of milk and curd were 3.99% and 49.41% respectively. The enzymatic digest of total casein which had the highest ACE inhibition (83.6%) in the *in-vitro* assay was further subjected to an animal study. Three different animal experiments were carried out to determine the effects of casein, whey and curd on serum ACE activity and long term intake on the lipid profile of *Wistar* rats. In experiment I, the test groups were fed with World Health Organization (WHO) standard feed incorporated with casein or curd, while the control group received the standard feed. In experiment II, test groups were

orally fed with either 2 ml of hydrolyzed casein or curd whilst experiment III test group received 2 ml of whey while control groups received 2 ml of water in addition to the standard feed. The mean differences obtained for ACE activity for individual animals were analyzed after eight weeks. In Experiment I, casein fed group had a higher serum ACE reduction when compared with the control group. The mean difference of ACE (U/L) in both casein (-37.2 ± 33.5) and curd (-12.3 ± 16.2) treated groups were significantly lower ($p < 0.05$) when compared to the control group (54.7 ± 66.2). In experiment I, curd treated group also had a lesser increase in serum cholesterol (1.65 ± 12.8 g/dL) when compared to the control group (16.5 ± 4.8 g/dL) whilst the whey treated group in experiment III had a mean reduction of -2.8 ± 4.0 g/dL for serum total cholesterol. The mean difference in both curd and whey fed groups showed a significantly lower value for serum cholesterol ($p < 0.05$). However, high density lipoprotein cholesterol, triglycerides, feed intake and body weight did not show a significant difference between the animals in the treatment group and the control groups. These results suggest that both casein and curd have an inhibitory effect on serum ACE activity. In addition to the ACE inhibitory effect, curd also has a serum cholesterol lowering effect on *Wistar* rats.