



# **USING OF SOME MEDICINAL PLANTS IN FUNCTIONAL DAIRY PRODUCTS IN EGYPT AND MOROCCO**

By

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**ABSTRACT**

The objective of this study was to addition some herbs rich source of physiological active ingredients, namely turmeric, sage as well as marjoram to skimmed-milk yoghurt and cast Kariesh cheese to find out to what extent they could be suitable for use as fortifiers *en route* to innovate functional products. To achieve these purposes, aqueous extract (10% W/W) of pulverized turmeric, sage or marjoram was prepared and filtered. To avoid any dilution during dairy products fortification, the total solids (TS) % of herbal aqueous extract (HAE) was adjusted to be equal to those of fat-free yoghurt or cast Kariesh cheese using skimmed milk powder (SMP). Both yoghurt milk and UF-precheese were fortified with any HAE at the level of nil (control), 1, 2 or 3% and converted into the final products. The obtained results revealed that, in the powder form, both herbs of sage and marjoram were containing protein, crude fiber, Fe, Mg, Ca, Na, K and Cu at levels higher than those of turmeric. Marjoram extract was the most effective herb on decreasing the increase rate in body weights and weight gain followed by sage extract and turmeric extract. The administration of any HAE was associated with reductions in serum total as well as all cholesterol types, serum triglycerides and glucose concentrations of rats blood fed thereon. Likewise HAE decreased the elevated activities of the liver enzymes aspartate amino transferase and alanine amino transferase. HAE improved oxidative stress by lowering malondialdehyde level and increasing level of glutathione. The histopathological investigation of some organs of rats bodies indicated that, the administration on any aqueous herbal extract studied, especially sage, for rats fed on high fat diet (HFD) led to relative reduction in the harmful effect of HFD feeding on liver only, but any of kidney heart and spleen showed no improvement due to the administration on the aqueous extract either of turmeric, sage or marjoram. Yoghurt sensory evaluation accepted yoghurt with HAE providing that the fortification level did not exceed 1.0 % (v/v). Both of marjoram and rather sage extract delayed the acid production in yoghurt and caused the higher pH values *versus* the other herb. The fortification with 1.0% turmeric extract led to encourage the growth yoghurt of both strains of *Streptococcus thermophilus* and *Lactobacillus delbrueckii* ssp. *bulgaricus*, while both of marjoram and sage extract delay slightly their growth in comparison with the control (plain yoghurt). Although the flavor of turmeric containing cast Kariesh cheese was not significantly affected by the level herbal extract up to 3%, the flavor and other sensory criteria scores of both of marjoram and sage containing cheese were significantly lowered when the level of their extract was exceeded 2%. Opposite to the cheese, protein content, the ash content increased by HAE adding. Finally, turmeric, sage or marjoram can be considered as an additive functional ingredient because of their antioxidant properties.

**Key words:** Yoghurt, Kariesh cheese, Turmeric, Sage, Marjoram, Biology, Histology.

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