

Pharmaceutical analysis of Helichrisum Arenarium L.

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Introduction. Helichrysum arenarium L. Moench has an extended utility in European ethnomedicine as a medicinal plant that's possessing with cholagogue, choleric, hepatoprotective, and detoxifying activities [1].

Helichrysum is a herbaceous perennial plant belonging to the Asteraceae family. Its natural distribution areas range includes Central, Eastern and South Eastern Europe, the Northern Balkans, West Siberia, Central Asia, Mongolia and China [2].

The beginning of the genus name is derived from Greek phrases “helios”, that means sun, and “chrysos”, that means gold, what refers to the shiny-golden color of flowers. The predominant biologically active compounds of Helichrysi arenarii inflorescentia are flavonoids, with chalcone isosalipurposide, and flavanones salipurposide, prunin and naringenin as dominant constituents, whilst different compounds found in extraordinary quantity are phtalides, carotenoids, essential oil and yellow pigments: α -pyron derivates which includes arenol and homoarenol [1].

Growth and development processes of H. Arenarium populations might be influenced by the weather conditions; the potential fertility is correlated significantly with the precipitation amount. The amount of biomass and its seasonal distribution depends on weather conditions and the number of plant species coexisting in the analyzed phytocoenoses [3].

Flowering time: July–October. The species occurs in both natural and anthropogenic communities. Sandy Everlasting is also an ornamental plant supplying material for dry bouquets [3].

In addition, the essential oil from the flowers of Helichrysum species, Immortelle, have been used as a cosmetic agent [4].

There are 3 types of the drug in the trade: dry flower heads (*Helichrysi arenarii* flos), fluid extract, typically received through extraction with water-ethanol or glycerin and dry extract of flower heads (*Extractum florum Helichrysi arenarii* siccum), typically received from fluid extract. The flower heads are especially used for decoctions, whilst dry extracts are extensively used for the manufacturing of galenic preparations in the form of capsules and tablets. These forms available in the marketplace are especially represented through Russian preparations; the most popular one is “Flamin tablets”. Besides the unsustainable collection, the primary hazard issue that threatens species subsistence is the transformation of natural habitat to agricultural land (orchards, vineyards) and regions for the cultivation of fast-growing tree species (types of poplar, pine, and acacia). Protection rules triggered a need to increase a new efficient developing era for sandy everlasting, which can restore the species for its use in phytotherapy [1].

Methods and materials:

Helychrysum arenarium seeds were collected in Tavush region, Dilijan, during the flowering period (July, 2021). The identification of plant was carried out at the Department of Pharmacognosy, plant flowers were deposited and are available at the Herbarium of the Institute of Botany, National Academy of Sciences of Armenia, Yerevan.

Crude drug in advance was prepared by the special technique for examination by the "Microscopical examination technique" based on article, (NPh XIII, ex. 2, p. 277-285). Tendering hot method was used. The grounded seeds were boiled in 5% of alkaline (NaOH) for 5 minutes.

Then the solution was removed and the raw material was washed and was left in water. Soaked pieces of seeds were placed between subjective glass and cover by in advance the water-glycerin mixture (1:1) drop was applied. Examination was carried out by Microscope ISOBASE EW10X/20 lens.

Extractible materials were organic, biological active, low molecular and secondary metabolic products. Determination of extractible matter was carried out without application of the fixing method for the determination of quantitative

constituents of biological active substances (Pharmacopea XIII,1.5.3.0006.15. ex II, 2015).[5]

One gram of raw material was added to 50ml 50% alcohol solution. The mixture was boiled 30 min on water bath connected with condenser. After cooling, it was filtrated, the amount of liquid extract was measured, then dried on water bath in porcelain bowl. Carefully collected powder of dry extract was weighted.

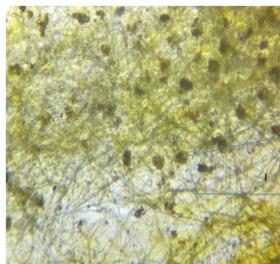
Just 3 grams of powdered plant was transferred into a weighing bottle. The sample was subjected to a temperature of 105° C for four hours followed by cooling in desiccators and weighted (Brazilian Pharmacopoeia V, 2010). The drying process was calculated from the point when the temperature in the drying shelf was 105 °C. The operation was repeated twice, for 2 hours and 30 minutes. The results of three determinations were evaluated in terms of weight percentage using the equation (Pharmacopea XIII,1.5.3.00067.15. ex II, 2015).

