Tag It Smart
Smart tags driven service platform for enabling ecosystems of connected objects

Grant agreement 688061

Open Call Deliverable Report for

Honey Tag – Brand protection and Quality Improvement for Montenegrin Honey

– Final Report –

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PART A. SUMMARY OF THE WORK PERFORMED

HoneyTag pilot project is designed to use TagItSmart (TIS) platform for brand protection and quality improvement for Durmitorski honey, which is unique due to the fact that it is produced at the territory of the National Park Durmitor, which is under the UNESCO protection. By combining string coded in QR code and letter printed by functional ink, the unique identification of honey jars is accomplished. These markers coupled with mobile app and cloud platform provide: unique identification and tracking of each honey jar, mechanism for anti-counterfeiting, food safety control, interaction with consumers and promotion of producers' business activities. According to the food safety rules, the honey should not be exposed to temperature greater than 45oC. Therefore, the jar label is equipped with the temperature threshold sensor indicating bad storage conditions. To indicate quality issue, the thermochromic irreversible ink provided by TIS partners is used. The honey quality is also monitored using the costumers' feedback trough the rating product functionality. Beside of honey production, many of beekeepers have some additional business activities. For example, they rent accommodation and have restaurants with traditional food. In order to link their business with honey production, the app used for scanning jar labels provides additional data about the producer giving ability to get in touch with them. The app has links to site from which customer can make direct contact with the producer.

Intensive promotional activity under the HoneyTag project mobilised Ministry of Agriculture and relevant inspections to initiate field controls, which resulted in withdrawing more then 400 kg of honey sold along the roads and religious facilities, without proper labelling and declaration of origin. Based on the increased awareness, it is clear that HoneyTag pilot has great extendibility opportunity to be used for protection of the Montenegrin honey.

Feasibility Study has been prepared to assess affordability of the application of HoneyTag in the future. Unfortunately, the price of execution is still high for the individual beekeepers to take over the costs (for example, the costs of jar and the cover are bellow the costs of label). Therefore, an initiative is prepared for the Ministry of Agriculture and Rural Development to step in and support Union of Beekepers Associations, by covering part of the costs. The initiative is fully in line with national policies to protect and promote local high quality products and reduce grey economy.

PART B. DETAILED DESCRIPTION

Activities implemented under the HoneyTag project during the reporting period are fully in line with project proposal. During this period, we managed to:

- ✓ Analyse TIS components and solutions and to select those that could meet the objective of the project;
- ✓ Complete the Analysis of the honey production and supply chain in order to properly identify and organize pilot facilities among honey producers in the municipalities of Pluzine, Savnik and Zabljak;
- ✓ Prepare the specification and design of the smart labels;
- ✓ Design system architecture;
- ✓ Develop mobile application, and to

- ✓ Test the first delivery of printed smart labels.
- ✓ In parallel, extensive promotional activities took place, which raised the awareness of both beekeepers and final consumers about the HoneyTag project benefits.
- ✓ In addition and not planned, we managed to mobilise policy makers (Ministry of Agriculture and Rural Development and relevant inspections) to start controlling the honey based products sold along the roads and religious facilities, which resulted in withdrawing and destroying significant quantities of the fake honey. Moreover, this contributed to increasing public awareness about false products available at the market, as well as beekeepers about the need to introduce some kind of protection to secure competitive position at the market.

Above mentioned was possible only due to well-organized project team of IPER, who also recruited three IT experts, out of which one is Senior and two are Junior experts. Despite the fact that the work could be completed by hiring one full time Senior IT Expert, we have decided to engage Senior IT expert half time and two Junior experts to learn about TIS methodology and technology and ensure better dissemination of TagItSmart project in the future. Also, for successful project implementation so far, support from TIS partners was crucial both in technical and managerial part.

After the implementation of planned activities, we believe that IT experts hired have enough knowladge to secure follow up actions in passing HoneyTag project and application to the full use, after this pilot phase, to the final beneficiaries – Union of Beeking Associations and beekepers.

Project Manager Mrs Dragana Radevic attended co-creative workshop organized in Padova beginning of March, while project team hosted:

- ✓ Mr Srdjan Krco, on April 16 in IPER offices, and
- ✓ Mr Rob van Kranenburg on May 27, when visit to the House of Honey and field trip was organized.

Additional discussions related to the project were organized in Cetinje, July 5-6 with both Mr Krco and Mr Rob van Kranenburg.

Regular communication existed with Project partners, especially VTT and Durst in the periods of printing the lables, and with DunavNet during the whole project implementation cycle.

B.1 Concept, Objectives, Set-up and Background

The general objective of the HoneyTag pilot project was to validate the feasibility of the TIS solutions and Smart Tags use for brand protection, quality control and reducing forging in honey production, as well as to test TIS capabilities to change based on environmental conditions (such as temperature and potentially UV rays) to avoid fake or misplaced honey products, by enabling contextual scanning.

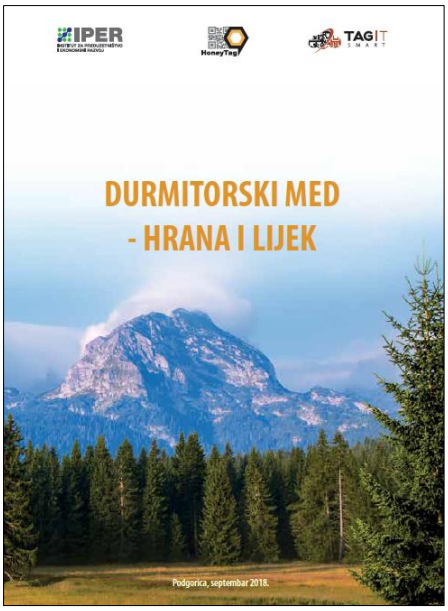
The following specific objectives were aimed for achievement:

- ✓ To analyse honey production and supply chain in order to properly identify and organize pilot facilities among honey producers in the municipalities of Pluzine, Savnik and Zabljak;

- ✓ To test and validate TIS configuration, implement and execute a pilot system for brand protection, quality control and reducing forging in honey production in targeted municipalities;
- ✓ To prepare feasibility analysis regarding the potential of TIS solutions usage for brand protection and reducing forging in honey production (reviewing both costs and benefits) in Montenegro, including the affordability study;
- ✓ To promote and widely disseminate the results of the pilot implementation, providing an opportunity to registered honey producers from other regions to explore the benefits of TIS technologies and tools in order to use them in the future, primarily through the Union of beekeeping associations of Montenegro (SPOCG) as a national umbrella organization;
- ✓ To provide relevant feedback and share "lessons learned" to the TIS project about pilot performance and propose improvements (if any).

During the project implementation period, the following activities were undertaken and the following key deliverables and outputs realized:

✓ **Analysis on Durmitorski honey production and supply chain completed (submitted as D 1.1a)**



The Analysis is based on thorough research of available literature as well as in-depth interviews with beekeepers from Durmitor area. Still the content is written in simple and understandable way, since the Analysis will also be used for promotional purposes. The Analysis contains the information about beekeeping in Montenegro in general, followed by elaboration on Durmitor area and vegetation, which is important for the quality of the honey produced. Statistics on number of beekeepers, number of hives and well as data on yields is presented, followed by the detailed procedure of production process (important operations during the year, extracting and storing the honey, honey packing; quality analysis) and sales channels. In addition to promotional purposes, the Analysis is used to learn about the process of production in order to properly identify and organize pilot facilities among honey producers in the targeted municipalities Pluzine, Savnik and Zabljak.

