

Morphological Characteristics of Greek Saffron Stigmas from Kozani Region

Theodora Mitsopoulou and Maria Z. Tsimidou
Aristotle University of Thessaloniki, School of Chemistry
Laboratory of Food Science and Technology
54124, Thessaloniki
Greece

Keywords: *Crocus sativus*, quality control

Abstract

Morphological characteristics, such as length and thickness of the filament, are important in the trade of saffron, though cannot serve as a safe criterion for identification of the origin, especially in cases of products registered as "appellation of origin". In order to collect data for the morphological characteristics of "Krokos Kozanis" saffron in filaments, an extended sampling was carried out among the producers of the respective area. No systematic measurement of the length of stigmas or thickness of the trumpet upper end has been reported before for Greek saffron though some scattered information can be found for stigmas of other regions. A set of 662 representative samples was collected in 1999 from an equal number of producers. Except for genetic reasons the dimensions of the threads are related to the way the growers separate the stigmas from petals and stamens. Processing is also a parameter that may influence the final size of the dried threads. An interesting finding was that only the 8% of the samples had a length of stigmas more than 30 mm. For the majority of the samples (87.6%) the length ranged between 20 – 30 mm. Concerning the thickness of the thread measured at the head of the stigmas, the most representative group (43.2%) had stigmas 1.5-2 mm thick. Further investigation is needed with regards to the plant material, the agricultural practices and the overall handling of the product so that the stigmas of "Krokos Kozanis" to present less scattered dimensions in the near future.

INTRODUCTION

Dried saffron is traded in the form of whole or cut filaments (stigmas+part of the style) or as a powder. Different commercial grades are found in the various countries. Saffron from certain regions, due to exquisite organoleptic or appearance characteristics, is preferred by the consumers and commands a higher price in the market. For example, within the European Union the designation of "appellation of origin" has been awarded to "the Azafrán de la Mancha" (EC Reg. 464/2001) and to the Greek "red saffron" under the name "Krokos Kozanis"(EC Reg. 378/1999). The identification of origin of these two products is based on the administrative documents that escort the lots in the market and of course on the experience of the people involved in the trade of this precious spice. However, there is no objective criterion to examine the origin of the product so far although such a labelling should be supported by analysis that confirms the origin (Dennis and Ashurt, 1996).

According to the trade standard ISO 3632 1&2 (1993) saffron in filaments is defined as "the stigmas of *C. sativus* Linneaus, dried, dark red in colour and trumpet shaped, serrated or indented at the distal end. The length is between 20 mm and 40 mm. The stigmas may be isolated or joined in pairs or threes at the end of the portion of the style, which is white/yellow in colour". Morphological characteristics seem to be, thus, important for the characterization of the spice, though cannot serve as a safe criterion for identification of origin.

In order to collect data for the morphological characteristics of "Krokos Kozanis" in filaments an extended sampling was carried out among the producers of the respective region. More than 1200 registered producers process their own produce in their

installations and then deliver the dried stigmas to the Cooperative of Saffron Growers of Kozani. The latter is responsible for the sales of Greek saffron worldwide. No systematic measurement of the length of stigmas or thickness of the trumpet upper end has been reported in the past for Greek saffron though some scattered information can be found for saffron stigmas from other regions.

MATERIALS AND METHODS

Samples

A set of 662 representative samples was collected in 1999 from an equal number of producers during the period they deliver their produce to the Cooperative (February-March 2000).

Measurement of Length and Thickness of Stigmas

The 662 samples were stored in sealed plastic bags, as they were delivered to the laboratory from the Cooperative of Saffron Growers. From each of the 662 samples, some representative stigmas were chosen for morphological examination. Measurements of the length and thickness of the stigmas were carried out and then the stigmas were placed in special plastic cases as it can be seen in Figure 1. The measurement of length and thickness of saffron stigmas was accomplished on a sheet of graph paper with the help of magnifying lens and a pair of forceps. Moreover, the samples found to contain broken stigmas were marked. Then, the samples were classified according to the length in 5 groups (Group I: 15-20 mm, Group II: 20-25 mm, Group III: 25-30 mm, Group IV: 30-35 mm, Group V: 35-40 mm) and on the basis of thickness in 5 groups (Group A: 1-1.5 mm, Group B: 1.5-2 mm, Group C: 2-2.5 mm, Group D: 2.5-3 mm, Group E: 3-3.5 mm).

