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Importance of Labelling Biodynamic Product Packaging in Croatia

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Abstract: A lot of research has been conducted on economic and consumer aspects of ecological food products. However, we are witnessing the appearance of food products produced according to the principles of biodynamic growth which can be seen as a higher standard in ecological production process. Similar to ecological cultivation the biodynamic one also has proscribed methods and processes of production, processing, distribution and labelling as well as control and certification processes. However, such products are still not being recognized be the consumers in Croatia. This paper provides, based on authentic empirical research, some basic background information on the importance of labelling packages of food products as well as their quality and traceability. These also present the first results of research on the importance of labelling biodynamic products packages in Croatia.

Keywords: biodynamic agriculture; biodynamic products; Demeter; organic farming; package labelling

1 INTRODUCTION

Awareness of people about the importance of sustainable and circular management, both in terms of environmental conservation, and in the direction of organic farming, together with the preservation of health and healthy life, has led to the creation of horizontal and vertical global eco-policies. Modern industry, to higher and lesser extent, has been continuously polluting the environment. All industrial branches, including food and packaging production, are beginning to recognize the importance of preserving the nature and natural resources. Therefore, they are increasingly trying to return to production that is environmentally friendly and sustainable [1-3], and follows the guidelines circular economy [4-6].

This concept includes the consumption of organically produced food that is packaged in environmentally friendly and recognizable packaging. The sale of organic food, i.e. food that has an eco/bio-label, is constantly increasing worldwide [7-9]. In last decades the world has been facing various social, political, economic and environmental challenges that are changing the classic dynamics of consumption towards sustainable practices, mainly in the field of food consumption (which includes environmentally friendly packaging). The mentioned values and trends are strongly linked and contribute to creation of an ecosystem in which sustainable processes can be promoted, especially in food production and packaging [10, 11]. The number of producers and consumers of organic and biodynamic food products is growing rapidly [12], despite the conflicting scientific opinions on the benefits of biodynamic food products [13]. Data on the share of organic agriculture in the world was presented in February 2021 by the Research Institute of Organic Agriculture (FiBL) and the International Federation of Organic Agriculture Movements IFOAM. According to the latest official data, 2019 was another record year for global organic farming. According to the latest research, organic agricultural land increased by 1.1 million hectares (1.6%) in one year, and amounts to 72.3 million hectares with 3.1 million organic producers. The global ecological market continues to grow worldwide and has crossed the $ 106 billion threshold [9].

According to the data of the Central Bureau of Statistics of the Republic of Croatia, and related to organic production, in 2019 in Croatia the share of areas under organic production in the total used agricultural areas is 7.18%. The number of organic farmers is increasing each year [14].

European policies for labeling the quality of agricultural and food products are an important and useful tool in the hands of producers that guarantee competitiveness and profitability as well as a high level of product quality. The system of putting quality labels on product packaging is one of the most effective levers in product protection; for the manufacturer it means standing out among similar products on the market. Labels on product packaging represent more than just the product quality and safety - they create additional markets, new market niches and market opportunities [15, 16]. Research has shown that consumers are willing to pay more for biodynamic products, which makes it necessary to differentiate them on market from other products [16].

The making of packaging involves the design and manufacturing processes of the container that wraps the product. In recent times, many factors have contributed to making the packaging an important marketing tool. Traditionally, the primary function of packaging has been packaging and protection of products from external influences. Increased competition and crowded shelves of retail chains imply that packaging has a great influence on the purchase decision [16-18]. The advantage of a particular product in relation to the competition lies in the ability to keep the consumer's attention at the selling point during the short time in which the purchase decision is made. The most dominant sense used in this process is sight, and packaging becomes a key element in making a purchase decision [19].

Packaging is necessary for all manufactured goods and wraps. It promotes and protects the products we buy from the process of production, handling and storage, all the way to the end consumer - user. Without the use of packaging, handling most materials and products would be inefficient and unattractive, and the modern way of trading would be

impossible. Food packaging occupies an essential place in today's modern food industry [20]. All this brings us to the conclusion that packaging is "a silent" seller and means much more to the product than can be imagined at the first glance [16, 21]. Graphic presentation of packaging means providing the product with an IT, aesthetic and security code. Errors in the information part can lead to fatal consequences for the user or the whole environment. This is the reason why certain parts are prescribed by various laws and regulations. The overly expressive or weak communication characteristics of the packaging may exclude the product from the market line of similar products.