✓ **TIS components and solutions analysed and selected those that could meet the objective of the project (submitted as D 1.2)**

After detailed analysis of the components and solutions available under the TIS, a combination of string coded in QR code and letter printed by functional link has been selected. Namely, it is decided that each honey jar will be marked with smart labels representing combinations of QR code and functional inks. These markers coupled with mobile app and cloud platform will provide:

- ✓ Unique identification and tracking of each honey jar,
- ✓ Mechanism for anti-counterfeiting,
- ✓ Food safety control,
- ✓ Interaction with consumers and

- ✓ Promotion of producers' business activities.

According to the food safety rules, the honey should not be exposed to temperature greater than 45 degrees. Since inks available within the project provide the option of only > 50 degrees, in cooperation with Project partners, we used that option. The jar label will be marked with irreversible ink that will appear in case of bad storage conditions. Based on this, the end user will have indication of the quality making decision of buying such food. User will have ability to report quality issue.

Platform will collect feedback trough the rating product functionality. To encourage this, in cooperation with producers, promotional activities are planned.

Besides of honey production, many of beekeepers have some additional revenue generating activities at their family holding. For example, they rent accommodation and have restaurants with traditional food. In order to raise their interest in the project and offer them value added, the app used for scanning jar labels will provide additional data about the beekeeper giving ability to get in touch with them. The app will have links to site from which customer can make direct orders for jars from the producer.

- ✓ **Specification and design of the Smart labels**

Based on the analysis of the technology available within the TIS project, it is decided to use QR code-based module and two functional inks, photochromic and thermochromic ones, provided by different TIS partners. The label consists of the QR code, letter printed with reversible photochromic ink and honeycomb painted with irreversible thermochromic ink. When it is illuminated by UV light (contained in flesh light of mobile phones), the letter appears and in combination with content of the QR code provides unique identification of honey jar. After illumination, the letter is visible for a period of time giving the capturing ability to a mobile device and checking validity of the unique ID.

Smart labels were printed and shipped to Montenegro beginning of July, when labels testing started. More details are available in the D 2.2 report.

- ✓ **Design and realization of the system architecture**

During the reporting period, all components of the system architecture (more details available in the report D2.2) have been established and integrated.

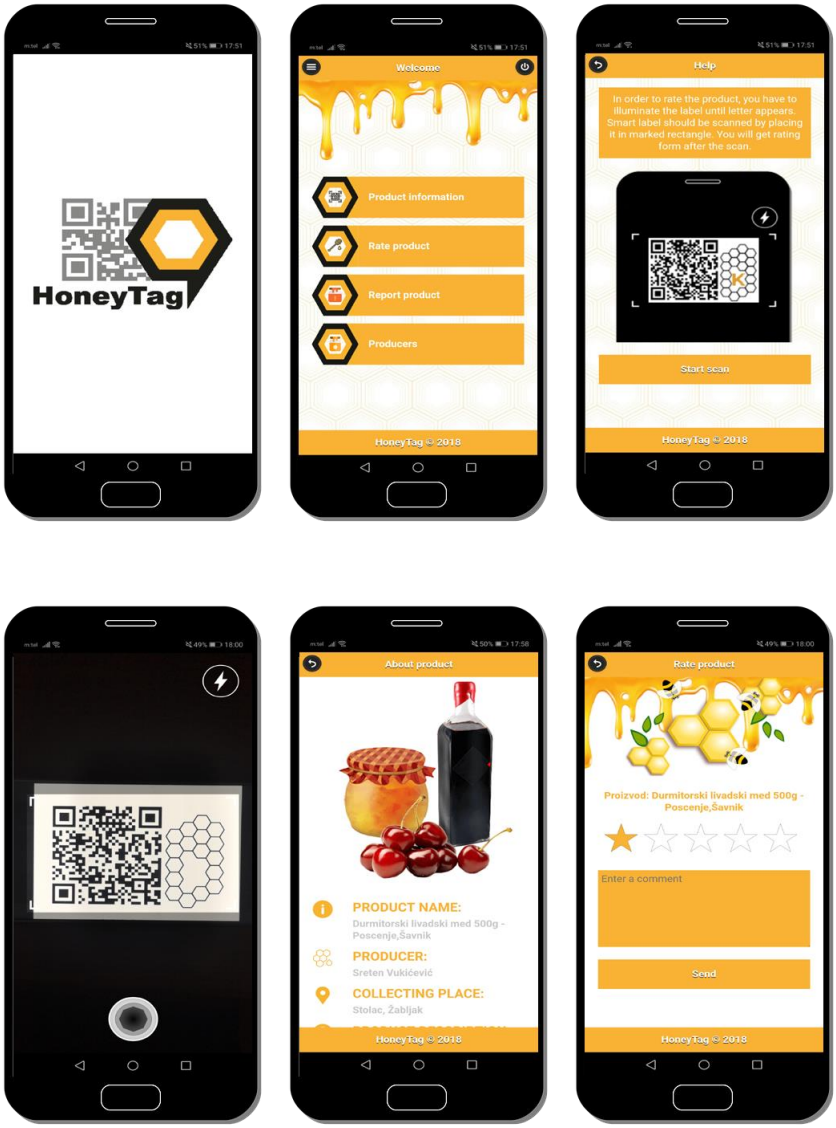
Mobile application is in core of the system enabling end-user interaction with all TIS components. Based on smart tag scanning, the application provides quality and originality checks, user feedback, product information and links with producers' direct contact. The TIS API is used for digital products creation, smart tags generation and customer reviews collection. The HoneyTag cloud server generates and validates combinations of unique strings contained by QR codes (obtained using TIS API) and letters that are printed by reversible photochromic ink. It also prepares scanned smart tag images for recognition by Azure Custom Vision (ACV) system. The role of the ACV system is to read sensor states, i.e. to perform letter and honeycomb state recognitions. Presentations of the Project and all producers with contact forms are placed on web server.

More details are available in the D 2.2 report. Updated D 2.2 report is submitted upon completion of the project implementation, including the feedback from testing the second round of printed lables.

✓ Mobile application

HoneyTag application is fully developed for Android and iOS mobile devices and is available on Google Play and AppStore. For the purpose of promoting and familiarizing the public, two educational videos about the application have been prepared and its capabilities, and they can be found on the following links:

https://www.youtube.com/watch?v=dEsJnd_Wo1o
https://www.youtube.com/watch?v=xsI425G9eBs&t=1s

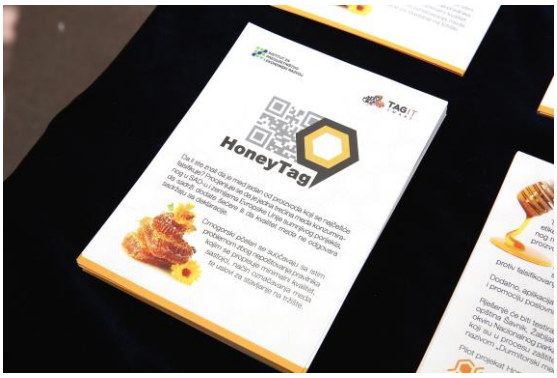


More details about the application can be found in technical report D2.2a, which is updated D2.2. report.

