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**The Nature of the Protein Materials which Adsorb  
to the Fat:Serum Interface of Homogenised Milk**

**A Thesis**

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## SUMMARY

The adsorption of protein material to the fat/serum interface of the fat droplets of homogenised milk has been shown to result in the major denaturation of those proteins of milk which are adsorbed. The materials present on the surfaces of fat droplets of homogenised milks and of emulsions containing casein and fat and also of whey powder and fat were subjected to analysis by DEAE-cellulose chromatography and polyacrylamide gel electrophoresis following solubilisation with sodium dodecyl sulphate or non-ionic detergents. Such materials showed no similarity to native milk proteins or native fat globule membrane proteins when similarly treated. While the techniques demonstrated the similarity of the natural fat globule membrane proteins of three natural milks, comparability did not exist among materials isolated from the homogenisation-created "membrane" materials of three homogenised milks. Similarly the "membrane" materials of globules having different size ranges within any one homogenised milk were not comparable.

It was concluded that the mechanical energy of the homogenisation process combines with surface adsorption energies to cause massive and varied changes to the properties of the native milk proteins which have become adsorbed to the homogenisation-created fat interface. The particular form taken by materials that appear upon a homogenisation-created membrane is apparently controlled by chance due to conditions of the micro-environment surrounding the fat-serum interface. There was no evidence to indicate that any one native milk protein was preferentially adsorbed.