RESULTS

The distribution of samples into different groups according to the length and thickness of the stigmas is presented in two figures (Figure 2 and 3). Furthermore, 93 out of 662 samples were found to have a great amount of broken stigmas (percentage 14.05% of the total stigmas).

DISCUSSION

The grouping of the samples does not correspond to, or suggest, any commercial grading, but is indicative of the characteristic dimensions of "Krokos Kozanis" stigmas. Except for genetic reasons the dimensions of the threads are related to the way the growers separate the stigmas from petals and stamens. Processing is also a parameter that may influence the final size of the dried threads. An interesting finding was that only the 8% of the samples had stigmas length more than 30 mm (Groups IV and V). For the majority of the samples (87.6%) the length ranged between 20 – 30 mm. Concerning the thickness of the thread measured at the head of the stigmas, it is obvious that Group B (1.5-2 mm) was the most representative of the five defined ones. Obviously, further investigation is needed with regards to the plant material, the agricultural practices and the overall handling of the product so that the stigmas of "Krokos Kozanis" to present less scattered dimensions. Rationalization of the results will strengthen the knowledge on the typicality of Greek saffron and will support labeling indicating denomination of origin.

ACKNOWLEDGEMENTS

The work was financed by ANKO (Greece) for the benefit of the Cooperative of Saffron Growers (Kozani, Greece).

Literature Cited

- Commission Reg. 1999. 378/99 OJ L. 46, 20.2. p.13.
Commission Reg. 2001. 464/2001, OJ L66, 8.3. p.29
Dennis, M.J and Ashurt, P.R. 1996. In: Food Authentication, Ashurt, P.R. and Dennis,

M.J. (eds), Blackie Academic & Professional, London, pp 4-5.
ISO 3632-1-1993, Saffron (*Crocus sativus* Linneaus) Part 1: Specifications, International
Organisation for Standardization, Geneva.
ISO 3632-2-1993, Saffron (*Crocus sativus* Linneaus) Part 2: Test methods, International
Organisation for Standardization, Geneva.

Figures

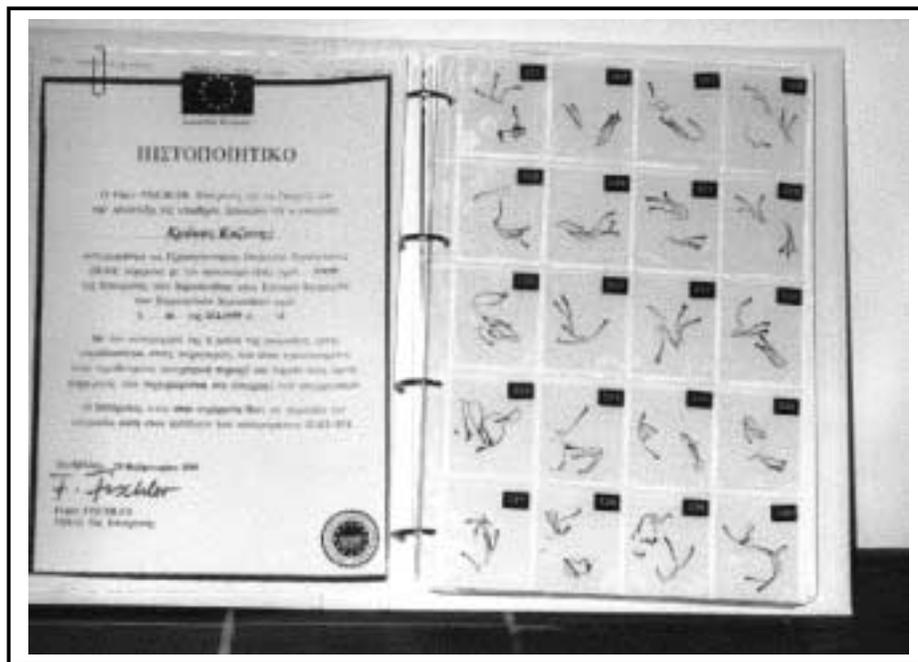


Fig. 1. Layout of record kept for 662 representative samples (production year 1999)