2 PAPCKAGE LABELLING OF ORGANIC AND BIODYNAMIC PRODUCTS

The Act on Agriculture (Official Gazette 118/18, Article 110) [22] and European legislation on organic production and labeling of organic products (EC 2018/848) [23] mention biodynamic production in terms of a sustainable agriculturally productive ecosystem. However, there is still no standardized labeling and marking of packaging of such products in Croatia, which would contribute to their diversification on the market. In the Republic of Croatia, biodynamic products are marked on their packaging only with the eco-product label, although according to their principles and methods of production they represent a completely different higher standard to the already defined eco-label (which is the standard). Without a specific mark on the biodynamic product packaging, both producers and consumers face the problem of recognizing such products on the market on daily basis [24]. Therefore, it is necessary to put forward a graphic solution in form of a label, which will convey adequate information about the product to customers, in order to protect consumers and producers. In addition, it is important to establish a comprehensive standardization of biodynamic product package labelling.

In the Republic of Croatia, several labels are used in food production for their labeling. Each of these labels represents a certain standard and relies on different regulations and norms. Competent institutions are responsible for the correct standardization of labels; in the Republic of Croatia, it is the Croatian Standards Institute. The base law regulating organic production in the Republic of Croatia is the Agriculture Act (OG 118/18) [22], which is in line with Commission Regulation (EC 889/2008) laying down detailed rules for the implementation of Council Regulation (EC) No. 843/2007 on organic production and labeling of organic products with regard to organic production, labelling and control

The eco-label is primarily a communication instrument that guarantees the credibility of an organic product to a potential buyer. The perception of eco-label is closely related to consumer behavior, more precisely to the purchasing decision. Therefore, the effectiveness of eco/bio-labels has been the subject of numerous studies and research [24, 25]. In this context, there is a need to create a specific label on the packaging of biodynamic products in order to distinguish such products from similar products produced on ecological principles. One of the conditions for effective labeling of packaging, both organic and biodynamic products, is that customers are willing to pay added value for the product, which contributes to covering the increased costs of sustainable environmental management practices [26, 27].

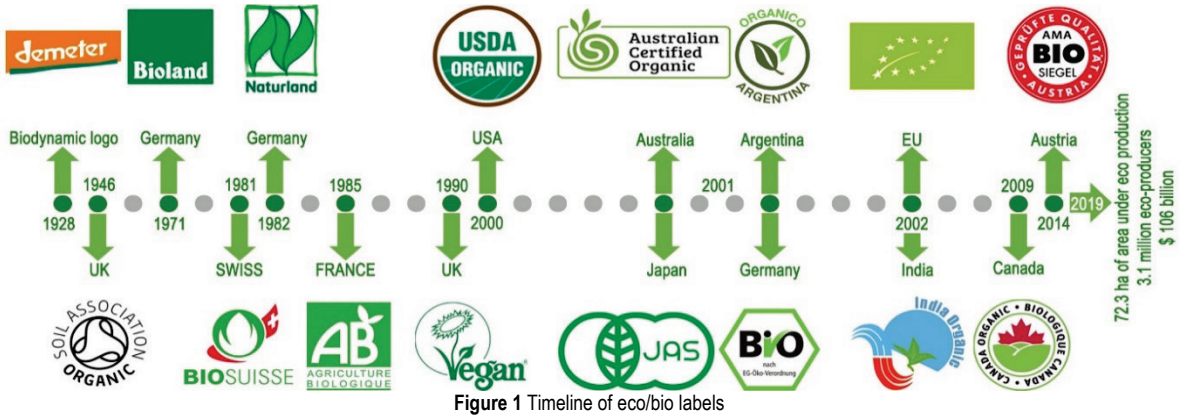

Figure 1 Timeline of eco/bio labels

The timeline shown in Fig. 1 shows that the labeling of biodynamic product packaging has existed in the world since 1928 and is recognizable by the Demeter label. Demeter is the only official certificate for biodynamic products, recognized internationally. Demeter-International prescribes a set of production and processing standards that are applied when using Demeter, Biodynamic® and related trademarks, as well as for marking the packaging of biodynamic products produced according to strictly specified methods and principles [25, 26]. Biodynamic and organic farming are similar because both are ecologically oriented and do not use mineral fertilizers or pesticides. The main difference between biodynamic and organic production is that biodynamic farmers use eight biodynamic preparations - for soils, crops and composts. Interest in biodynamic agricultural practices and its methods is growing rapidly because it shows the potential to mitigate some of the adverse effects caused by conventional chemical-dependent agricultural practices [29].

