INTRODUCTION

In recent years, increasing attention has been paid to the role of antioxidants in human health. Such compounds, particularly those of natural origin, are recognized as being very important compounds in food preservation and are believed to play a significant role in health protection. They can act both by reducing the content of toxic components in foods and by supplying the human body with exogenous antioxidants.

Antioxidants are used in many applications, not only in the food industry. Pharmaceuticals, cosmetics, wrapping materials fall also in the list (Pokorny, 1991).

Synthetic antioxidants and, to a lesser extent, natural antioxidants are used routinely in the agroalimentary industries to minimize the oxidation reactions and to stabilize fat-containing foodstuffs. Phenolic antioxidants, such as BHA (butylated hydroxyanisole), BHT (butylated hydroxytoluene), PG (propyl gallate), TBHQ (tertiary butylhydroquinone), are the most widely used synthetic antioxidants due to their high stability and effectiveness and to other practical advantages such as their low cost. However, their use has decreased because of their suspected action as promoters of carcinogenesis, and because of the general rejection of synthetic food additives by consumers (Chen et al., 1992). Therefore, the need to search for natural antioxidants, especially of plant origin, has greatly increased in recent years (Jayaprakasha, et.al., 2003).

The basic pigments derived from natural sources that are currently permitted for food coloration purposes are the following: curcumin; lutein; B-carotene; bixin/norbixin; capsanthin/capsorubin; anthocyanins; betanin; carminic acid/carmine; chlorophyll; copper chlorophyll/chlorophyllin; caramelized sugar; malt extracts; carbon black. Since it is unlikely that any new additions will be made to the list of permitted synthetic colors, the main restriction being the expense of carrying out the necessary toxicological tests, it is to be expected that future developments will be currently employed in order to further enhance stability or ease of use (Collins and Hughes, 1994).

Agricultural byproducts contain a variety of biologically active species that mostly go to waste. In particular, most plant-derived materials are rich in antioxidant polyphenols. An estimated 13% by of the weight of the grapes processed by the wine industry ends up as a byproduct after pressing (Torres et al., 2002).

Waste re-use is a critical area of importance in the food industry. Agro-industrial waste presents a cheap and rich source of exploitation for the recovery of natural antioxidants. There exist precedents for the recovery of antioxidant substances from herbs, citrus peel, shrimps, grape skins etc. (Bocco et al., 1998; Kanner, 1994).

Since many undesired oxidation processes, including food decay and a variety of diseases, involve free radicals, anthocyanins from grape skins are potential added value products that can be applied as natural food additives and disease chemopreventive agents.

Anthocyanins are widely dispersed throughout the plant kingdom, being particularly evident in fruit and flower tissue. The world annual consumption of anthocyanins has been estimated as 10,000 tons from red grapes only. They are also found in leaves, stems, seed, and root tissue (Strac and Wray, 1993). As well as acting as attractants for pollinating insects, anthocyanins in the epidermis have a protective role, acting as a filter and reducing the levels of harmful irradiation reaching mesophyll cells (Burns et al., 2002).

Anthocyanins are responsible for red, blue and purple colors in red grapes. White grapes do not contain anthocyanins. They are located principally in the skins of grapes, although they are also present in the flesh of some berries, a characteristic known as teinture (Zheng and Wang, 2003). The amount and concentration of anthocyanins in red grapes varies depends on the variety, maturity, climate, geographic origin, and fruit yield. The anthocyanins in grape skins are mainly the 3-O-glucosides of delphinidin, cyanidin, petunidin, peonidin, and the major compound, malvidin, although coumaric, caffeic, and acetic acid esters have also been detected (Burns et al., 2002).

Anthocyanins are readily extracted from grape skins and provide the vibrant reddish-purple tones of young red wines. They are also known to contribute to the antioxidant and vasodilation activity of red wines (Burns et al., 2000).

As chemical compounds, they are rather unstable. They are sensitive to enzymes, temperature, oxygen and hydrogen peroxide, ascorbic acid, pH, metals, sugars and their breakdown products, light, other pigments and sulfur dioxide.

Today, natural antioxidants are still under intensive study and represent a currently emerging concept in nutrition. The present work aims to identify and quantify anthocyanins present in thirteen traditional Greek red grape varieties and four of the socalled "international" cultivars grown in Greece and to evaluate their antioxidant activity. Their identification and quantification were carried out using High Performance Liquid Chromatography (HPLC). Antioxidant activity was evaluated by measuring the scavenging ability of skin extracts using the DPPH assay.