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Effect of fat replacers on physicochemical properties and thermal behavior of reduced-fat regular and instant coffee creamer

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This study was conducted to investigate the effects of different fat replacers (i.e. inulin, 0, 2.5, 5 and 7.5% w/w; maltodextrin, 0, 15, 20 and 25% w/w) and agglomeration process on the characteristics of the reduced-fat coffee creamer. In the current work, the partial replacement of the hydrogenated fat with inulin and/or maltodextrin led to provide the reduced-fat creamer with desirable characteristics. The results indicated that the creamer containing 25% maltodextrin and 7.5% inulin exhibited the highest glass transition temperature (T_g) and the lowest stickiness among all samples. The new formulated-creamers had higher glass transition (T_g) than the control and commercial creamer. This could be due to the addition of components (i.e. maltodextrin and inulin) with high molecular weight to the creamer formulation. The bulk density of regular-and-instant creamers ranged from 0.29 to 0.86 (g/cm^3) depending on the drying stage and method. All instant-creamers from two stage drying had lower moisture content, bulk density, and stickiness as well as higher solubility and glass transition temperature (T_g) than the regular-creamer from the single stage drying. This indicated the significant positive impact of fluidized bed drying on physicochemical and functional properties of the reduced fat creamer.

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AlgaCulture: From hunting-gathering to sustainable farming

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Fish are a major source of protein and Omega-3 essential fatty acids for millions around the world. It is man's most important single source of high-quality protein, providing ~16% of the animal protein consumed by the world's population. Historically, the oceans were considered limitless and thought to harbour enough fish to feed an ever-increasing human population. However, as the demands of growing population, particularly in poorer countries grow, there are growing concerns regarding the sustainability of fish and fish-oil production. The increasing pollution in the oceans and the depleting wild fish stocks due to over-fishing and weather-related influences (e.g. El-Niño) – propel the concerns about questionable future of "hunting for fish" both quality and quantity wise. Aquaculture production, fish and shellfish farming has grown rapidly to address the shortfalls in capture fisheries. But aquaculture has come under intense scrutiny and criticism as environmentalists fear that it could cause significant environmental problems and further impact wild species that are already threatened. Now it is time for an evolutionary change. Algae are the natural source of vital protein and Omega-3s. They can grow in brackish water without using fertile land. Alga-Culture is transitioning the world to a new way of sustainable food production. This is a way that does not compete with traditional agriculture of these finite resources. The techno-economical and regulatory challenges that Alga-Culture has to overcome in order to become a major player in the food industry are: Scalable and sustainable algae culturing, harvesting and processing platforms; regulatory approvals required to enter the food market and; competitive economics - leaving the end customer with an easy choice. Alga-Culture is a necessary evolutionary step towards sustainable production of vital proteins and essential fatty acids and it is already happening.

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