According to research dealing with the so-called "green products", it was concluded that the products marked with the

eco/bio label symbolize a trustworthy product for the buyers. The goal of the eco-label is to reduce noise in the communication channel between the producer of the eco-product and the consumer, by providing credible information related to the environmental parameters of the product, as well as to suggest that the product stands out over a product without the label. Additionally, the aim of eco-labels is to provide simple and easy-to-understand information and encourage increased demand for products that are considered environmentally friendly [30]. Each label has its own development path, regardless of whether it is prescribed, standardized or originated as a producer's idea. When it is established that there is a need for a label, the procedure of its prescribing, i.e. standardization is initiated. The result of that process is a regulation or norm for handling the identified label. There are prescribed labels the use of which can be both obligatory and non-obligatory. The manufacturer decides whether and when to put any of the labels on its product and packaging. Regulations, Legal Acts and Ordinances on quality labels are prescribed at European and national level [31].

3 ECO/BIO LABEL AND PACKAGING AND ITS FUNCTION IN PRESERVING THE ENVIRONMENT

Current trends imply that consumers, especially in more industrialized countries, make purchasing decisions based on quality, price and availability, but also on environmental parameters. In doing so, it is necessary to monitor the environmental impact that may occur during the entire life cycle of the observed product. In this respect, the correct labeling of products and packaging is one of the ways to reduce the environmental threats that can occur in all areas of human activity. Therefore, attention should be given to all stages of product "life cycle" (from design, production, labeling of packaging, packaging, marketing, consumption, use to disposal of products and packaging) [32]. The impact of environmentally friendly packaging can be observed through increased civic awareness of self-responsibility, progress in the industrial sector, quantitative improvements in environmental protection and an increase in environmentally conscious consumer behavior [33]. The economic effects resulting from the application of environmental labeling can be seen through the analysis of market profit and impact on trade: a) market profit - different manufacturers state that they have achieved significant market profit by adopting some of the labeling of packaging standards; b) the impact of labeling on trade (sales) - the increase in sales of labeled products compared to similar (compatible) products without labeling represents a certain "power" of the standard for labeling packaging. The increasing sales of eco/bio-labeled products leads retailers to put appropriate pressure on producers so that they would supply them with eco/bio-labeled products. Some big retailers, such as ICA in Norway, commit in their statements that they will provide consumers with a certain share of eco/bio-labeled products in their range of products. Such trend directly affects the increase in requirements toward producers in terms of adapting their products to the requirements of different standards for packaging labeling [20, 30].

Package labelling for environmental protection will certainly in the future, taking into account the current development trends, retain the status of the main method for educating and encouraging environmentally responsible consumer behavior. It is also important that consumers continue to express the need for this type of information and that environmental protection remains important as a global issue, while continuing the trend of market and trade globalization [34]. Consumer requirements related to environmentally friendly packaging, which is safe when it comes to migration, easy and simple to handle, and preferably personalized, is one of the main growth and development drivers of the packaging market today. Packaging is omnipresent and concerns almost every person on the planet regardless of the shape it comes from or material it is made of. People need all these products directly or indirectly for living - mostly packaged in some form of packaging. As a result, packaging, along with labels, is one of the fastest growing areas within the printing industry due to the constant growth of overall needs. The latest Smithers Pira data, published in the study "The Future of Global Packaging to 2024", show that growth in the global packaging market will continue over the next five years, significantly influenced by technological and business evolution that drives global expansion [33].

4 RESEARCH AND RESULTS

For the purposes of this paper, an empirical research was conducted using the survey method, hat is an online survey questionnaire, for the purpose of which a specially structured questionnaire was made. The questionnaire was done using *Google* form and was conducted on *Facebook* social network. The survey was conducted in November 2020, after which the data were processed using Microsoft Excel, TIBCO Statistic and Flourish studio. The survey was conducted using the "snowball" method, a deliberate sample of subjects of both sexes aged 19 to 72, heterogeneous education levels ($N = 194$).

