**USE OF MEDICINAL AROMATIC PLANT EXTRACT IN WOOD AND SOME PHYSICAL CHANGE FEATURES**

Since the beginning of history, the global world structure and medicinal aromatic plants in our country have been used in very rich fields (Medicine making, perfumery industry etc.). New human and environmentally friendly wood preservative materials are being developed, thereby trying to create an antioxidant / antibacterial product structure in a wide range of areas such as furniture, children's toys and hospitals that are harmless to health. In this study, the extract of Evelik (Rumex patientia L.), which is one of the medicinal aromatic plant species and whose antioxidant / antibacterial properties have been reported in the literature, was prepared and its extract was prepared (3%). According to the results of the experiment; The highest air dry specific gravity value is 3% Borax at 30 minutes diffusion (0.69 g/cm3), in the lowest control sample; highest retention 3% Borax 30 minutes vacuum at 30 minutes diffusion (3.16%).

It has been reported by the World Health Organization (WHO) that the number of plants used for treatment and as a spice in the world is around 20,000. Extracts from plants are prepared and used as medicine. It dates back to 2700 years. As in the countries of the world, many plants known as medicinal plants among the people found in our country by trial and error method are used in the treatment of diseases. However, the number of plants used for medical purposes is much higher among the public [1, 2]. Medicinal and aromatic plants are an important part of the plants that are traded today. This is an important issue not only in terms of maintaining the continuity of plant species, but also in order to transfer it to future generations in line with the principle of 'sustainable use' and to use it for many years by avoiding the consumption of all natural resources[3].The main aim of the study is the rapid decrease in forest presence and exposure of synthetic / chemical effects to the environment in which human beings pose serious threats; The fact that wood preservative materials are of chemical / synthetic origin requires the presence of new natural / organic preservatives the ability of the plant extract (3%, 5%) of Evelik (*Rumex patientia* L.) plant, whose antioxidant / antibacterial properties have been determined, has been determined to be impregnated with a vacuum system in various vacuum/diffusion (20-30 minutes, 35-45 minutes) concentrations. Subsequently, by determining some technological features, it is aimed to transform the organic wood into an antibacterial/antioxidant structure, albeit partially. In this way, this plant extract will be used in many areas (indoor, children's toys, hospitals, furniture in places requiring hygiene, etc.).

Maple (*Acer platanoides* L.) was preferred as the wood type in the study. Evelik (*Rumex patientia* L.) plant, whose antibacterial/antioxidant properties are determined in the literature was used [4]. While preparing the samples, the smoothness, crack, knot of the fiber structure of wood was prepared according to TS 2470/2471 from sapwood without color distortion. The 30-minute vacuum was subjected to diffusion for 30-40 minutes. Experimental samples have been completely dried to prevent the impregnation agent from being affected by wood moisture [5]. Preparation of extract, the residue was washed with 200 ml of hot distilled water and the residue was poured with the help of a pump or another device that would serve as a suction, after drying the porous capsule and the contents in the oven set at 103 oC for 16 hours, then it was cooled in the desiccator and weighed with 0.001 g precision [6]. Retention amount (% Rate), Physical properties (Full / Air Dry Specific Gravity) and Mechanical properties (Bending Strength / Elasticity Module) was calculated. RetentionRate; The amount of retention that is obtained in both the single and double impregnation process of the extract and borax used is given in Tab. 1. Air / full dry specific gravity (g/cm3) is given in Tab. 2.

**Table 1.** Retention Rate and Simple Variance Analysis (SVA) Results

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **İmpregnation Material** | **Vacuum** **Minute** | **Diffusion Time** **(Minute)** |  **Retention Rate (%)** | **HG** |
| % 3 Evelik | 30 Minute | 30 Min | 0.37 | f |
| 40 Min | 0.41 | e |
| % 3 Borax | 30 Min | 3.16 | a |
| 40 Min | 2.75 | b |
| % 3 Evelik+Borax | 30 Min | 0.71 | c |
| 40 Min | 0.65 | d |

**HG**: Homogeneous groups; the bolded values are high values

When the table is examined; the highest% adhesion was 3% Borax 30 minutes diffusion (3.16%), the lowest 3% evil extract 30 minutes diffusion (0.37%). The plant extract has yielded a positive result both for use alone and for dual use with Borax. Considering the antioxidant / anti-bacterial structure of the plant extract structure and the positive effect of boron structure on human / environmental health, we can say that it can be used jointly in a wide range of areas, with its strong effect against biotic / abiotic effects and fire retardant effect.

Wood samples impregnated yellow pine wood with boron compounds and kebracodan, and reported that the highest retention occurred at a concentration of 1% [7]. In the study reported that he found the retention values in beech wood (0.49%) in his study of isgin plant extract in various concentrations (1.3%) [8]. İn this study, they determined total retention and % retention in the wood material impregnated with tea plant. As a result of their treatment, they found that the lowest % retention was in iroko wood (1.58%) and the highest % retention rate was in beech wood (6.75%). They reported that the lowest total retention was in iroko wood (31.27 kg/m3), the highest total retention value was in beech wood (100.65 kg/m3). According to the retention results; they stated that the organics obtained from the tea plant extract can be used as an impregnation agent in wood [9]. Air / full dry specific gravity values/ Duncan Test results are given in Tab. 2.