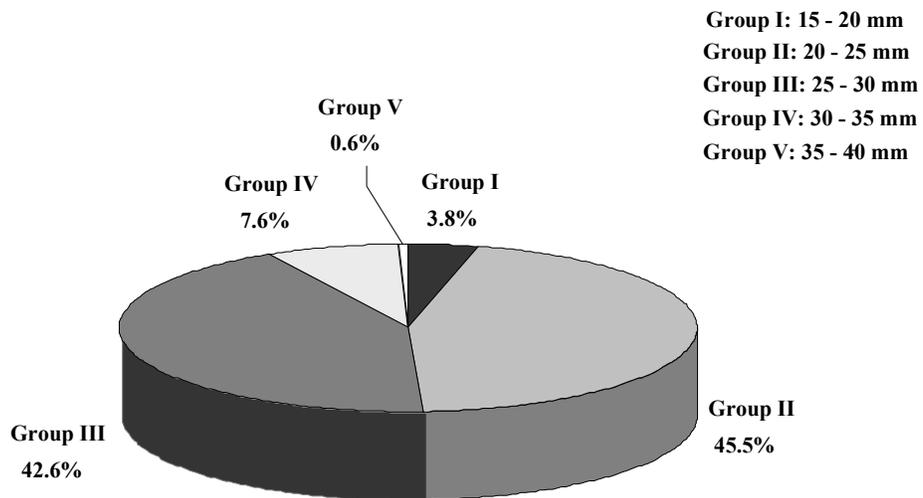


Fig. 2. Length of stigmas of "Krokos Kozanis" saffron (662 representative samples of 1999 production)

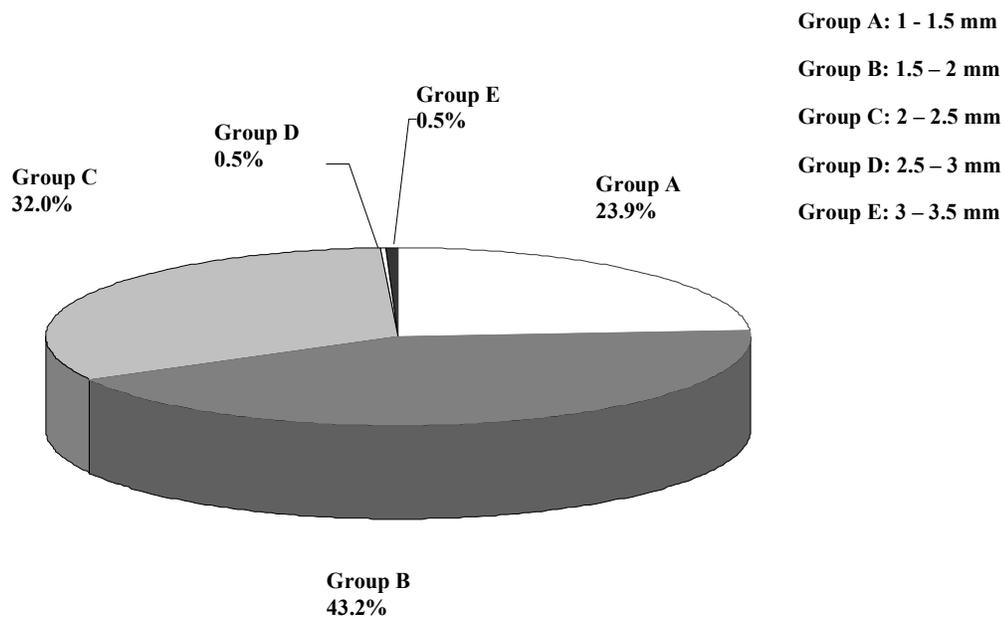


Fig. 3. Thickness of stigmas of "Krokos Kozanis" saffron (662 representative samples of 1999 production)