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Thermal and structural behavior of a vegetal and an animal fat in three different states: bulk, oil-in-water emulsion and whipped cream

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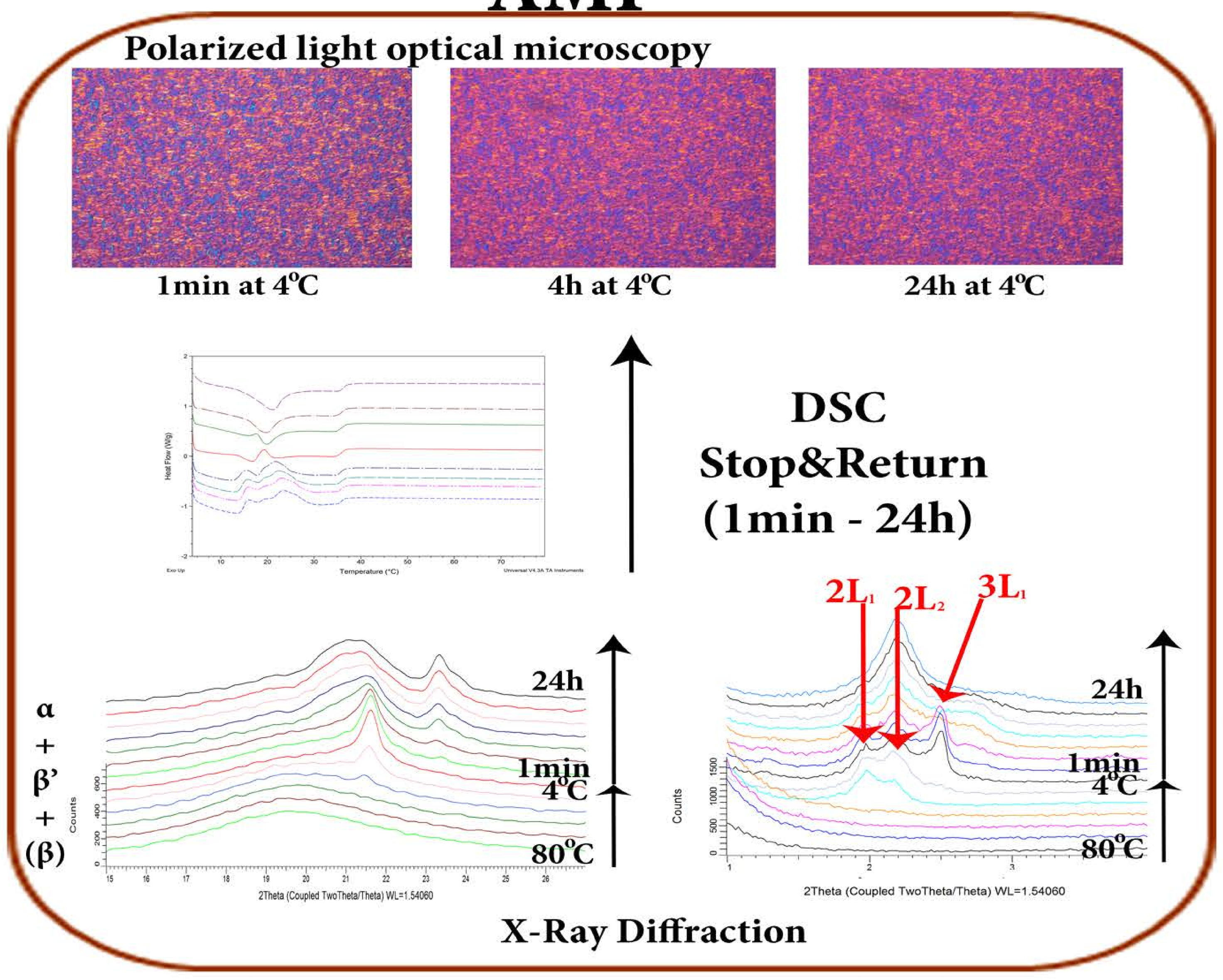
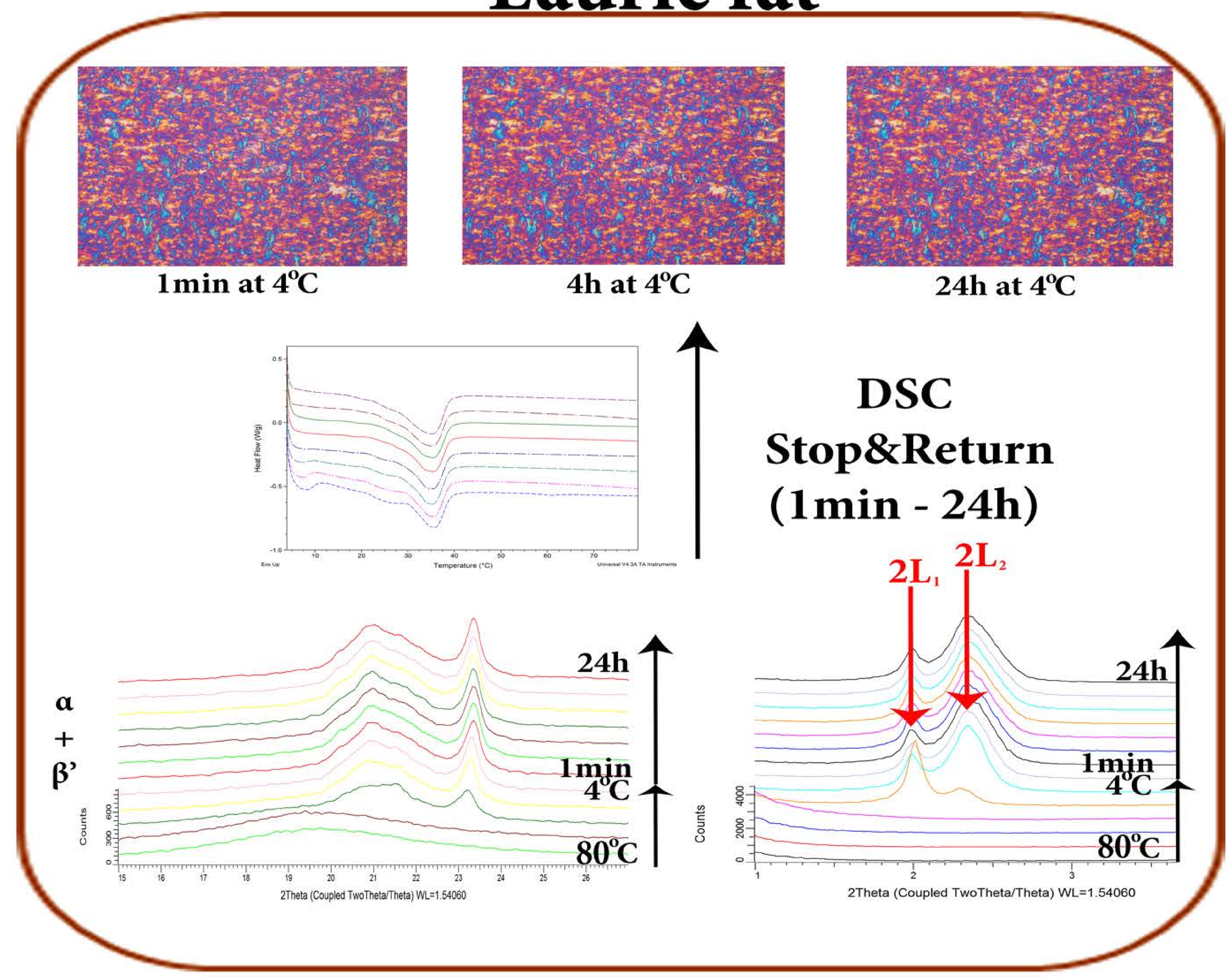
INTRODUCTION

The complexity of AMF comes from the wide diversity of fatty acids which possess various chain lengths (C4 – C18), degree of saturation and distribution in regard to the glycerol head. On the other hand the lauric fat has a narrow range of dominant fatty acids which make it desirable for the formulation of some food systems where a fat structure formation is required. The fat phase strongly influence the physicochemical properties and stability of different food matrices such as whipped toppings, ice cream, margarine, dressings and other emulsion systems.Due to its practical importance, the relationship between fat in bulk and emulsified state in terms of thermal and structural behavior needs to be understood. The objective of this study was to investigate fats thermal and polymorphic behavior and evolution when subjected to an isothermal crystallization in three different states: bulk, emulsion and whipped cream.