The obtained values were checked for distribution normality using Shapiro Wilks W test, the homogeneity of variance was tested using Levene's test, and after these checking the appropriate test was used to compare variables (t-test, Mann Whitney U test, ANOVA or Kruskal Wallis ANOVA). When the p value amounts to less than 0.05 it was considered to be a statistically significant difference among the respondents, 30.4% were male and 69.6% were female. The obtained distribution is not completely typical for the population image of Croatia because it represents a higher ratio in relation to the real situation of men/women, which amounts to 51.7% of women and 48.3% of men. According to the level of education of the respondents, 36.6% have completed only secondary school, while 28.9% have completed higher education with a degree in mag. ing. Number of respondents with high school or bacc. is represented in the survey with 19.1%, while 15.5% of respondents have a master's or doctorate degree.

Food quality is an important factor when choosing groceries; in the range of 1 to 10, 99% of respondents answered that it was important to them in the range of 6 to 10, which is an extremely high percentage (Fig. 2).

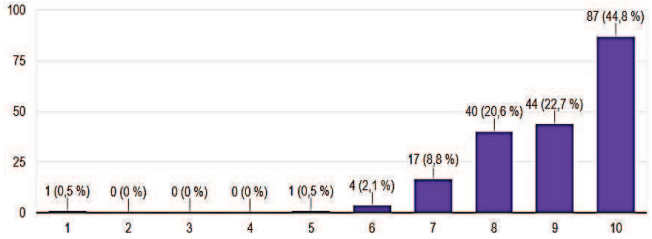

Figure 2 Importance of food quality consumed by the respondents

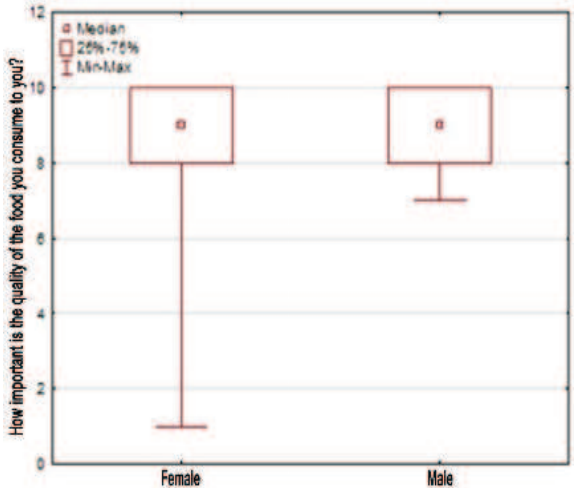

Figure 3 Relation between gender and importance of food quality

Importance of food quality consumed by the consumers (respondents) does not depend on gender. The medians are equal and the data distribution matches 75% data. Mann-Whitney U test confirmed that there is no statistically significant difference between the data distribution, which is evident form the p-value 0.95. Unlike for men, there is minimal value in women for whom the quality of the food they consume is extremely unimportant. Still, there is no statistically s difference (Fig. 3).

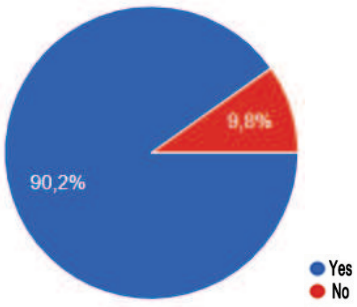

Figure 4 Perception of package labelling

The declaration is an "identity card" of each food that reveals its origin, purpose and composition. At the same time, it gives us proof of food health, that is it confirms its safety for consumption. Therefore, it is extremely important to pay attention to the declarations that are on products in stores. From 194 respondents, 90.2% of them read the declarations on product (Fig. 4). However, considering the age (median 36 years), generally speaking the middle-aged and older population reads the declarations on the packaging more than the younger population (median 21 years).

