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CHERRY LAUREL (*Prunus laurocerasus*) EXTRACT AND LIPOSOME ENCAPSULATION

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Aim. The study aimed to determine the antioxidant activity and the number of phenolic substances of cherry laurel fruit and to reveal the usability of the fruit for other studies.

Methods. Cherry laurel fruit was separated from the seeds and pureed. The fruit was extracted by ultrasonic extraction. Ethanol was used as a solvent. The fruit was extracted by acidic and ethanol extraction. The solvent was removed in a rotary evaporator at 50–60 °C. For liposome production, lecithin solution was first prepared. Chitosan solution was added to the resulting reduced-size liposome and mixed overnight. Liposomes with and without extracts were prepared.

Results. The DPPH value of the acidic fruit extract was determined as 66.399 mg TEAA/kg KM, the CUPRAC analysis result was 42.424,84 mg/kg KM, and the total phenolic content was 3.895,34 mg GAE/kg KM.

Conclusion. The data obtained from this study show that cherry laurel fruit has good antioxidant activity and phenolic substance content and that the fruit can be a raw material for anticancer studies in this field.

Keywords: antioxidant and phenolic, cherry laurel, encapsulation, liposome.

Cherry laurel (*Laurocerasus officinalis* Roem.) is a red-purple fruit belonging to the Rosaceae family, also known locally as “taflan and laz cherry.” In Turkey, it is generally cultivated in the Eastern Black Sea region and is also produced in the Balkans, Iran, Western Europe, Southern and Western Caucasus, and some Mediterranean countries [1–3]. Wild-grown cherry laurel fruits are astringent, while specially grown fruits have a sweet taste. The fruit is consumed fresh, dried, roasted, or in forms such as jam, pickle, and marmalade [3–5]. Cherry laurel can be consumed as food as well as for the treatment of some diseases among the people. Among these diseases are stomach ulcers, bronchitis, digestive system disorders, eczema, and hemorrhoids [6, 7]. Phenolic acids such as chlorogenic, vanillic, syringic, caffeic, p-coumaric, and p-hydroxybenzoic in the structure of cherry laurel make the fruit a good source of antioxidants [7, 8]. Fruits and vegetables have a significant place in human nutrition. This importance of fruits and vegetables is due to the antioxidant and phenolic compounds they contain. These compounds especially protect against cancer and cardiovascular diseases [9, 10]. The use of natural compounds in the treatment of diseases is becoming increasingly popular.

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Due to this, researchers have focused on the extraction of phenolic compounds from natural sources in recent years. Extraction is a method used to extract the desired bioactive compounds from plant, animal, and microbial tissues with special solvents. Various techniques are used for this purpose. Ultrasonically assisted extraction is one of these methods [11–13]. The extraction process, which takes hours with conventional extraction, can be performed in minutes with ultrasound-assisted extraction. This extraction method has advantages such as reducing time, being environmentally friendly, inexpensive, and increasing extract yield [13–15]. Encapsulation enables an active ingredient to be coated with a specific coating material to maintain its stability and release at the desired dose. There are different encapsulation techniques in the literature. Liposome formation is one of them and has been a popular research topic in recent years. Liposomes are small vesicular spheres with a lipid bilayer containing hydrophilic and hydrophobic substances together. Liposomal encapsulation also has benefits, such as increasing the bioavailability of active compounds and ensuring stability and controlled release. Therefore, it is a preferred encapsulation method for phenolic compounds [16].

Aim. The objectives of this study were to perform ultrasonically assisted extraction of cherry laurel fruit, to compare the antioxidant activity and total phenolic content of acidic and non-acidic extracts, and to form extract-containing/plain liposomes.

Methods. Blackcurrant fruit was separated from the seeds and pureed with the help of a blender. 100 g of fruit was mixed with 1000 ml ethanol and 1% formic acid. Only ethanol was used in the acid-free extraction. Extraction was performed in an ultrasonicator at 40 °C for 40 min. At the end of the time, the mixture was filtered with coarse filter paper (Fig. 1). The solvent was evaporated in a rotary evaporator at 60 °C. °Brixs value of the extract was measured by hand refractometer. The method of Demircan et al. was modified and used for liposome formation. First, lecithin solution was prepared for liposome production. Chitosan solution was added to the resulting size-reduced liposome and mixed overnight. 0.8% w/v chitosan solution was added to the solution to ensure the stability of the liposomes formed. Liposomes with and without extracts were prepared [17].

