Productive functions of forests
COMPARISON OF COMPOSITION ELEMENTS ON DIFFERENT SUBSTRATES OF OYSTER MUSHROOMS (PLEUROTUS SPP.) GROWING UNDER PLASTIC SHEET

M. Güler and Y. S. Ağaoğlu

The paper describes changes in the yield, dry matter percentage, crude protein percentage, pileus diameter, stipe diameter and stipe length of Pleurotus pulmonarius (PP), P.sajor-caju (PSC), P.sp.cfrFlorida (PF), P.columbinus (PC), P.ostretus (Origin of England-POE) and P.ostretus (Origin of Anatolia-POA) inoculated and grown in different substrates composed of mixtures of wheat straw (W), paddy straw (P), corn straw (C), wheat+paddy straw (WP), wheat+corn straw (WC) and wheat+paddy+corn straw (WPC). During the experiment it was also found that substrates of WPC (437.90 g), WP (377.90 g) and WC (375.90 g) have proven to be the best growing media, providing highest yields. Yield of the P (249.90 g) are lower than the others. According to the comparison of quality factors at different media, the levels of dry matter in C (8.32 %), crude protein in W (25.32 %), pileus diameter in P (70.77 mm) stipe diameter in WC (15.06 mm) and stipe length in WPC (30.96 mm) were found to be important.

Keywords: Pleurotus, waste matters, plastic sheet, composition elements.

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PRODUCTION AND EXPORT OF BASIC SECONDARY FOREST PRODUCTS OF TURKEY

E. Gavcar, M. K Yalınkılıç and A. Aytekin

Turkey is very rich country in terms of secondary forest products. Many of these plant species are present in the forest areas and are named as secondary forest products (SFPs). The paper outlines the production and export of these products. These products are mainly the balsamic secretions of the living trees, parts of trees excluding timber and some woody or herbaceous plants having medical and industrial importance or consumed as food. Such products of Türkiye are composed of styrrax oil, naval stores, root of licorice plant and their pure extract, valonia acron. pine nut, carob fruit, lavrel leaves and oil, linden flowers, thyme, sage, etc.

Keywords: Turkey, Secondary Products, Styrrax oil. naval stores, licorice, valonia acron, pine nut, carob fruit, lavrel, linden, thyme, sage.

1Assistant Prof. Dr., Karadeniz Technical University, Faculty of Forestry . Forest Products Dep.
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THE ZERO EMISSIONS RESEARCH INITIATIVE SEPARATING NON WOOD FOREST PRODUCTS INTO VALUE ADDED MATERIALS
INTRODUCTION

Turkey is very rich country in terms of secondary forest products. Determinations of more than 9000 endemic plant species proved this phenomenon. Many of these plant species are present in the forest areas and their named as secondary forest products (SFPs).

SFPs of Turkey which have been subjected so far, grown throught were given (OGM, 1987) as follow:

- Garden sage (Salvia spp.)
- Juniper fruit (Juniperus spp.)
- Alder Buck thorn (Frangula spp.)
- Yellow berry (Rhamnus spp.)
- Gentian, yellow gentiana (Gentiana lutea L.)
- Pine nut (Pinus pinea L.)
- Soapworth (Gypsophila L.)
- Sweet By, Lavrel, Roman Lavrel (Laurus nobilis L.)
- Bracken, fern, make fern root (Dryopteris filix-mas (L.) Schott.)
- Heather (Erica arborea L. and E. manipulifora Salisb.)
- Milk-vetch (gum-tragancanth) (Astragalus L.)
- Snowball, guelderrosa (viburnum opulus L.)
- Daedly nightsihade, belladonna (Atrope belladonna L.)
- Marsh mallow (A. rosa=hollyhock) (Althaea officinalis L.)
- Chaste tree (Ricinus communis L.)
- Birch (Betula pendula Roth.)
- Linden tree (Tilia spp.)
- Simmondsia chinensis (Link) Schneied
- Snowdrop (Galanthus L.)
- Carob (bean) fruit (creatonia siliqua L.)
- Valerian, Creton, Spikenard (Valeriana officinalis L.)
- Graden thyme (Thymus spp.)
- Rosemary (Rosmarinus officinalis L.)
- Lavander (Lavandula spp.)
- Mahaleb, Europan cherry (Creasus mahaleb (L.) Mill. var. mahaleb)
- Daisy, Comomlie (Matricaria chamomilla L.)
- Terebinth tree (Pistacia terebinthus L.)
- Sweet marjoram (Organum spp.)
- Nut gall (Quercus infectoria Oliver subsp. infectoria)
- Valonia acron (Quercus ithaburensis Decne subsp. macrolepis (katschy) Hedge-Yalt.)
- Root and pure extract of licorice plant (Glycrrhizza glabra L.)
- Redgum (Eucalyptus spp.)
- Common fennel (Foeniculm vulgare Mill. subps. vulgare)
- Mastic tree, lentisc (Pistacia lentiscus L. var latifolius Coss.)
- Sumac (Rhus spp.)
- Cherry lavrel (Laurocerasvs officinalis Roemar)
- Foxglove (Digitalis spp.)
- Edible forest musrooms (Morchella spp., Agaricus spp., Pleurotus spp., Lactarius spp. etc. (Yalınkılıç, 1985)).