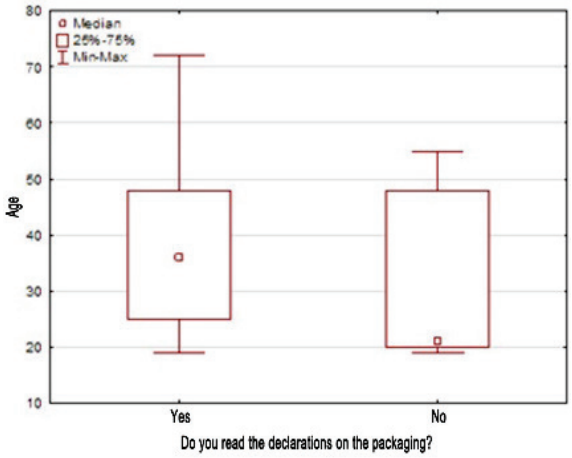

Figure 5 Relation between reading the package declaration and age

Data analysis leads to the conclusion that, regardless of the respondents' gender, the quality of the food consumed by the respondents is equally important. Have in mind that there is 63.4% of highly educated people in this population. This is further confirmed by the fact that those older than 25, who can already be considered highly educated, read the declarations on packaging (Fig. 5) [35, 36].

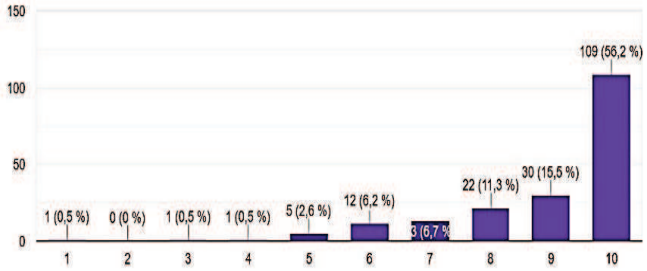

Figure 6 Importance of information on traceability of food production

Regarding the importance of information on the traceability of production from producers to consumers, in the offered range from 1 to 10, almost all respondents (98.5%) chose the answer on a scale of 5 to 10. This result indicates to consumer awareness about food product choices (Fig. 6). In the EU Commission report on factors influencing consumer purchasing decisions, consumer interest in origin labeling comes after the aspects of price, taste, date "use by/best used by" [34]. Although two-thirds to three-quarters of consumers express an interest in labeling the origin of unprocessed food. Consumers link information on origin to different aspects of products, such as quality, safety and environmental issues. Consumers also state that they would buy national products to support their country's economy, although there are important differences between Member States. They would prefer information on origin at country

level compared to the EU/non-EU level. They appear to be more interested in the place of production compared to the place of cultivation of the food [13].

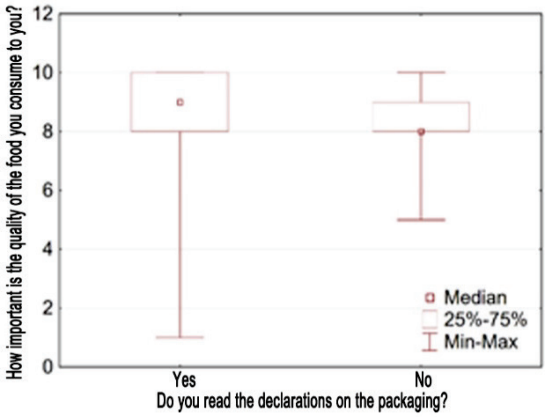

Figure 7 Relation of reading the package declaration and food quality

There is a statistically significant difference (p-value 0.01) in the distribution of data between the two groups; those who do not read the declarations on the packaging are generally less concerned about the food quality they consume (Fig. 7). While those who read the declarations on the packaging will pay attention to the labels and the appearance of the packaging itself in order to choose the best product for themselves. It is equally important for the respondents to have the data on product traceability (Fig. 8), which is shown by the statistical difference (p-value 0.01). From the above mentioned, it can be concluded that the middle and older population is more concerned about the quality of food and that they are the ones who read the declaration on the packaging. In doing so they pay attention to the traceability of products from producers to consumers.

