Study of the Stability of Beef Tallow during Heating at High Temperatures

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The worldwide production of beef tallow, a byproduct of the slaughter industry, represents about 6% of the total fats and oil's production. In Uruguay, however, in the year 2005, 73% of the production of fats and oils went to beef tallow. Due to its high oxidative and thermal stability and its unique flavor it is widely employed in the manufacture of food; around 50% of the global production of beef tallow is used for food purposes.

The aim of this work was to study the oxidative and thermal stability of beef tallow, to acquire a better knowledge of its behavior when being exposed at high temperatures. This serves as basic data for frying studies, as it is carried out in conditions of strict control of the variables involved in this process: temperature, time and rate surface/volume. Different brands of beef tallow were exposed to termoxidation at 180 ºC (the most suitable temperature for food frying) in an OSI equipment, without bubbling. Samples were analyzed at 10, 20, 30 and 40 hours (h). The stability was studied by determining the total polar compound's content (TPC), acid, peroxide and p-anisidine values (AV, PV and PAV respectively). As expected, the TPC and PAV increased with the time of termoxidation, indicating the progress in the degradation of the fatty material (TPC showing the general deterioration and PAV the level of secondary oxidation). Differences were observed regarding the moment at which the level of 25% of TPC was reached in the samples: the higher TPC values were in the initial sample (without termoxidation) the less time was required to exceed this threshold. AV remained almost the same during the 40 h and PV presented a random variation. Above all samples, 60% exceeded the 25% of TPC only after 40 h, which indicates a good termoxidative stability of this fatty material. In the case of AV, 40% of the samples showed initial values beyond the threshold fixed by uruguayan reglamentation for this type of product (0.5%). The samples that showed higher values of TPC were the same that evidenced an AV above the allowed range. These samples also showed the highest rate of deterioration. The results evidence the impact of the initial quality of the fatty material (AV and TPC) on its termoxidative behavior.