Three grams of the powder was transferred to porcelain crucibles which were previously calcined, cooled and weighed. The samples were charred in a muffle furnace at 450 °C for 6 hours. After cooling in a desiccator, they were weighed on an analytical scale. This procedure was repeated twice, for 4 hours and 2 hours. The amount of ash was calculated based on methods mentioned in Pharmacopeian. (Pharmacopea XIII,1.5.3.0006.15. ex II, 2015).

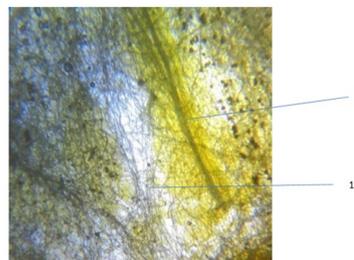
Results and discussion:

Raw material identification by the microscopical study considers very high in contemporary Pharmacognostic analysis. Particularly, more than two major distinguishing features of the plants are supposed to be identified in microscopic field. In order to obtain the objective evaluation of the main anatomical

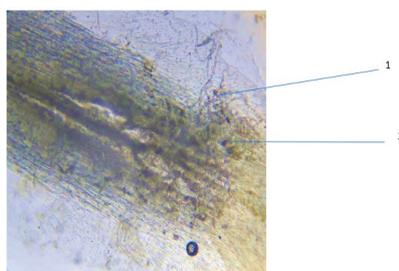
distinguishing features of raw material during the investigation *Helichrysum* is



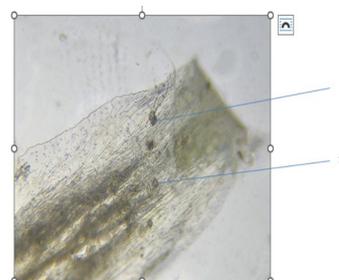
Picture 1. Upper surface of epidermis. 1. Hairs, 2. Essential oil glands.



Picture 2. Lower surface of epidermis. 1. Hairs, 2. Vascular tissue.



Picture 3. Tubular flower. 1. Bristles, 2. Flagellated hair.



Picture 4. Wrapper leaf. 1. Glands, 2. Flagellated hair.

supposed to be collected during fruiting period.

Everlasting flower leaves microscopic slides are presented by the pictures 1,2. Many essential oil glands were visible on to the upper surface of leaves. Three types of hairs were noticeable: unicell simple hairs, knee shape simple hairs, which cells of which are generating corner, and headed hairs with oval shape head. The vascular tissue was visible well, especially along the central vein. The tracheas had the oval shape and spiral. Also, high density of hairs was noticeable. Stomatas were marked on upper and lower surfaces.

Helichrysum flowers microscopic pictures are presented by the picture 3, 4.

On the flowers, especially at the ends of the teeth, numerous glands are visible on a short unicellular stalk. Glands are situated by the 1-2 rows, multi-tiered, often with a small cuticle. The edge of the teeth of the flowers is fringed, consists

of papillary outgrowths of the epidermis and at the base there is a row of mechanical cells. At the apex of the ovary there is a tuft of large, fragile, rough bristles sticking up or slightly deflected.

Table 1. Commodity indicators of Helychrisum (% , X ± S_E)

<i>Commodity indicators</i>	<i>Extractable matter</i>	<i>Total ash</i>	<i>Moisture</i>
<i>Dry raw material</i>	14%± 0,05	7.67% ± 0,02	11.33% ± 0,12

Conclusions

Anatomical - distinctive features of Helychrisum raw material of Armenian flora have been revealed and the herb specie is identified

Within the framework of preliminary standardization, commodity indicators of raw material were approved. Total ash was equal to $7.67 \pm 0.02\%$.

Alcohol extract of medicinal raw materials contained 14 % of extractible matter.

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