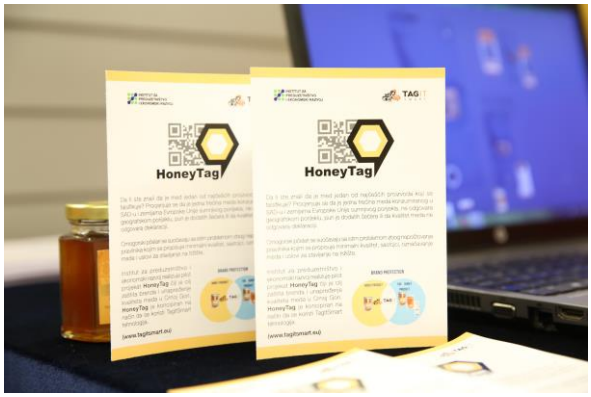
- ✓ **Intensive promotional and educational campaign raising the awareness of beekeepers, policy makers and general public about the Project**

Project brochure.

In order to promote the Project, its goals and planned activities, a brochure is prepared for sharing with stakeholders and general public during the promotional events/meetings. This was initial brochure, which will be further developed and enriched during the course of the project, with project activities and results.



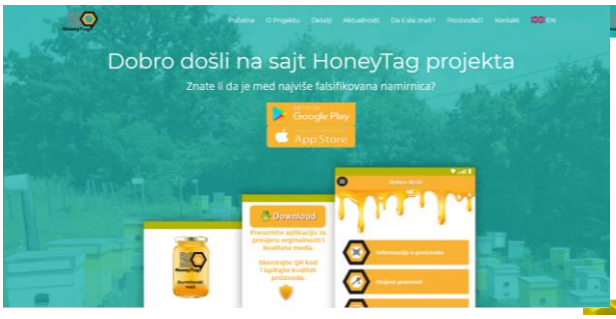
Later on, for the purpose of intensive promotional and educational awareness raising campaigns for beekeepers, policy-makers and the public about the HoneyTag project, a new redesigned brochure was prepared, shared by all stakeholders and the public at all promotional events. The first initial brochure has been redesigned and updated with project activities and results.

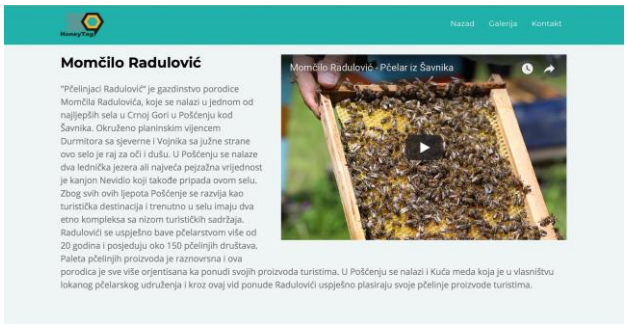


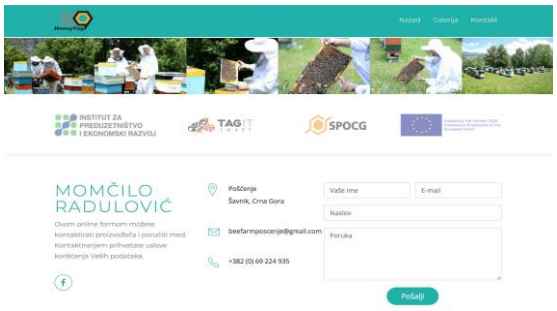
Website developed, along with profiles on social networks Facebook and LinkedIn, with sub-websites on six individual beekeepers involved in the project.

HoneyTag website (http://honey-tag.me/) is launched in order to promote both the Project and business activities of all producers/beekeepers involved in this project. Site is responsive, i.e. adaptive to different screen sizes and resolutions. It contains web forms for establishing communications

between customers and producers, and has information about the project dissemination activities, as well educational articles about the honey.







For the purposes of the web site development and professional presentation of the beekeepers involved in the project, short video clips have been prepared for each of them with professional photos. In addition to sub-website of each beekeeper, inquiry form is developed for direct communication.

Participation in agricultural fairs/events to promote the project

HoneyTag Project was initially designed to utilise existing off the shelf tools of TIS to build an interesting brand protection /anti counterfeit use case for honey producers in Montenegro. Therefore we invested significant efforts to promote the case and obtain the feedback from both final consumers, as well as beekepers.

April 19, Agricultural Fair in Podgorica

The fair was organized in cooperation with the Montenegro Business Alliance, the Capital City Podgorica and the Ministry of Agriculture and Rural Development, with the support of the Ministry of Economy and the Ministry of Sustainable Development and Tourism. More then 50 agricultural producers presented their products, while HoneyTag had its own stand to promote the project activities and expected benefits.

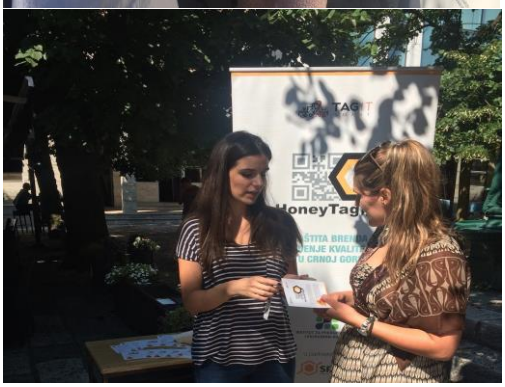
April 21, Promotion of HoneyTag at the manifestation "Children's spring weekend", Podgorica

The manifestation "Children's Spring Weekend", is organized every year in the Delta City Shopping Center. On this occasion, the youngest visitors and their parents were introduced to the pilot project HoneyTag. Through the fun and educational workshop, the children had the opportunity to learn about agriculture, the production of safe and quality food and benefits of domestic products. Children have learned how bees make honey, why it is among the best sweets, but also why bees, as the main pollinators, are important for the survival of nature. They were especially excited to see bees placed in a special glass hive, to try the beekeeping suit and caps provided by the Union of Beekeepers Associations of Montenegro.

This year the manifestation was dedicated to the Program "Let's Purchase domestic", initiated by the Government of Montenegro in cooperation with retail chains, in order to promote and better place domestic products.

July 12, Promotion of HoneyTag at the manifestation "Days of Lime and Honey", Cetinje

HoneyTag Project has been presented at another manifestation “Days of Lime and Honey” in Cetinje. Through direct communication with visitors and participants of the fair, Project activities and benefits were presented and discussed. For the occasion of this event, smart labels were presented.



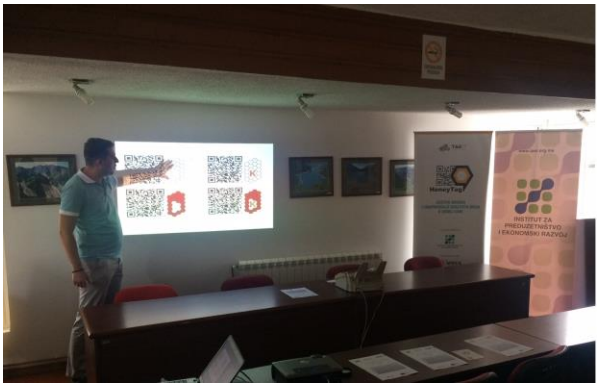
Regional workshops with young beekeepers and with members of local beekeepers associations' in Durmitor area.