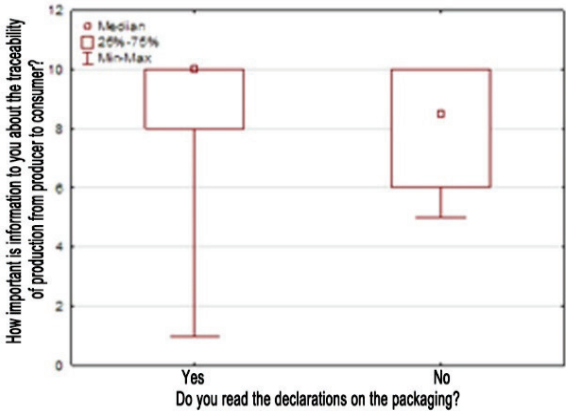

Figure 8 Relation of reading the package declaration

Food products produced according to biodynamic principles are above the ecological production standard, having their own standards in production and processing [37]. Although there are scientists who are asking for further research to confirm such claims [13]. In Croatia, there is a growing interest of agricultural producers who produce in compliance with the given biodynamic production guidelines, but still do not have a recognizable label on their product, on the packaging. On the other hand, there are almost no biodynamic products with the Demeter label on our market [38]. Nevertheless, 71.1% of respondents have heard of this type of product (Fig. 9) while 91.8% believe that the packaging of such products should be additionally marked (Fig. 10).

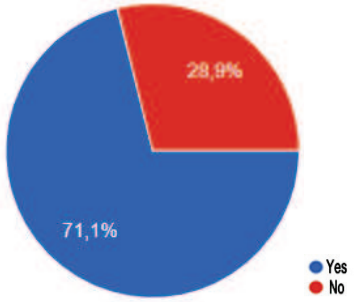

Figure 9 Result to the question: *Have you heard of the term biodynamic product?*

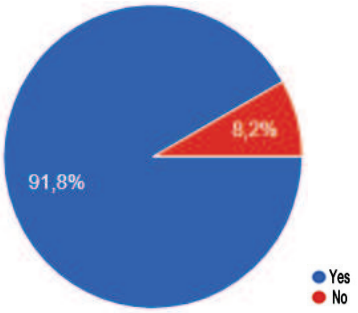

Figure 10 Result to the question *Do you think biodynamic products should be labelled additionally to be recognizable on the market?*

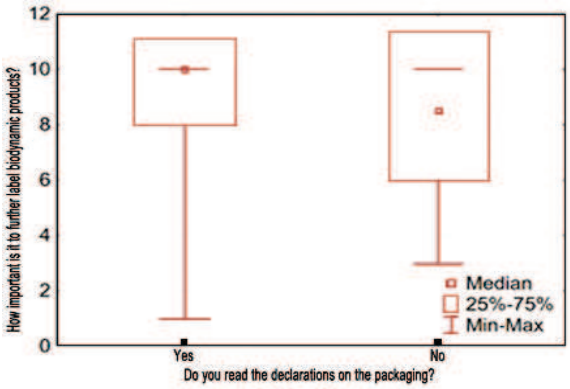

Figure 11 Relation of reading packaging declaration and additional labelling of biodynamic products

The results of the research show that consumers prefer products with an ecological and biodynamic certification label to identical products without a label. For almost all tested organic and biodynamic labels, consumers were on average willing to pay premium prices compared to similar organic products without a label. It can be seen from Fig. 11 that regardless of whether the respondents read the declarations on the packaging or not, both groups believe that biodynamic products' packaging should be additionally marked with a separate label. However, there is no

statistically significant difference (p-value 0.08) in the distribution between these data.

5 CONCLUSION

In this research we wanted to determine how important the quality of food that respondents consume is in relation to age and gender. Also, are respondents informed about the quality of food through packaging declarations, and how important is the information about the traceability of the product to them? The research found that there is a need to label the packaging of biodynamic products. The results of research on the importance of food quality consumed by respondents, with emphasis on the purposefulness of the declaration on the product packaging, and traceability of the product, show that respondents (consumers) are extremely interested in the quality of food they buy, and especially its traceability. This includes the information on its production, its origin as well as its environmental, ethical and health production aspects. Consumers are being more and more aware of their eating habits, and knowledge and consciousness as well as the need to have good quality groceries in on the increase. Also, research on biodynamic products has proven their recognizability in the market and the need for additional package labelling of such products. From this part of research, it can be concluded that most respondents are familiar with the methods and principles by which biodynamic food is grown, while a large percentage of respondents believe that biodynamic products should have package labelling so that the consumers could more easily recognize and notice them. Based on the results of this research, it is necessary to make additional research on how and in what way to effectively label the biodynamic products packaging.

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