**Table 2**. Air / Full Dry Specific Gravity Values and Duncan Test Results (g/cm3)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Wood** **Type** | **Extract Concentration** | **Vacuum Time**(Minute) | **Diffusion Time**(Minute) | **Air Dry****(**g/cm3**)** | **Full Dry****(**g/cm3**)** |
| **Avr** | **St Dv.** | **Avr**  | **St Dv.** |
| **Control** | 0.62 | 2.15 | 0.58 | 1.86 |
| **Maple Wood** | % 3 Evelik Extract | 30 Min | 30 Min | 0.63 | 1.34 | 0.61 | 2.34 |
| 40 Min | 0.61 | 2.12 | 0.59 | 5.17 |
| % 3 Borax | 30 Min | 0.69 | 3.61 | 0.65 | 4.49 |
| 40 Min | 0.65 | 2.53 | 0.62 | 5.01 |
| % 3 Evelik+Borax | 30 Min | 0.64 | 1.12 | 0.62 | 2.85 |
| 40 Min | 0.65 | 2.90 | 0.62 | 3.11 |

 **Avr**: Average: **Std Dv**: Standard deviation

While both concentrations of plant extract (3%, 5%) showed a partial decrease in use alone, it provided a partial increase in the specific weight value in dual use. This situation; the anatomical structure of wood may be due to its extract structure and pH value. The highest air dry specific gravity value 3% Borax was determined at 30 minutes diffusion (0.69 g /cm3) in the lowest control sample. The lowest full dry specific gravity was determined at 5% diffusion (0.56 g/cm3) for 30 minutes in Evelik extract.

The impregnation retention rates, exact dry densities and air dry densities of the samples were determined. As a result; In sapelled wood material, which has impregnated the highest impregnation retention rate (6.83 g / cm3) with boric acid, the highest dry density value (0.66 g / cm3), air dry density value (0.72 g / cm3) with beech tree [10]. İt reported that diffusion time increased the specific gravity level and obtained a high specific gravity value compared to the control sample; highest air dry specific gravity 20 minutes vacuum in hot plant extract 60 minutes diffusion (0.52 g / cm3), 20 minutes vacuum in the lowest wood oil 20 minutes diffusion (0.42 g / cm3); reported that the highest full dry specific gravity was 20 minutes vacuum in wood oil, 60 minutes diffusion (0.50 g / cm3), and the lowest 20 minutes vacuum in wood oil, 20 minutes diffusion (0.38 g / cm3) [11].

Healthy life in the human-environment relationship is provided by the wooden equipment used in the indoor and outdoor spaces where it lives. The natural strength of wood in simple use is not long lasting. This causes huge losses in terms of the country's economy and forest resources. Many of the wood preservatives are of chemical origin, which required orientation towards organic / natural preservatives. Study; Suggestions have been made by determining the various technological features of the Evelik plant, which has an important place in terms of healthy life, and also has antioxidant/ antibacterial properties, in order to determine the level of adhesion and usage areas in wood.

1.Yiğit N., Benli M. Antimicrobial activity of thyme (*Thymus vulgaris*) plant, which is widely used in our country // Orlab On-Line Journal of Microbiology-2005. - No. 3, P. 1-8.

2.Çenet M., Toroğlu S. Usage areas and methods used for determination of antimicrobial activities of some plants used for therapeutic purposes // Kahramanmaraş Sütçü İmam Unıversity Journal of Science and Engineering – 2006. – No. 9 – P. 12-20.

3.Güler, S., Ministry of Environment and Forestry Publication // Number:209 -2004-Erzurum,https://www.tarimorman.gov.tr/TAGEM/Belgeler/yayin/2009\_yayin\_listesi.

4. Çetin S. Determination of Antioxidant and Antimicrobial Activities of Some Plants Growing in Erzurum Province and Among the People Used for Medical Purposes // (Master Thesis), Artvin Coruh University, Institute of Science, Artvin - 2017.

5. Baysal E. Effect of Various Boron and WR Compounds on Some Physical Properties of Red Glass Wood // (Master Thesis), Black Sea technıcal Unıversity,Institute of Science, Trabzon - 1994.

6.Bal B.C. Investigation of some physical and mechanical properties of yellow pine (*Pinus sylvestris* L.) wood impregnated with ammonia copper quat (ACQ) impregnation salt // (Master Thesis), Kahramanmaras Sutcu Imam University, Institute of Science, Kahramanmaraş - 2006.

7.Alkan E. Investigation of physical and mechanical properties of yellow pine (*Pinus sylvestris* L.) wood impregnated with natural impregnations and boron compounds // (Master Thesis), Gümüşhane University, Institute of Science, Gümüşhane - 2016.

8.Bahadır Ö. Effect of Isgin (*Rheum Ribes* L.) Plant (Antioxidant/Antibacterial) Extract on the Impregnation Feature and Technological Properties of Wood // (Master Thesis), Artvin Coruh University, Institute of Science, Artvin - 2019.

9.Atılgan A., Ersen N., Peker H. (2013). Different Types Of Wood Treated With Tea Plant Extract Retention Values // Kastamonu University Journal of Forestry Faculty – 2013. – No. 13. – P. 278-286.

10.Atılgan A. Effect of Plant Extract Dye on Flexural Strength/Elasticity Module in Some Wood Species // Journal of Biological Sciences Research – 2017. - No. 10. – P. 10-13.

11.Ceylan Ş. Possibilities of Usage Plant (Antioxidant/Antibacterial) Extract in Wood Industry (Furniture/Construction) // Artvin Coruh University, BAP Coordinator, Project Code: 2017.M82.02.02. – 2020.