May 22, Introductory Training for Young Beekeepers in Danilovgrad

Union of Beekeepers Associations is implementing the project with the Ministry of Agriculture and Rural Development to raise awareness about honey production and motivate young people to get involved. Through one of such initiatives, 131 young beekeepers beginners will be given three bee-shaped societies so they can start dealing with beekeeping. For all of them, introductory training was organized in the House of Honey during which Mr Vladimir Radulović presented basic beekeeping terms as well as the operations that are expected in the area of beekeeping for young beekeepers in the coming period. On this occasion, HoneyTag Project was also introduced to the young beekeepers.

June 14-15, Regional workshops with beekeepers (June 14 - Žabljak and Šavnik, and June 15 - Plužine)

Within the framework of project activities, regional workshops were organized in all three municipalities covered by the project. Doc. Dr Marko Simeunović, Senior IT Expert, explained to manufacturers the TIS technology and the benefits of the project implementation. This was an opportunity for all of them to ask questions and get immediate answers. The feedback was very positive though beekeepers might not understand the entire technological part of the project. They all face the problem of fake honey sold in Montenegro under the brand of "Montenegrin honey" which damages the operations of each of them. An opportunity to promote own facility and additional services they can offer to tourist for example has been positively evaluated and immediate effect is recognized.



Live interviews in TV shows to promote the Project.

During the reporting period, members of the IPER team participated in two live TV shows (so called morning programs):

- ✓ on June 21, TV 777, and
- ✓ on July 14, at national public service RTCG https://www.youtube.com/watch?v=0LOYn9K9bF4

In May 2018, the text about the HoneyTag project was published in the journal Beekeeping, No. 205. This journal is an expert-informative monthly, with a circulation of 2500, which is issued by the Union of of Beekeeping Associations of Montenegro for its members, and is available online at their web site https://pcelarstvo.me/casopis-pcelarstvo/.

In this way, HoneyTag project is presented to the wider audience throughout Montenegro.

HoneyTag project was also promoted at conference "Cetinjski Dijalozi", organized by University of Donja Gorica on July 5-6, through presentations of Mr Srdjan Krco, and Mr Rob van Kranenburg.

July 28, Traditional event for honey and beekeeping equipment in Bijelo Polje

Traditional event for honey and beekeeping equipment called 'Honey - food and medicine' was held in the city square in Bijelo Polje (Northern Montenegro), organized by the Beekeeping Association 'Pčelar'. More than twenty exhibitors from this and other municipalities of Montenegro, as well as from neighboring municipalities from Serbia, presented their products and equipment for beekeeping. Mr Radule Miljanic, President of the Association of Beekeeping Organizations of Montenegro and Nebojsa Velickovic, on behalf of the Ministry of Agriculture and Rural Development, addressed at the event and announced even more generous support from the Government, so that the producers of honey would have the best conditions for dealing with this multisignificant work.

This was an opportunity to present the Honey Tag project to the exhibitors as well as to our guests. During the event, promotional material was distributed and all the interested people had the opportunity to get acquainted with the goals of this project in more details. Atmosphere from the event is available on the HoneyTag facebook page:

https://www.facebook.com/pg/honeytagmontenegro/posts/?ref=page_internal

August 6, Beekeeping manifestation 'Days of Honey in Mojkovac 2018'

Mojkovac Municipality and Beekeeping Association 'Mojkovac' organized the beekeeping event for the seventh time. In accordance with beekeeping practice and successful manifestations, held in other cities of Montenegro, bee products and beekeeping equipment were presented at the event. Members of the HoneyTag project team used the opportunity to inform participants about the goals of the HoneyTag project and about all the activities implemented so far.

September 7, Regional manifestation of honey, bee products and beekeeping equipment in Pljevlja 2018

HoneyTag project team took the opportunity to visit the 9th Regional exhibition of honey, bee products and beekeeping equipment in Pljevlja (Northern Montenegro). The manifestation is recognized not only in Montenegro, but in the region, both by number of participants and by citizens' attendance. It gathered 48 exhibitors from Montenegro (27 exhibitors), Serbia (16 exhibitors) and Bosnia and Herzegovina (5 exhibitors).

The regional exhibition was organized by the Secretariat for Economy of the Municipality of Pljevlja and the Public Enterprise 'Matica'. The exhibition was organized with the support of the Ministry of Agriculture and Rural Development (MARD) and the organization of the exhibition was supported by the Permanent Working Group for Regional Rural Development (SWG) in South East Europe within the project 'Regional cooperation and networking in the field of agriculture, rural and economic development of cross-border areas', funded by the European Union.

The message sent from this event was that, although poor yields of honey were recorded in the north of Montenegro this year as in previous years, Montenegrin beekeeping sector is rising. Also, beekeepers expect great work to meet the standards of the European Union.

September 22, Days of Honey in Niksic

A traditional event that has been organized for more than 20 years was held in Niksic. Besides Niksic exhibitors, the event was attended by beekeepers from other Montenegrin cities, as well as the surrounding countries: Serbia and Bosnia and Herzegovina.

The event attracted a huge number of citizens who had an opportunity to consume and buy the quality homemade honey. The organizer of the event is the beekeeping organization 'Niksic', one of the largest beekeeping organizations in Montenegro, with 220 members and about 7,000 beehives.

Members of the HoneyTag project team, in a conversation with beekeepers and representatives of the Ministry of Agriculture and Rural Development, concluded that we all have to work together to improve this sector, to protect bees and bee products, to raise quality standards, to brand Montenegrin honey and placement in order to overcome all major challenges in beekeeping related to global trends of reducing the number of bees.

September 28-30, Days of Honey in Podgorica

The traditional beekeeping event, which was held this year for the 24th time, gathered over 50 exhibitors. The fair was attended by famous beekeepers from Montenegro who offered honey and other bee products. HoneyTag team promoted the application and beekeepers at the Durmitor region at its stand. In addition to the promotion, the honey was sold with TagItSmart label. Also, the survey was conducted with consumers to get feedback about app evaluation.

We can gladly say that the stand was extremely visited. The special interest in the HoneyTag project was expressed by the Deputy Prime Minister Mr. Milutin Simovic who is also the Minister of Agriculture and Rural Development in the Government of Montenegro. He expressed the wish for cooperation with IPER on HoneyTag Project.

The atmosphere from the event could be found at the following links:

https://www.youtube.com/watch?v=PyyFBzbuwr4

https://www.youtube.com/watch?v=Mtsj2EAImok

https://www.facebook.com/pg/honeytagmontenegro/

https://www.facebook.com/honeytagmontenegro/photos/pcb.1774618209303101/1774617209303201/?type=3&theater

https://www.youtube.com/watch?v=3UsxhI9DfPA&t=1s

https://www.facebook.com/honeytagmontenegro/videos/715399102192309/?modal=admin_todo_tour

November 24, Promotion of the HoneyTag application

After the beekeeping manifestations, the Institute for Entrepreneurship and Economic Development (IPER) successfully implemented the promotion of the HoneyTag application. The promotion was held at IDEA CG Super Market in Podgorica, owned by Merkator llc. We chose this trade chain in order to support the campaign 'The taste of my homeland', launched by IDEA Montenegro and Mercator in March 2017 with the aim of supporting traditional production and promoting local producers from Montenegro, and thus strengthening the domestic economy.

During the promotion, we educated consumers about how important it is to give preference to homemade products while doing shopping and we introduced the HoneyTag application that provides unique identification, a mechanism to combat falsification and interaction between producers and consumers. During the promotional campaign, all those who have seen short project presentation, launched the application and answered the questionnaire, got a gift - honey jar with HoneyTag labels.