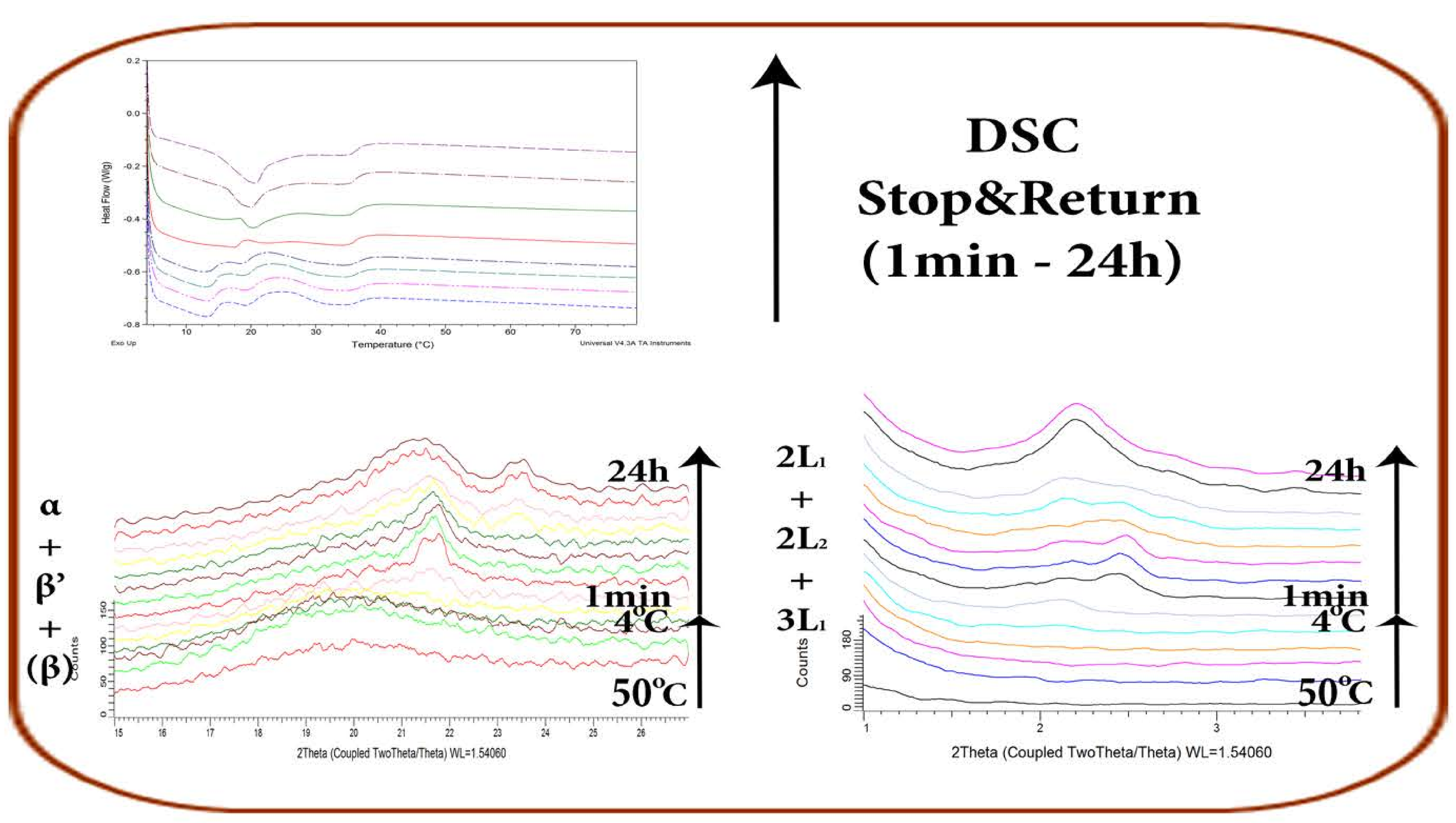
AMF

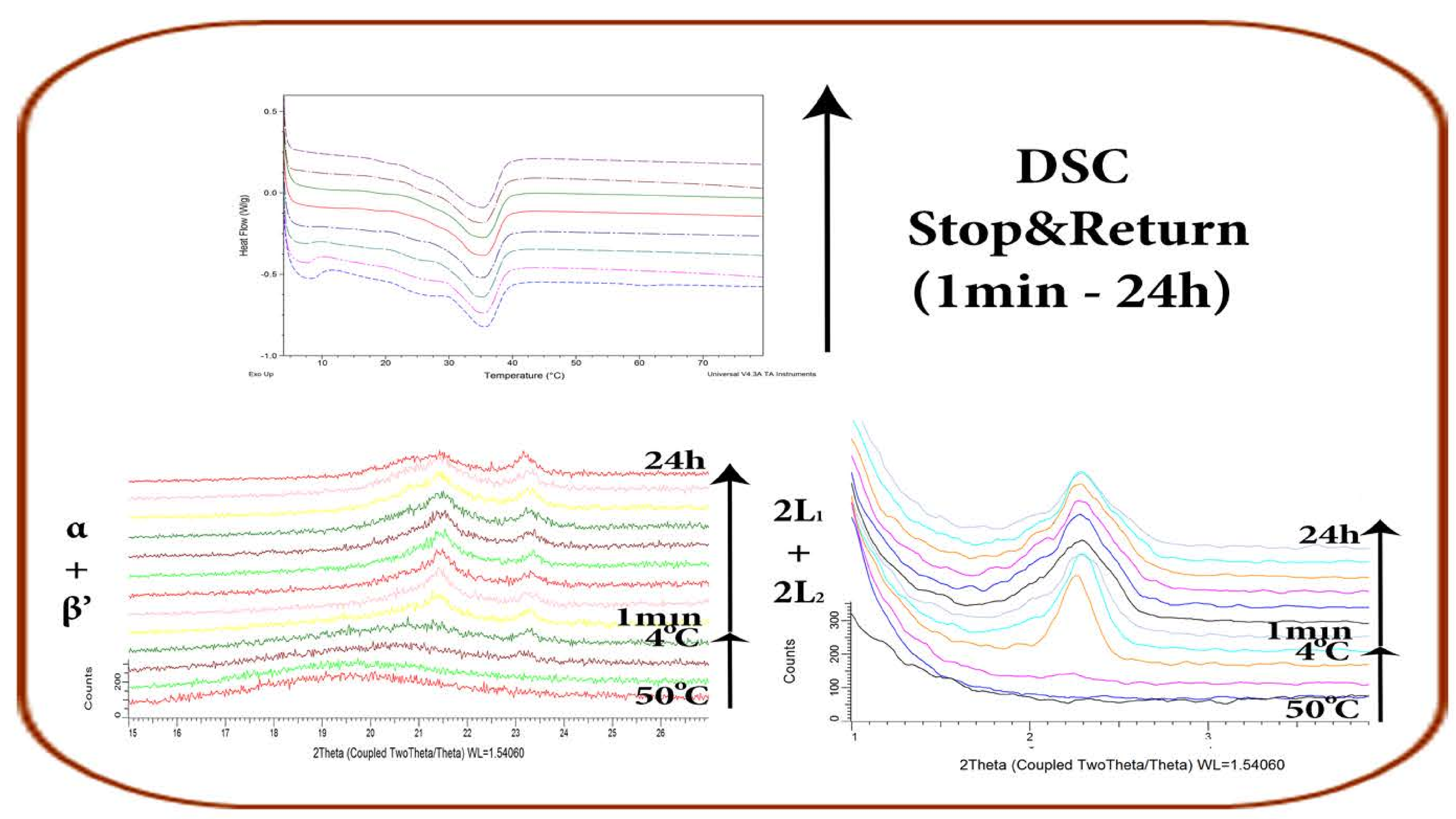
Lauric fat



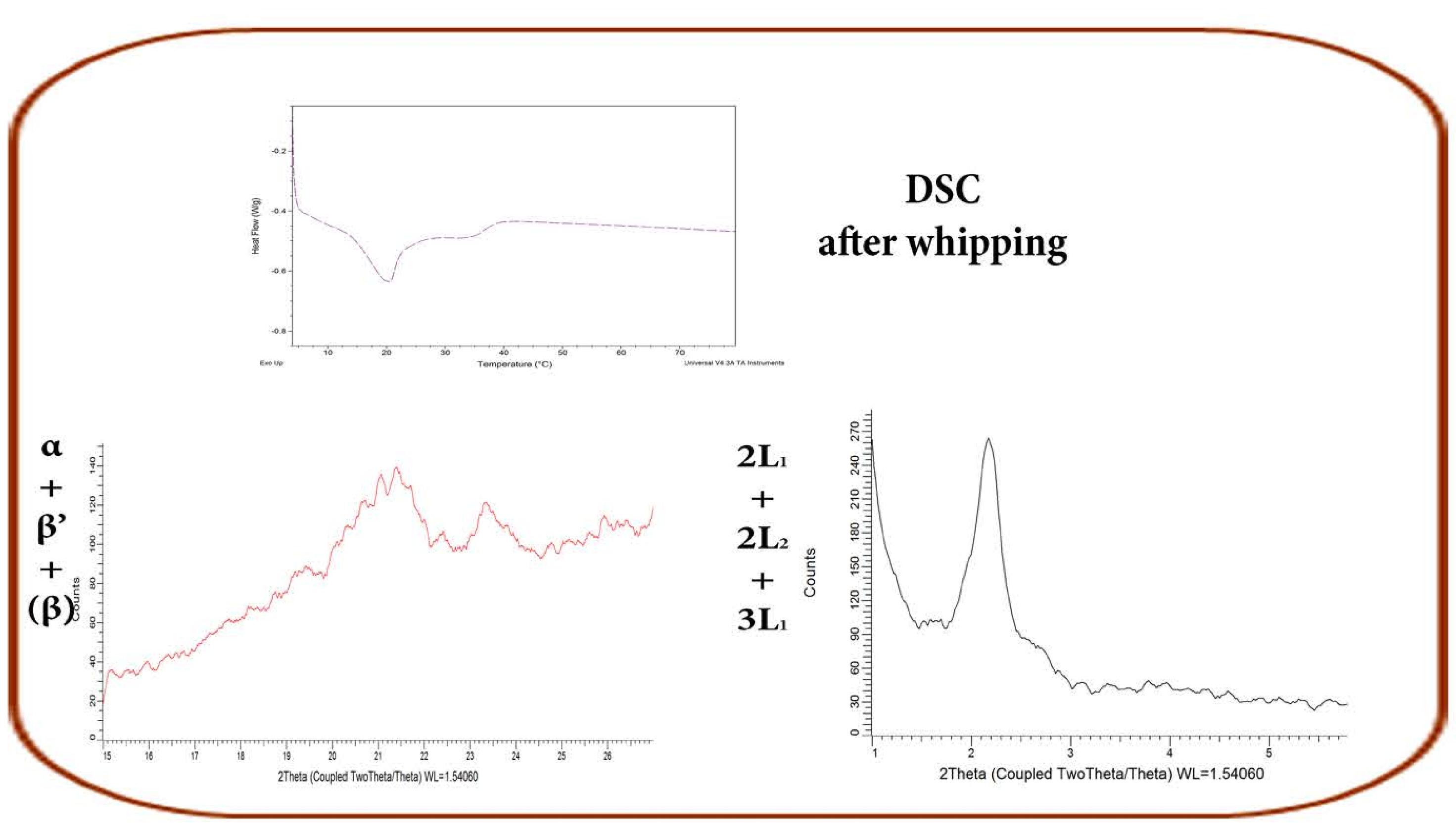


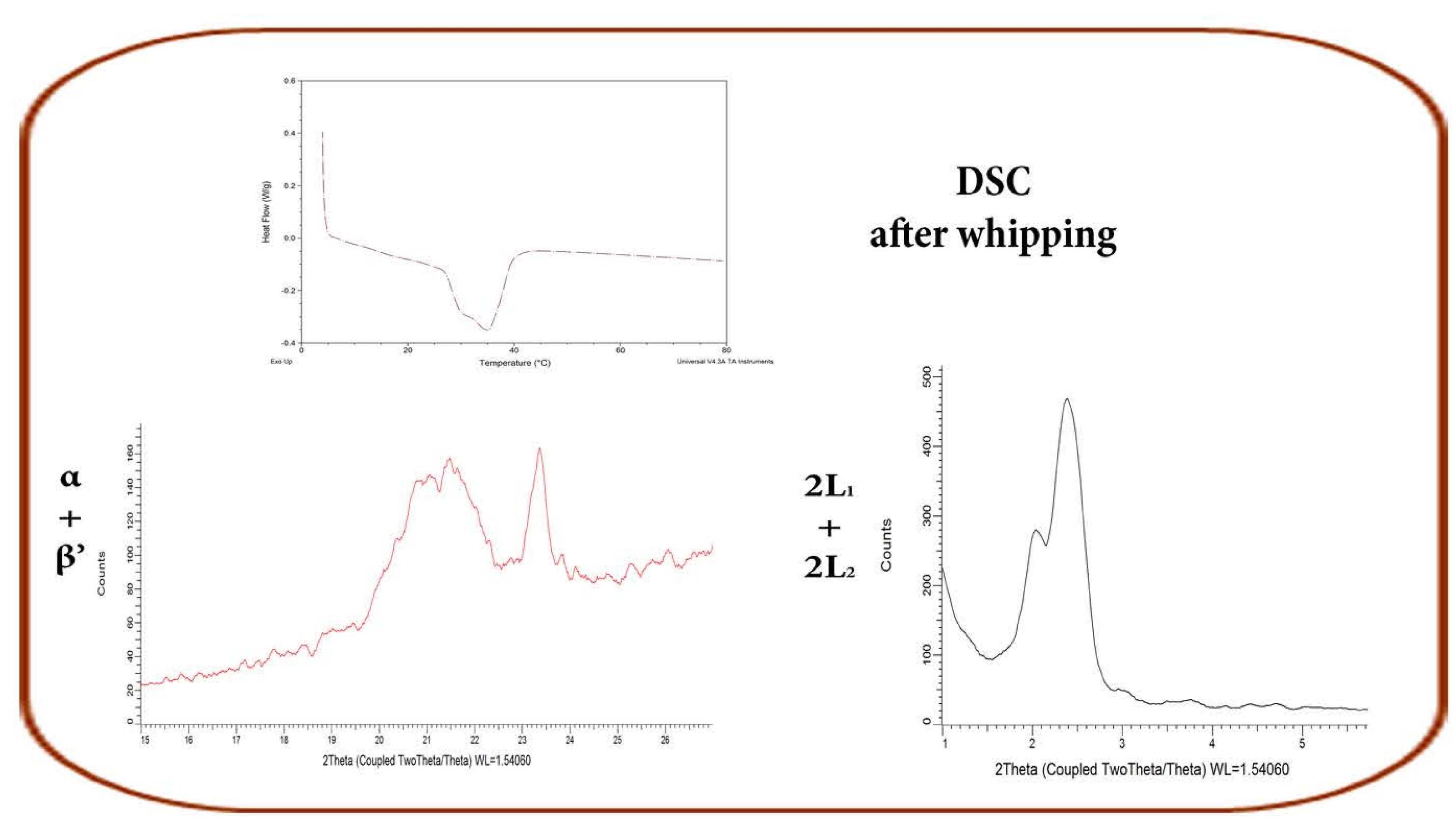
Bulk





Emulsion





Whipped

CONCLUSIONS

The complex chemical composition and the wide melting range of AMF leads to a continuous evolution in terms of crystallization and polymorphic behaviour in both states: bulk and emulsion. On the other hand in the case of the lauric fat, only evolutions of polymorphic forms are observed during isothermal crystallization.The metastable polymorphic α form will e volve into the more stable β'form, the latter increasing gradually in the detriment of the previous one. Both polymorphic form (α + β') are being observed until the end of crystallization, with traces of β forms in the case of AMF. . The action of mechanical forces during the whipping process does not seems to affect the thermal or the polymorphic behaviour of the investigated fats.Due to the fact that no obvious differences were observed between the three states of fat (bulk, emulsion and whipped) it can be concluded that the fat undergoes the same crystallization mechanism in all states for the implied conditions.