Current information levels on honey labels in Vojvodina

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Abstract. Honey sells according to its appearance and the information given on the label. Labels provide the necessary information to consumers to enable them to make safe, healthy and sustainable choices. Label information is usually the only information consumers have at their disposal when deciding whether to buy honey. Lack of any information on honey labels causes confusion and misunderstanding among consumers. A total of 103 labelled honeys were collected from different retail chains and market places in Vojvodina, Serbia, in autumn 2018. All honey labels were analysed according to the requirements of Serbian food labelling regulations. Generally, the labels did not fulfil legal labeling requirements. Specifically, 89.32% of labels lacked at least one of the mandatory pieces of information from the list stated in the regulations. This result shows the need for further education of beekeepers, manufacturers and distributors of honey.

1. Introduction

Honey is natural sweet substance made by bees on collecting nectar of plants, combining it with their own substances and depositing, dehydrating and storing it in honeycombs to ripen and mature [1].

In Serbia, 7014 tons of honey were produced in 2017, i.e. 8 kg of honey was produced per beehive. Compared to 2016, when 7 kg of honey was produced per beehive [2], it could be that honey production is slightly increasing. The market for locally produced honey is important in Serbia. Local beekeepers sell their own honey via retail chains, farmers’ markets, roadside stands or their homes. In the province of Vojvodina (north Serbia), in 2017, the sale and purchase of honey and beeswax amounted to 240 million RSD [2].

Honey is used as a food and natural health product, due to its high-calorie, easily digestible properties and composition [3]. Consequently, besides safety and quality control of honey, adequate and correct information present on honey jar labels is equally important.

Information on labels can provide a wide range of information and help consumers avoid suspect honey, such as adulterated and misbranded honey [4]. The total amount of information that has to be included on honey labels has become complex and comprehensive. Details are prescribed by law, but problems with labelling still occur in Serbia. The current legislation in Serbia sets out the requirements for the labelling, advertising and presentation of foodstuffs, including honey and honey products. The food business operator, or the operator under whose name or business name the food is marketed, is responsible for food information in accordance with the applicable food information law and requirements of relevant national provisions [5, 6].

Information on labels can be divided into mandatory and voluntary. Mandatory information must always be displayed on labels, while voluntary information may or may not be displayed. Food labelling policies have a dual purpose: to protect consumers and to ensure fair marketing. Some of the...
information, such as batch number, establishes the traceability of honey. Traceability is the ability to trace every step forward through the distribution chain, from origin to destination, and backward, providing information on origin of the materials, ingredients and processing history of the products [7].

Considering honey sells according to its appearance and the information given on the label, labels can help each honey product to stand out from the competition. Therefore, attractive, informative and effective labelling is important [8].

In March 2017, the Serbian government adopted the rulebook on food declarations, labelling, and advertising [5], and planned it to be fully implemented on June 15, 2018. A year later, a change to this rulebook was adopted. Therefore, according to the latest legislation, all the packed and labelled food, until the date of the application of the rulebook from 2017, which does not meet the rulebook’s conditions, can be released on the market until its expiration date, but no later than December 31, 2018.

Regarding this deadline, the aim of this study was to investigate current information levels on honey labels in Vojvodina, Serbia.

2. Materials and methods
In total, 103 labelled honeys (Table 1) were collected from different retail chains and market places in autumn 2018 from Vojvodina (north Serbia).

| Type                      | Number |
|---------------------------|--------|
| Meadow honey              | 35     |
| Acacia honey              | 34     |
| Linden honey              | 14     |
| Honeydew honey            | 6      |
| Honey with no statement of identity | 4 |
| Floral honey              | 3      |
| Sunflower honey           | 3      |
| Baker’s honey             | 2      |
| Rapeseed honey            | 1      |
| Linden-meadow honey       | 1      |
| **Total**                 | **103**|

Every honey label was inspected for the presence of statements of identity, classification according to origin and according to mode of production and market placement, net weight, shelf life date indication, storage condition, batch number, manufacturer’s or distributor’s name and address, and country of origin.

3. Results
The results obtained (Table 2) showed the low compliance of the honey labels with regard to the mandatory statements that must appear on honey labels under current regulations [5, 6].
Table 2. List of the mandatory information elements contained on the honey labels

| Information                                      | Number of labels without information | % of labels without information |
|--------------------------------------------------|-------------------------------------|---------------------------------|
| Name                                             | 4                                   | 3.88                            |
| Classification according to origin               | 78                                  | 75.73                           |
| Classification according to mode of production and market placement | 57                                  | 55.34                           |
| Net weight                                       | 25                                  | 24.27                           |
| Shelf life date                                  | 42                                  | 40.78                           |
| Storage conditions                               | 75                                  | 72.82                           |
| Batch number                                     | 75                                  | 72.82                           |
| Manufacturer’s or distributor’s name and address | 2                                   | 1.94                            |
| Country of origin                                | 66                                  | 64.08                           |

Out of 103 examined honey labels, 92 (89.3 %) lacked at least one of the mandatory pieces of information from the list prescribed in the regulations [5, 6].