After the promotion of the application in IDEA super market, the campaign was continued on the Facebook page: https://www.facebook.com/pg/honeytagmontenegro/

The promotion is available at the following links:

https://www.youtube.com/watch?v=YrG1SmW7J98&t=2s

https://www.facebook.com/honeytagmontenegro/

All promotional activities are available at the following Facebook pages and websites:

https://www.facebook.com/pg/honeytagmontenegro/

https://www.facebook.com/med.crnagora.58

https://www.facebook.com/ipermontenegro/

http://honey-tag.me/

https://iper.org.me/

November 3-4, split, Croatia, 'Dalmatina 2018'

Our colleague from the Union of Beekeeping Association that is our partner in the project participated at International Fair of Beekeeping 'Dalmatina 2018' in Split, Croatia, on November 3-4, 2018. Event was organized under the auspices of the President of the Republic of Croatia Mrs Kolinda Grabar Kitarović, the Ministry of Agriculture, HPA, HPS and Split-Dalmatia County and the Association of Beekeeping Associations of the Split-Dalmatia County, This event brought together a large number of exhibitors from Hungary, Poland, Slovenia, Serbia, Montenegro, Bosnia and Herzegovina and Croatia who exhibited their beekeeping products, accessories and equipment.

Also, some smart solutions for beekeeping industry are presented, including our HoneyTag project.

December 14, Annual of Ministry of Science for awarding the scholarships, grants and annual scientific awards

The Ministry of Science of Montenegro on Friday, December 14th, at the Villa Gorica, organized the reception to award the PhD Fellowships for Young Researches, and Grants for Innovative Projects. Also, winners for Scientific Achievements in 2018 are promoted and Grants for European Social Research in Montenegro awarded on this occasion. Atendees included members of the Government, Diplomatic Core, scienfitic cmmunity, public institutions and private sector. More then 150 visitors received gifts from the Ministry of Science, which included honey jar with HoneyTag labels.

During the tourist season, honey jars with smart labels were offered for sales in the unique facility, which is owned by local beekeepers associations in Savnik. At this location, but also during the trantional honey based products related events as presented above, we collected responses from consumers – through application and/or polls.

Design of the new etiquette for the Durmitorski Honey developed under the HoneyTag project

✓ **Feasibility and Affordability Study**

Affordability Study (D 2.3) showed that usage of smart-tag labels for marking the honey jars with Durmitorski honey by registered beekeepers – memebers of the National Union of Beekepers

Associations is increasing the production costs for 15% and is reducing the profits for 10%. In other words, the feasibility study showed that targeted beekepers are ready to pay not more then 0.1 EUR per smart label per jar. With this, HoneyTag project is not affordable for targeted beekeepers. Therefore, it is proposed to contact the Ministry of Agriculture and Rural Development to support beekeepers in obtaining and using the smart labels, at least for the first year after the pilot project implementation.

More details available in the D 2.3 report.

HoneyTag research with bee products' consumers

- **Research objective and methodology**

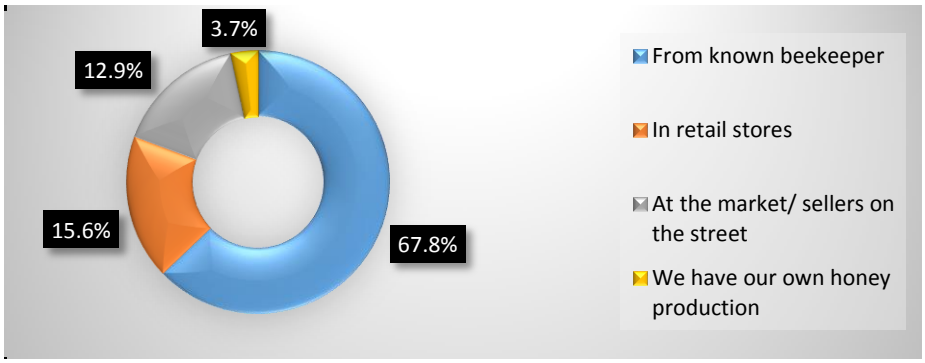
Within the project, the survey was conducted to provide basic information on consumer habits and other preferences for honey purchase, as well as ratings of the HoneyTag application. The survey covered 326 respondents with a quantitative method, through a direct interview (face-to-face) and through an on-line survey available at http://honey-tag.me .

Data collection in the field was carried out during promotions in the House of Honey in Posćenje, municipality of Savnik. All respondents are consumers of honey and other bee products.

- **The results of the research**

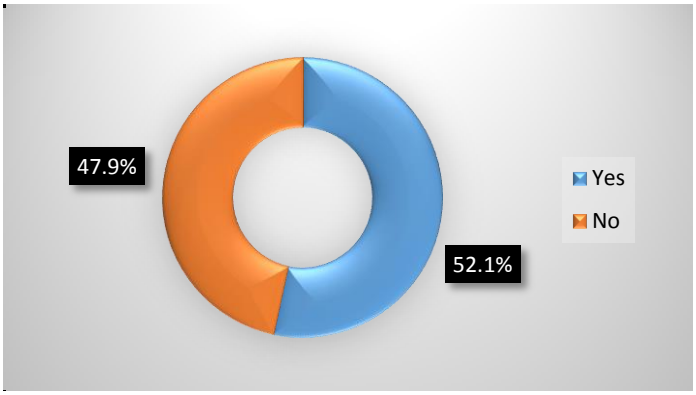
The result of the research show that about two-third of the respondents are most likely to opt for the purchase of honey from a known beekeeper (67,8%), a small percentage of respondents buy honey in stores (15,6%) while 12,9% buy it at the market or the street vendor. Among the respondents there was a small number of those who have their own production.

Graphic 1: Where do you usually buy honey?



As expected, consumers are not well informed about the fact that honey is one out of three most common products in the world that is falsified. More precisely, 52,1% are familiar with this claim while 47,9% are unaware.

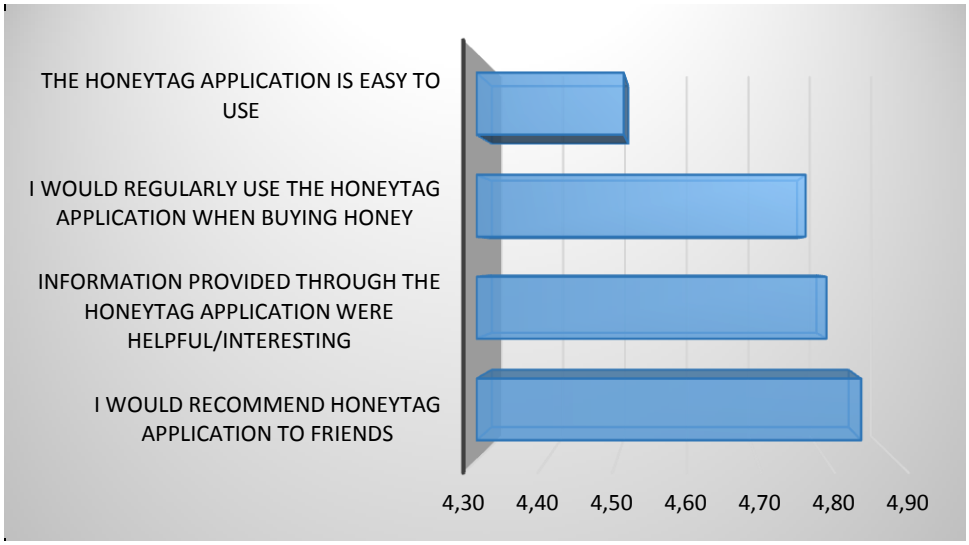
Graphic 2: Did you know that honey is one out of three the most commonly counterfeit products in the world?