Results and Discussion. The antioxidant activity content of cherry laurel fruit was determined by DPPH (2-2-Diphenyl-2-picrylhydrazyl) and CUPRAC analysis [18, 19]. Total phenolic content was determined by total phenolic matter analysis according to the Folin Ciocalteau method [20]. The results of the extract analysis are given in Table 1. The DPPH value of the acidic fruit extract was determined as 66.399 mg TEAA/kg KM, the CUPRAC analysis result was 42.424,84 mg/kg KM, and the total phenolic content was 3.895,34 mg GAE/kg KM. According to the results of the acid-free extract, the DPPH value of the fruit was 52.696 mg TEAA/kg KM, the amount of phenolic matter was 3.383,97 mg/kg KM, and the CUPRAC value was 63.898,63 mg/kg KM. The water-soluble matter content of the extract was determined as 83°Brix, and the results were given over this dry matter.

According to Table 1, acidic extraction increased the amount of antioxidant and phenolic substances in the fruit. DPPH and CUPRAC assays are two separate antioxidant assays. In the DPPH method, the reduction of the free radical DPPH by antioxidants is measured, while in the CUPRAC analysis, the reduction of copper (Cu) ions is measured. These two values differ from each other according to the type of antioxidant compounds. The CUPRAC value of the acid-free extract was lower than the acid extract. This indicates that the acid-free extract releases more copper-binding compounds. The use of acid in the extraction increased the amount of DPPH and total phenolic content (TFM). Acidic media increase the extraction efficiency of phenolic compounds due to their

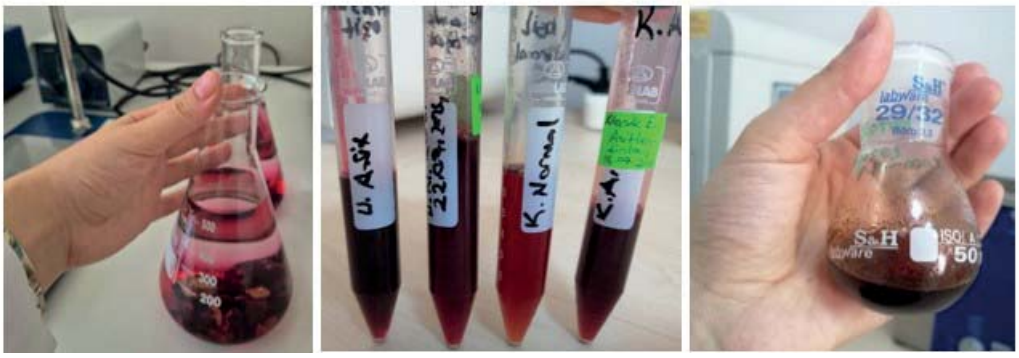

Fig. 1. **Extraction of cherry laurel**

Table 1. **Cherry laurel extract analysis results**

	DPPH TEAA mg/kg KM	CUPRAC mg/kg KM	TFM mg/kg KM
Ultrasonic-Acid	66.399	42.424,84	3.895,34
Ultrasonic-Acid-Free	52.696	63.898,63	3.383,97

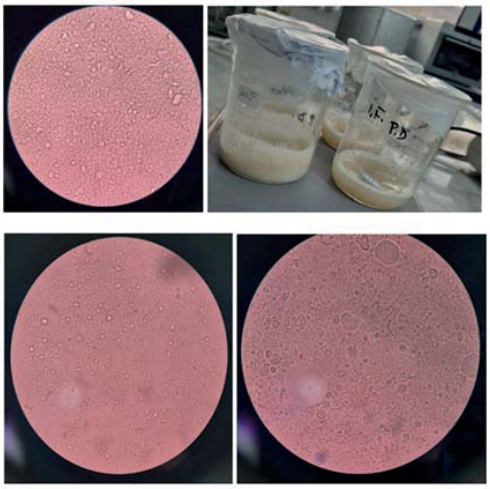

Fig. 2. **Liposome formation and microscope view**
(Images were obtained at 100× magnification under a light microscope)

effects, such as increasing the solubility of the compounds and disintegration of the cell wall [21]. The results given in Table 1 also show this. Extract-loaded and empty liposome samples are presented in Fig. 2.

Conclusions. The data obtained from this study show that cherry laurel fruit has good antioxidant activity and phenolic substance content and that the fruit can be a raw material for anticancer studies in this field.

Authors' contribution

E. N. Bulut — analysis, thesis writing; C.A. Ağca — giving ideas, guiding the study, supporting the laboratory environment, providing materials; N. Ertaş — goal setting, laboratory environment support, material and analysis support, evaluation of research results

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