Some of these products are for export while the remained consumed for domestic purposes. They were individual standardised by Turkish Standard Organisation (TSE) when their production and export rates reach to remarkable level.

Turkey hold monopoly some of the worlds SFP production such as styrax oil (Styrax Liquidus T.K.) which were picked from the traumatic wounds made on the stem of Liquidambar orientalis Mill. Styrax oil were utilise in pharmacy, perfume and chemical industry. Licorice plant is another example of Turkey's famous SFP, which is used in cola, bear production as well as pharmacy and cigarette making as reducing agent of nicotine (Gavcar, 1989).

Turkish native tanning sources got importance in tanner industry since the azo-type paints were considered as carcinogen by German leading importing countries. Production and tanning with azo-type paints were prohibited in leather industry of Turkey since beginning of January 1995 by an associated decision will open the new future for Turkish native tannin industry sources such as bark of trees which have high tannin content, nut gall, valonia acron, sumac, etc.
PRODUCTION QUANTITIES OF SFPs OF TURKEY

SFPs were produced by public and private sector particularly for pharmacy and cosmetic industry in Turkey. Production rate and quantities of major-products were given in Table 1.

Table 1. Production Quantities of Some Major SFPs of Turkey (DIE).

<table>
<thead>
<tr>
<th>Item</th>
<th>Production amount for per year as kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Styrax oil</td>
<td>4246</td>
</tr>
<tr>
<td>Naval store</td>
<td>184392</td>
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<tr>
<td>Root and pure extract of licorice plant *</td>
<td>189072</td>
</tr>
<tr>
<td>Valonia acron</td>
<td>5000</td>
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<tr>
<td>Pine nut</td>
<td>27276</td>
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<tr>
<td>Carob fruit</td>
<td>19733</td>
</tr>
<tr>
<td>Lavrel and lavrel oil</td>
<td>1294841</td>
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<tr>
<td>Linden flowers</td>
<td>19733</td>
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<tr>
<td>Garden thyme</td>
<td>1034770</td>
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<tr>
<td>Garden sage</td>
<td>280769</td>
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</table>

* Production by private factor (Data could not be given because of difficulties of obtaining recorded data).

Same statistical data of private sector was not included in the Table because of the difficulties of obtaining the data out of record.

Lavrel and garden thyme were the most produced items among other SFPs as seen in Table 1. Production amounts of Garden sage, pine nut and naval stores follow them, respectively. Production rate of garden thyme boosted from 1991 to 1993.
RATES AND TOTAL INCOME OF SFPs' EXPORT

After having consumed for domestic purposes, the remained parts of SFPs of Turkey are exported to various countries. Export and total income of export of SFPs were given in Table 2.

Table 2. Export rates and Total Income of Export Sales of SFPs of Turkey (DIE).

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<th>Item</th>
<th>Data (kg/S)</th>
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<td>Naval store</td>
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</table>

Values on Table 2 denotes the high export potential of SFPs of Turkey. For instance, garden thyme export were two fold increased from 1980 to 1992. Similarly, export rate of garden sage were increased from 550 tons to 1100 tons within same years. As, export rates of carob fruit, pine nut and linden flowers increased, whereas some reduction were recorded on those of styrax oil and valonia acron. Reduction in the production and export rate of styrax oil, as a monopoly SFP of Turkey were taken under consideration by General Directorate of Forest of Turkey. Liquidambar trees which are the sources of styrax oil are getting old as time proceeds and tired by consecutive production by traumatic wounds. To get more stabilised production rate and quality level of styrax oil, some precautions were taken, such as establishment the new Liquidambar plantations and also taken under protective control of old trees.
SFPs of Turkey are exported to the following countries in major.

<table>
<thead>
<tr>
<th>Item</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Styrax oil</td>
<td>Germany, France</td>
</tr>
<tr>
<td>Root and pure extract of licorice plant</td>
<td>USA, Italy, Germany, Israel</td>
</tr>
<tr>
<td>Valonia acron</td>
<td>England, Germany</td>
</tr>
<tr>
<td>Pine nut</td>
<td>Saudi Arabia, Italy, Dubai, USA</td>
</tr>
<tr>
<td>Carob fruit</td>
<td>Italy, Portugal, Spain</td>
</tr>
<tr>
<td>Lavrel and lavrel oil</td>
<td>USA, Germany, Japan, France, England, Netherlands</td>
</tr>
<tr>
<td>Linden flowers</td>
<td>Germany, France, Spain</td>
</tr>
<tr>
<td>Garden thyme</td>
<td>USA, Germany, Canada, England, Greece</td>
</tr>
<tr>
<td>Garden sage</td>
<td>USA, England, Italy</td>
</tr>
</tbody>
</table>

CONCLUSION

SFPs of Turkey were considerably increased as amount and yield in the whole forest products of country. It has also very high development potential by a good management and by taking necessary regulatory precautions which some of them have already being applied. Nevertheless, there are lack of information on producing, picking, drying, storing and utilisation techniques of these products. Therefore, considerable losses on quality and quantity have been growing danger which require much more effort on informative basis about above mentioned subjects in order to obtain valuable products to be consumed domestically and export.

REFERENCES


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