To the question - Did you know that honey should not be exposed to UV rays and temperatures above 45 degrees Celsius? - the information of the respondents is at a similar level. More precisely, 52,8% said they know while 47,2% said they did not know.

The respondents had the opportunity to evaluate the HoneyTag application on a scale of 1 to 5. The data obtained shows that consumers like mobile application, would like to use it regularly, would like to recommend it to friends and provide useful informations.

Graphic 3: Average rating for the HoneyTag application



When it comes to using the application, some respondents gave low grades (grades 1 to 3).

The reasons why some of the respondents gave lower grades are as follows:

- ✓ Due to large number of applications that allow scanning of QR codes some consumers consider them to facilitate access and create a unique application that will directly take QR code to the HoneyTag, which will allow the user to immediately approach the desired steps;
- ✓ The QR code is hard to read, which prevents fast loading of the label.

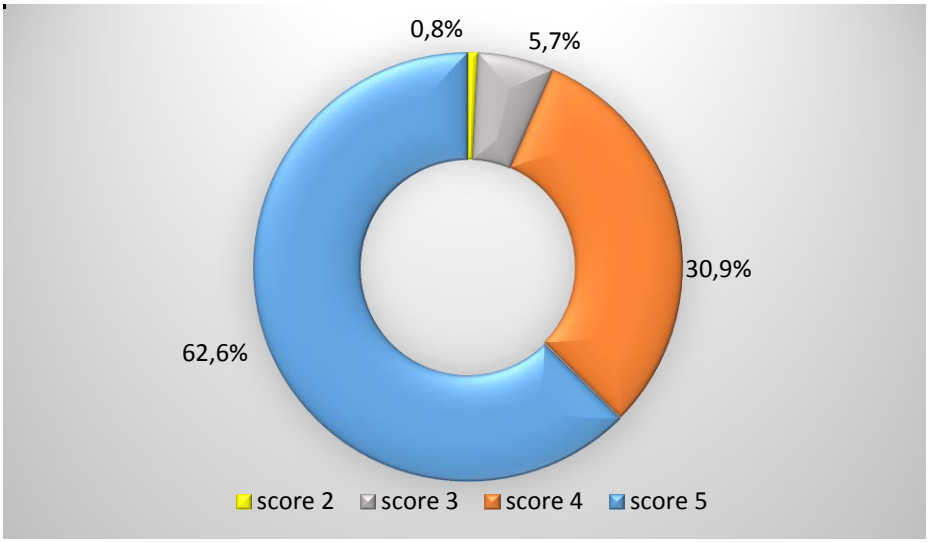
During the use of the HoneyTag application, consumers of Durmitor honey had the opportunity to evaluate product quality after consuming the product (from 1 to 5). During the promotional activities, the score was given by 123 consumers.

Based on the results, the average grade is 4.55. From the graphic 4 one can conclude that 62.6% of respondents gave the highest score (5), while 30.9% rated it with grade 4.

Consumers mostly provided the following comments:

- ✓ Honey is great!
- ✓ Honey is delicious!
- ✓ Fin taste!
- ✓ Honey is of superior quality!
- ✓ The beauty of Durmitor in the jar...! Thank you for your hard work and keep doing like that!

Graphic 4: Product quality score through the HoneyTag application



These results indicate that consumers recognize quality and product innovation from the Durmitor region. In this way, Durmitor honey got a new value that can establish it as a unique product on the market.

B.2 Technical Results

In terms of technical/substantial components of the project, the following activities were implemented:

- ✓ Smart label specification and design,
- ✓ System architecture design and realization, as well as
- ✓ Project website launching,
- ✓ Application development.

Brief review is presented above, while more details is available in the report D 2.2 and D 2.2 updated version.

B.3 Lessons learned

As it can be seen from reported activities and achievements, all planned activities were implemented in time and all outputs delivered as initially planned.

HoneyTag project is relying on the off the shelf solution directly used from the project partners. The reason for this is the fact that focus of our project was the implementation of the existing solution in the specific sector-honey production-instead of adding additional technologies to extend the TIS eco-system. Therefore, the focus of our activities is promotion of the Project and TIS technology as well as increase of public awareness and policy makers. Having in mind reported activities, we believe we were very successful in achieving this goal.

Despite the lack of internal technical expertise, with hiring Senior and two Junior IT experts, IPER managed to perform a detailed analysis of TIS solutions in order to identify relevant capabilities and select TIS components that would be used in the implementation of the brand protection and quality control pilot. Our intention was to select experienced Senior IT expert who would be able to perform relevant tasks by him self alone, however, we decided to use the opportunity to train two Junior IT experts to gain new skills and knowledge for the implementation of the IoT. With good project management, outsourcing the missing IT skills did not influence the overall project implementation of the project.

The success of the pilot relies on involvement of individual beekeepers, which has been recognized as an additional risk. With offering the possibility to promote their activities online and intensive communication, we managed to develop very strong cooperation with both local associations of beekeepers and individual beekeepers involved in the project, which is built on mutual trust.

As for the technical solution, the API is well documented and based on provided examples we were able to easily implement all TIS functionalities. Server response time was reasonable and we were not facing any functional faults.

In our opinion, in order to improve flexibility of both system for tag creation and digital product representation, it is worth to consider implementation of API calls that will enable custom creation of digital product unique ID signatures, as well as user defined product attributes. In our application, unique ID signatures (combination of QR codes and letters) are created on HoneyTag custom server, while additional product attributes are part of product description field.

In general, all TIS components have shown excellent performance that candidate whole system for commercial applications. We are very proud of having taken part in the validation of this new technology and we believe that it will have significant impact on both brand protection and product quality control in the future.

As one of the project activities, Feasibility study with Affordability analysis was prepared to evaluate the costs of honey production, as well as costs of packging and affordability of the smarttags for individual beekeepers. The Study showed that labels are still too costly for individual beekeepers. Namely, according to estimations, the cost of the label is about 0,5 EUR per jar, while the jar it self with cover is about 0,26 EUR. In addition, the final product price at the market is between 10 and 15 EUR. According to the feedback received from the beekeepers, they would be willing to pay up to 0,1 EUR per label. Therefore, to continue with the project implementation, we have prepared the initiative for

the Ministry of Agriculture and Rural Development to cover the costs of the labels and back up system in the next year, while we expect that printing costs will decline through the time.

Namely, Union of Beekeepers Associations has received support from the Ministry to purchase the equipment for packing the honey branded as “Montenegrin Honey”. We proposed that each jar is marked with HoneyTag label. As the first step, this initiative is to be adopted by the Board of Directors of the Union of Beekeepers Associations, and then will be officially submitted to the Ministry. Ministry of Agriculture and Rural Development provides the support for beekeepers. In 2018 this support amount 290,000 EUR. Also, for 2019-2023 Montenegro should develop the first National Apiculture Programme which means that more funds will be available for honey production.

B.4 Impact

Considering that during the pilot project, TIS technology was directed towards beekeepers from the Durmitor region, the follow up activities should include national level, especially if our initiative for the Ministry of Agriculture to step in and cover the costs of printing is accepted.

Our project directly involved 6 beekeepers whose honey jars were promoted and offered to the end users with smart tags.