The manufacturer’s or distributor’s name and address and the name of honey were the items most commonly present on the labels, followed by net weight information and shelf life date. However, more than half of the honey labels (55.3 %) did not contain information about classification according to mode of production and market placement.

Most of the labels did not have any information about the classification of honey according to origin (75.7 %), storage condition (72.8 %) and batch number (72.8 %).

The results show that only 11/103 (10.7 %) honey labels fulfilled the legal labelling criteria in Serbia [5, 6].

4. Discussion

Despite more than one year of preparation, many honey labels in this study lack even basic information required by the legislation. A study conducted in 2017 [8] showed better results, but still low compliance with the law, with 23.33 % of labels in accordance with legislation.

Mandatory label information allows consumers to make healthy and informed dietary decisions [9]. The first five pieces of food label information that consumers look at are expiration date, production date, shelf life, name and brand of product and ingredients [10]. This set of information conveys to consumers the product’s characteristics and influences consumers’ purchase behavior [11].

In this study, four honey labels did not contain name information. Products conforming to the definition of honey must be designated “honey”. The name “honey” can be supplemented by the term “blossom” or “nectar” [6]. The floral or plant name can be included in the honey name if the honey comes wholly or mainly from that floral or plant source, and has the organoleptic and physicochemical properties corresponding with that origin [1].

The extraction of honey includes separation of the honey from the combs by pressing. Honey extracted from combs contains pollens, beeswax, and other undesirable materials. To ensure better quality and longer shelf life, these undesirable materials should be removed [12]. The most common method of processing honey is by centrifuging decapped broodless combs. All the honeys from this study that included information about processing on their labels were extracted honeys.
Due to honey’s nutritional value, health benefits, the growing global trade and the economic gains, adulteration of honey has increased. Adulteration of honey is relatively easy to conduct, but difficult to detect. The most frequent frauds are based on preparations with simple and complex sugars, which can mimic the natural sucrose-glucose-fructose profile of honey [13, 14, 15].

Thus, honey authenticity is a globally important concern for consumers and honey producers. Honey authenticity has two aspects: origin of the honey and the mode of production of the honey. The origin of the honey covers geographical origin and botanical origin, while production mode is related to the harvesting of honey hives and processing [6]. Specific flora and vegetation in the area from which the honey originates determines the quality of honey, and affects its organoleptic properties [14]. Although, the presence of this information regarding honey’s authenticity on labels cannot guarantee the quality, it can gain consumers’ trust. In Poland, the geographical origin was seen as the most useful and interesting information on honey labels [15].

Properly processed, packaged and stored honey retains its quality for a long time. Honey should be stored in airtight containers. This protects it from external moisture that the honey can absorb, and odors. Optimum storage temperature is 10-16 °C, while the relative humidity of the storage room should be <65 %. However, honey is susceptible to physical and chemical changes during storage. This is a temperature-dependent process, making the shelf life of honey difficult to define. With increasing temperature, the 5-hydroxymethylfurfural content increases, while the enzyme activity decreases. This decreases the quality of honey [16]. Honey should retain its specific properties for a number of years if correctly stored. It is up to the beekeeper or honey packer to determine a suitable shelf life for their product. In our study, honey labels that did contain information about storage conditions cited room temperature storage as being optimum.

Net weights of 78/103 (75.7 %) of our honeys were expressed in gram (g) or kilogram (kg). Better results were obtained in an earlier study [8], where 96.67 % of inspected labels contained net weight information.

Traceability is important for safety, quality and labelling. The ability to physically trace honey in every step from origin to destination is important to consumers. Although the information remains in the ownership of the beekeeper, manufacturer or distributor, consumers are willing to pay extra for honey with a traceability system [17].

Food labelling frameworks aim to regulate different interests, which range from human health and consumers’ rights to international trade. However, consumers admitted that they purchase honey in containers without labels, but indicate that the honey came from a trusted manufacturer or retailer [18, 19].

5. Conclusion
The purpose of legal labelling requirements is to provide consumers with important information about the honey they purchase. This study shows that some honey labels do not fulfill regulatory requirements and, at the same time, we feel they would be unlikely to gain consumer trust. Honey labelling is costly, and further expenses have to be met when the labelling is not appropriate, especially in the cases of formal charges for a labelling offence or if product withdrawal from the market is required. This research provides a foundation for further education of beekeepers, manufacturers and distributors of honey.

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