INTERACTION BETWEEN MILK PROTEINS AND SOME OF PHENOLIC COMPOUNDS

By

TAMER MOHAMMED ALI EL-MESSERY

B.Sc. Agric. Sc. (Dairy Science), Kafr El Sheikh University, 2002

M. Sc. Agric. Sc. (Dairy science), Cairo University, 2010

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This thesis for Ph. D. degree has been approved by:

Dr. NABIL M. MEHANNA …….

Prof. Emeritus of Dairy Science and Technology, Faculty of Agriculture, Kafr El Sheikh University

Dr. REZK A. AWAD …….

Prof. of Dairy Science and Technology, Faculty of Agriculture, Ain Shams University

Dr. ZAKARIA. M. R. HASSAN …….

Prof. of Dairy Science and Technology, Faculty of Agriculture, Ain Shams University

Dr. ALI ABDELAZIZ ALI …….

Prof. of Dairy Science and Technology and Vice President for Post Graduate Studies and Research, Ain Shams University

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Under the supervision of:

Dr. ALI ABDELAZIZ ALI

Prof. of Dairy Science and Technology and vice president for post graduate studies and Research, Ain Shams University (Principal Supervisor).

Dr. ZAKARIA MOHAMED REZK HASSAN

Prof. of Dairy Science and Technology, Department of Food Science, Faculty of Agriculture, Ain Shams University.

Dr. HALA MOHAMED FAKHER El-DIN

Researcher Prof. Emeritus of Dairy Science, Department of Dairy Science, National Research Center.

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ABSTRACT

Tamer Mohammed Ali El-Messey: Interaction between Milk Proteins and Some of Phenolic Compounds. Unpublished Ph.D. Thesis, Department of Food Sciences, Faculty of Agriculture, Ain Shams University, 2014.

Interaction between milk proteins (casein and/or whey protein isolate) and some of standards phenolic compounds (Rosmarinic acid, Chlorogenic acid, Quercetin, Vanillin, Gallic acid, Caffeic acid and Catechin), were determined using Sephadex G-25 column chromatography. Fractions corresponding to protein, protein-phenolic complexes and fractions corresponding to the free phenolics were collected, and their phenolic content was determined by Folin–Ciocalteu reagent. The strongest milk protein-binding affinity was noticed with caffiec acid, whereas chlorogenic acid and vanillin were less interacts with milk proteins. Interaction in the wide range of pH was determined by precipitating potential assay. The optimum pH for the highest interaction was at 3 for rosmarinic acid, quercetin, gallic acid, caffeic acid and catechin, while it was at 5 for chlorogenic acid and vanillin and the lowest interaction for all phenolic compounds was at pH 7.

The interaction between tannin fractions isolated from walnuts (*Juglans regia*), green tea and lentil (*lens culinaris* L.) and acid casein was determined using fluorescence quenching method and tannic acid standard. The interaction between casein and tannic acid had the most extensive fluorescence quenching and followed by walnut > green tea > lentil for plant tannins. Interaction in wide range of pH was determined by precipitating potential assay. The optimum pH for the highest interaction between casein and tannins was at pH 5, while it was at pH 6 for interaction between WPI and tannins

Interaction between tannin fractions from plant source and milk protein fractions [β-casein, κ-casein, β-lactoglobulin (β-Lg) and α-lactoalbumin (α-La)] were determined by high-performance liquid chromatography (HPLC) method with a photo-diode array UV detector.

Photodiode Array Detectors in UV–VIS Spectroscopy: Part

Theoretical aspects of photodiode array detection are presented in this month's INSTRUMENTATION. In next month's issue, the second article in this two-part series will cover photodiode array detection in spectroelectrochemistry, high-performance liquid chromatography, stopped-flow kinetics, and other analytical chemistry applications.

The properties of UV and visible light and the responses of many compounds to these wavelengths have long been considered a useful tool both in identification and in quantitative analysis of compounds. Molecular absorption UV–visible (UV–VIS) spectrophotometry requires detectors with high-UV to near-IR (NIR) response, large dynamic range, linear response, low noise, and temporal as well as thermal stability.

The photodiode array used as a UV–VIS spectrophotometric detector meets these requirements with the added advantage over classical systems of acquiring the entire UV–VIS spectrum simultaneously. Because spectral acquisition is a parallel process, many of the concerns of UV–VIS spectrophotometer users, such as sample photodegradation, scanning nonlinearities, and difficulties in observing transient phenomena, have been minimized if not eliminated.

Conventional UV–VIS spectrometers

Complete UV–VIS spectrophotometric information can be obtained either by scanning across the spectral region of interest or by simultaneously monitoring this region in its entirety. Conventional scanning monochromator systems use a continuous source (deuterium or tungsten lamp) and a dispersive element (a grating or a prism). This dispersive element is mechanically rotated to vary the wavelength of light passed th
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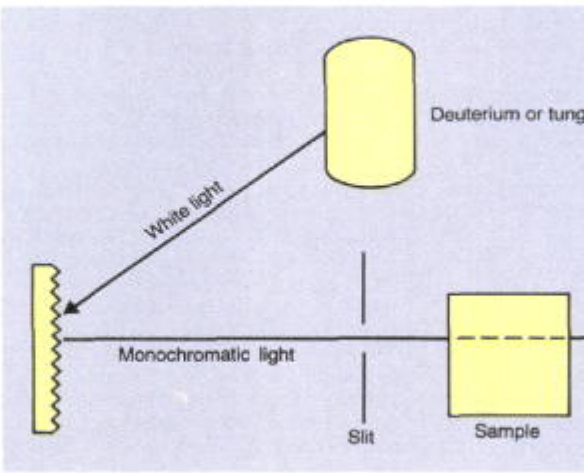

Figure 1. Conventional spectrometer optical configuration

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