Through National Union of Beekeepers Association we reached 2,500 individual beekeepers, meaning all registered beekeepers.

Through events where we presented the project (honey fairs in 7 different municipalities), our team members have spoken directly to almost 13,000 end users - honey consumers.

Through media - statements given for National TV and articles published in the daily newspapers, we reached almost 100,000 end-users (calculation prepared based on the media market share). Our project directly initiated government action to discover and destroy fake honey sold next to the roads. Such actions are now continuously done and widely reported in media, reaching every adult person in Montenegro which is almost 480,000 people.

HoneyTag project was introduced through direct communication to more then 250 individual beekeepers, while thousands of consumers learned about the project as well partially directly an indirectly (through media reports).

TIS technology is offering very strong tool for protection of the Montenegrin honey and increasing food safety. Once fully applied, HoneyTag solution will increase competitiveness of the Montenegrin beekeepers and will ensure protection of the final consumers having in mind product quality and food safety standards. When their product is secured from falsification, Montenegrin beekeepers will not have to sell its products on the “door step” only, and unfair competition will be reduced if not eliminated from the market.

From the survey we learned that Montenegrin citizens mainly buy the honey from known producers, however, this is not the case with tourists who often rely on the products offered for sales around main landmarks of the country, including religous facilities. Since our application also includes promotion of other activities of beekepers – e.g. accommodation, catering, we believe it will contribute to strenghten the linkages between agri producers and tourist sector. This is one of primary developing policies of Montenegrin Government.

The project itself already created important benefits for society. Consumers are better informed about the advantages of the honey consumption, including children. More over, after the HoneyTag project is widely promoted, Ministry of Agriculture and relevant inspection launched activities (on June 19) of controlling the quality of the honey, which is sold along the roads[1].

The Administration for Food Safety, Veterinary and Phytosanitary Affairs of Montenegro provided us with the data on the control of honey transport in the Montenegrin market, as well as the control of non-hazardous / rejected honey dispatched from internal control.

Since the beginning of the action, the following quantities of honey have been destroyed:

- ✓ June: 362 kg of honey
- ✓ July: 17 kg of honey and 18 kg of nuts in honey
- ✓ August: 15 kg of honey and 7 kg of nuts in honey

Also, one consignment of honey weightening 3,000 kg intended for import, was forbidden to be placed on the market because of not established compliance with the prescribed requirements for quality of honey.

[1] More information is available on the following links:

http://www.mpr.gov.me/vijesti/186224/Prvi---rezultati---kontrole---prodaje---meda---na---trzistu---Oduzeto---308---kilograma---meda---i---oko---57---litara---maslinovog---ulja.html

http://www.mpr.gov.me/vijesti/186277/Novi---rezultati---akcije---kontrole---prodaje---meda.html

https://radiojadran.com/novom-kontrolom-zaplinjeno-preko-63-kg-meda-i-21-l-maslinovog-ulja/

EKONOMIJA

12/09/2018 11:55

(17)

Podijeli

Kazne za prodavanje lažnog meda i do 20.000 eura

12/09/2018 11:55 Izvor: CdM

Za tri mjeseca Uprava za bezbjednost hrane, veterinu i fitosanitarne poslove je oduzela više od 500 kilograma lažnog meda na tržištu Crne Gore. Ipak, kako je za CdM kazao **Vladimir Radulović**, sekretar Saveza pčelarskih organizacija, pčelari u Crnoj Gori ne mogu u potpunosti da se zaštite od trgovaca koji na tržištu naše zemlje prodaju lažni med, obmanjuju potrošače i prave veliku štetu državi. U skladu sa Zakonom o bezbjednosti hrane propisane su kazne u iznosu od 500 do 20.000 eura za pravno lice i u iznosu od 150 do 6.000 eura za preduzetnika.

CDM VIJESTI LIVE 24 HRONIKA SPORT SVIJET ZABAVA LIFESTYLE TEHNO & NAUKA

Nakon dobijanja informacija da se na tržištu Crne Gore prodaju med i maslinovo ulje sumnjivog porijekla i kvaliteta na tezgama pored saobraćajnica, Uprava za bezbjednost hrane, veterinu i fitosanitarne poslove je polovinom juna preduzela pojačanu kontrolu.

U cilju utvrđivanja bezbjednosti meda, maslinovog ulja i drugih vrsta hrane, posebno uzimajući u obzir rizik koji nosi prodaja hrane na otvorenom, bez zaštite od kontaminacije i direktno izložene sunčevoj svjetlosti, inspektori su obavili veći broj kontrola na lokacijama pored vjerskih objekata, kao i onih koje se nalaze na putnom pravcu ka Nikšiću, Žabljaku, Njegušima, Mojkovcu i Kolašinu, Đurđevića Tari, Nacionalnom parku Durmitor, kao i pijacama u Tuzima, Podgorici, Tivtu, Kotoru, Ulcinju i Budvi.

"Tokom akcija, od juna do kraja avgusta, van prometa je stavljeno i ocijenjeno nebezbjednim više od 500 kg meda. Oduzeti proizvodi su ocijenjeni nebezbjednim jer nijesu ispunjavali propisane zahtjeve za stavljanje na tržište između ostalog, prodavci nijesu posjedovali dokaz o porijeklu/proizvođaču ove hrane, proizvodi nijesu bili označeni/deklarisani i nijesu čuvani na propisani način. Urađeno je laboratorijsko ispitivanje ovog oduzetog meda i u skladu sa rezultatima laboratorijskih analiza u 50 odsto uzoraka je utvrđeno da se ne radi o pčelinjem medu, već o šećernom sirupu koji izgleda kao med", saopšteno je CdM-u iz Uprave za bezbjednost hrane, veterinu i fitosanitarne poslove.

Kazne i do 20.000 eura

HRONIKA

BEZ POTVRDE PORIJEKLA

Oduzeto 440 kilograma meda

Inspektori Uprave za bezbjednost hrane su od polovine juna van prometa stavili i ocijenili nebezbjednim 418 kilograma meda, 22 kilograma meda sa orašastim plodovima i 65,5 litara maslinovog ulja, saopštila je direktorica Uprave Vesna Daković. Inspekcija ove uprave Ministarstva poljoprivrede pokrenula je u junu organizovanu akciju kontrole prodaje meda i maslinovog ulja na tržištu, u cilju zaštite zdravlja potrošača i brenda crnogorskog meda.

Snažne i organizovane kontrole prodaje meda (foto: Uprava za bezbjednost hrane)

"Oduzeti proizvodi su ocijenjeni nebezbjednim, jer nijesu ispunjavali propisane zahtjeve za stavljanje na tržište. Između ostalog, prodavci nijesu posjedovali dokaz o porijeklu, odnosno proizvođaču ove hrane, proizvodi nijesu bili označeni/deklarisani i nijesu čuvani na propisani način", kazala je Daković Pobjedi.

Ona je navela da je prije uništavanja oduzetih proizvoda izvršena dodatna laboratorijska provjera kvaliteta i prisutnosti potencijalnih supstanci opasnih po zdravlje ljudi.

RTCG Radio Televizija Crne Gore Herceg Novi 10.4 °C

VIJESTI SPORT KULTURA MAGAZIN TV RADIO SHQIP ENGLISH

Naglasila je da kvalitet, održivost i stabilnost hrane zavise od uslova čuvanja, higijene rukovanja i niza drugih faktora koji određeni proizvod u procesu prometa mogu učiniti štetnim ili nepogodnim za ishranu ljudi.

"U cilju utvrđivanja bezbjednosti meda, maslinovog ulja i drugih vrsta hrane, posebno uzimajući u obzir rizik koji nosi prodaja hrane na otvorenom, bez zaštite od kontaminacije i direktno izložene sunčevoj svjetlosti, inspektori su izvršili veći broj kontrola na lokacijama pored vjerskih objekata, kao i onih koje se nalaze na putnim pravcima ka Nikšiću, Zabljaku, Njegušima, Mojkovcu, Kolašinu, Đurđevića Tari, Nacionalnom parku Durmitor kao i pijacama u Tuzima, Podgorici, Tivtu, Kotoru, Ulcinju i Budvi", navela je Daković.

Prema riječima Daković, postoje neodgovorni i prodavci koji i pored izrečenih mjera, oduzimanja proizvoda, pokretanja prekršajnih prijava i izricanja novčanih kazni, pokušavaju i dalje povremeno staviti proizvode bez porijekla i oznaka na neuslovnim mjestima.

"Takođe, imamo još jedan problem koji se ogleda u tome da kupci vrlo često vjeruju da baš u tim područjima mogu kupiti domaći proizvod i neopreznо se odlučuju za kupovinu neoznačenih proizvoda", upozorila je Daković.

UPRAVA ZA BEZBJEDNOST HRANE

АКЦИЈА МИНИСТАРСТВА ПОЉОПРИВРЕДЕ И УПРАВЕ ЗА БЕЗБЈЕДНОСТ

Контролисаће продају меда

PART C. RESOURCES

C.1 Resources Deployed

Table 1 below includes the budget structure as it is estimated within the project proposal.

Table 1: Project costs as presented in the Proposal

Participant Number	Participant short name	Estimated eligible costs						
		Effort (PM)	Personnel Costs (€)	Other direct costs (€)	Indirect costs (€)	Total subcontracting costs (€)	Total costs (€)	Requested funding (€)
1	IPER	43	58,900	7,800	16,675	0	83,375	83,375
TOTAL		43	58,900	7,800	16,675	0	83,375	83,375

Table 2 contains estimated direct costs.

Table 2: Direct costs as presented in the Proposal

Participant no. 1 IPER	**Cost (EUR)**	**Justification**
Travel - international	1,500	One international conference to present HoneyTag pilot results
Travel - local	500	Visit of the Durmitor region and meeting with bee keepers/covering traveling costs for trainings
Other goods and services	5,000	NFC tags, SmartTags for honey jars; dissemination materials
Miscelanious	800	Refreshment costs for trainings, training materials
Total	7,800	

Table 3 contains the review of the payment dynamics, as agreed in the signed contract. So far, the first payment has been executed, upon signing the Contract.

Table 3: Payment schedule for HoneyTag according to the Contract signed.

	Payment dynamics	**Amount (in EUR)**	**Share**
1	40% of the overall financial support as advance payment after the signature	33350.00	40%
2	30% of the overall financial support as interim payment based on the evaluation by the TagItSmart consortium of the Intermediate Report	25012.50	30%
3	30% of the overall financial support as Final payment based on the evaluation by the TagItSmart Consortium of Final Report	25012.50	30%

Table 4 contains the review of the costs incurred.

Table 4: Project budget executed.

Cost category	Costs incurred within the reporting period (in EUR)
Personnel	58,890.00
Travel	4,117.47
Promotional activities (excluding travel)	11,977.90
Design and printing	8,310.81
Domen, hosting, server, application	528.82
TOTAL COSTS	83,825.00

Since project proposal did not included budget breakdown, costs incurred are not directly comparable, however, it is clear that more funds is involved in local travel and promotional activities, having in mind strong focus of the project on these aspects.

In addition to the funds received from the project, 450 EUR was received from Ministry of Science for honey, which was purchased from the beekeepers for gifts (please see the page 19).

Detailed budget breakdown with copies of contracts, invoices and receipts is available upon request.

C.2 Project System Development

After the end of the project, activities will certainly continue in the direction of the development of the protection of the Montenegrin Honey brand. With the Union of Beekeepers Associations of Montenegro and the Ministry of Agriculture and Rural Development we have already begun discussions for extension of the HoneyTag implementation to the Montenegrin Honey brand.

Namely, Union of Beekeepers Associations has received support from the Ministry to purchase the equipment for packing the honey branded as "Montenegrin Honey". We proposed that each jar is marked with HoneyTag label. As the first step, this initiative is to be adopted by the Board of Directors of the Union of Beekeepers Associations, and then will be officially submitted to the Ministry. Ministry of Agriculture and Rural Development provides the support for beekeepers. In 2018 this support amounted 290,000 EUR. Also, for 2019-2023 Montenegro should develop the first National Apiculture Programme, which means that more funds will be available for honey production and beekeepers.

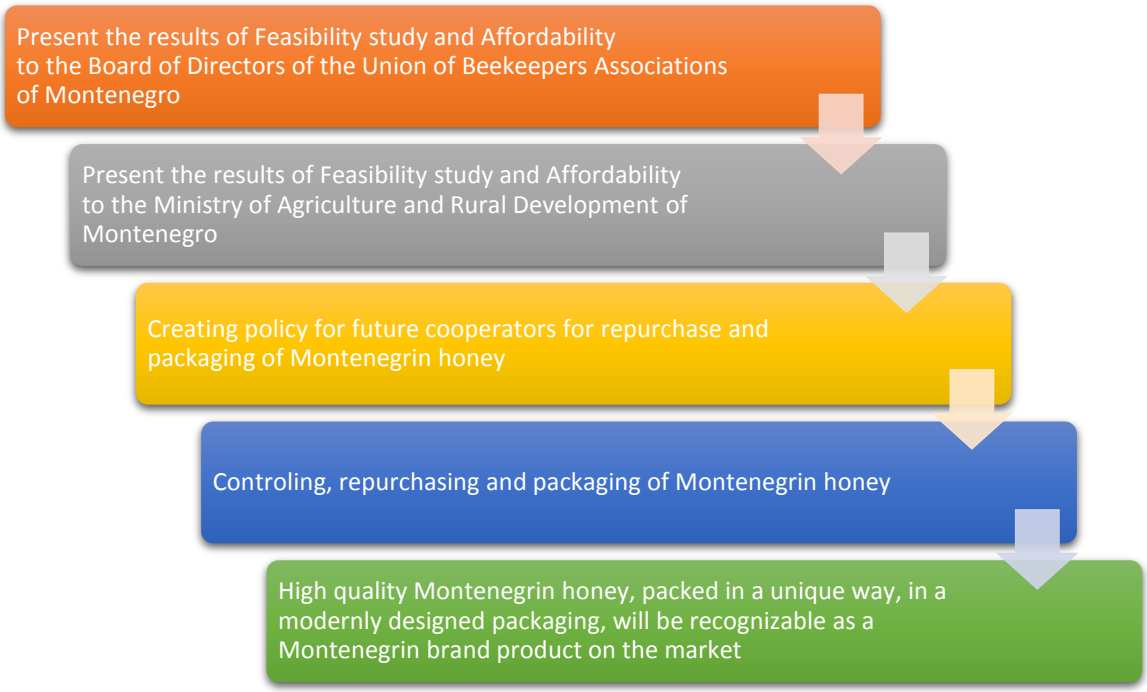



Figure 1: Further development of the project in steps