

# Increasing Productivity of USEP KM Casting Chips and Peyek through Technology and Product Packaging Standard Assistance in Nangsri Kidul Village, Semanu, Gunung Kidul, Yogyakarta

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## ABSTRACT

Nangsri Kidul Village is one of the villages in Semanu District, Gunung Kidul Regency. The majority of people in Nangsri Kidul Village work as farmers. Apart from farmers, there are also people who open businesses such as USEP KM Cassava Chips and USEP KM Peyek. However, in Nangsri Kidul Village there are problems faced by the community, namely production technology that is still simple and packaging is still simple. In the USEP KM, the financial administration aspect is not well organized, the product packaging is simple, so it is less attractive and the product is not well protected, and the production technology is still manual, not using a dryer. Therefore, it is necessary to carry out counseling, training, and knowledge of product packaging standards for USEP KM Cassava Chips and USEP KM Projects and the provision of production and packaging equipment. The targets to be achieved are: i) Understanding of product packaging standards; ii) Using modern production technology. This target is achieved through: i) Dissemination and provision of standard product packaging samples; ii) Technological training and making cassava chip dryers and chips. The results of the community service were i) USEP KM was given directions and training on how to pack the product properly and made a product brand label so that the product is known by consumers and the product is not easily damaged; ii) USEP KM was briefed on a more modern technology and developed an automatic dryer to reduce the oil in cassava chips and dents.

## KEYWORDS

Packaging;  
Cassava Chips;  
Project;  
Technology;  
Products



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## 1. Introduction

Semanu sub-district is one of the sub-districts in Gunung Kidul district. The total area of Semanu sub-district is 108.39 km<sup>2</sup>. The stretch of the Semanu sub-district is a plateau. The highest temperature ever occurred in the district. Based on geographical position, Semanu sub-district is bordered by Karangmojo sub-district in the north, Ponjong sub-district in the east, Tepus sub-district in the south, and Wonosari sub-district in the west. The people of Nangsri Kidul Village, especially mothers, have other jobs besides being farmers and housewives, namely as processed food craftsmen of Cassava Chips and Peyek, these processed food craftsmen have formed a group consisting of RT 02 mothers called USEP KM which produces Chips Cassava and Peyek. Based on the results of observations, documentation, and interviews, the authors found several problems faced by USEP KM, namely the products produced still use ordinary plastic packaging which is not safe and does not yet have a brand label so that it does not meet the standard requirements for good product packaging and the production tools used are still simple. for cassava chips and peyek dryers, they still use newspaper mats so that the

oil is absorbed by the newspapers, they have not used modern technology, namely automatic dryers. From these problems the community service team referred to several previous studies on food processing technology such as Food Packaging, Food Storage,

Food processing regarding food storage has been investigated by previous researchers. The Russian-Ukrainian Conflict: Implications for Global Food Supply Chains was researched by Jagtap [1]. Bipolar membranes: An overview of principles, recent developments, and applications investigated by Pärnamäe [2]. Nanotechnology in Food Science: Applications, Recent Trends and Future Perspectives researched by Nile [3]. The antimicrobial mechanism of spice essential oils and their application in the food industry was investigated by Li [4]. A critical review of smart and active packaging in the food industry: Research and development research by Soltani Firouz [5]. Climate change responses benefit from the global food system approach researched by Rosenzweig [6]. Acting now before the Ukrainian war plunged millions of people into malnutrition was studied by Osendarp [7]. A comprehensive review of the toxicity of chlorpyrifos with special reference to endocrine disorders: Evidence of mechanisms, exposures, and mitigation strategies investigated by Ubaid [8]. Bioavailability of nutraceuticals: The role of the food matrix, processing conditions, digestive tract, and nanodelivery systems was investigated by Dima [9].

The application of food coloring and bio-preservatives in food and their effects on human health was investigated by Dey [10]. The current situation of pesticide residues in China and their removal and transformation during food processing was investigated by Li [11]. The vulnerability of the UK food supply chain to exposure to COVID-19 was investigated by Garnett [12]. Improving the bioaccessibility and bioavailability of carotenoids using an emulsion-based delivery system was investigated by Boonlao [13]. Innovation in nano science for the development of sustainable food and agriculture with implications for health and the environment was researched by Ashraf [14]. The effect of konjac glucomannan on the water distribution of frozen dough and the corresponding quality of steamed buns was investigated by [15]. Enzymatic modification of starch: A green approach for starch application was investigated by Punia Bangar [16]. The formation and fate of the Amadori rearrangement product in the Maillard reaction was investigated by Cui [17]. The effect of processing and storage on pesticide residues in food was studied by Yigit [18]. The application of metabolomics to reveal the effect of functional food interventions on metabolic diseases was investigated by Fu [19]. Dietary protein-phenolic interactions: characterization, biochemical-physiological consequences, and potential food applications investigated by Zhang [20]. Covalent modification of food proteins with plant materials (polyphenols and organosulfur compounds): A general reaction with potential utilization recently investigated by Kepler [21].

Recent trends and applications of electrolyzed oxidizing water in fresh food preservation and safety control were investigated by Sun [22]. Metal-based nanoparticles, sensors, and their multifaceted applications in food packaging were investigated by Kumar [23]. Application of Pollen as a Functional Foodstuff and Feed—Contemporary and Perspective investigated by Kostić [24]. Chitosan nanoparticles embedded with curcumin and their application in the antioxidant edible coating of pigs was investigated by Shen [25]. The deep population history of northern East Asia from the Late Pleistocene to the Holocene was studied by Mao [26]. Prevention of protein oxidation and improvement of surimi gel properties of silver carp (*Hypophthalmichthys molitrix*) with the addition of protein hydrolyzate derived from by-products of surimi processing was investigated by Zhang [27]. The Maillard reaction chemistry in the formation of critical intermediates and flavor compounds and their antioxidant properties was investigated by Shakoor [28]. Application of Chitosan-Based Apple Peel Polyphenol Edible Coating on Strawberry Fruit Preservation (*Fragaria ananassa* cv Hongyan) was studied by Riaz [29]. Microencapsulation and fortification of vitamin D: Trends and technology researched by Maurya [30].

Food processing regarding food packaging has been studied by previous researchers. Fabrication and Evaluation of Halloysite Nanotubes Containing Basil Essential Oil in Chitosan Nanocomposite Films and Their Application in Food Packaging was investigated by Chaudhary [31]. Recent developments in the manufacture of food packaging films using biopolymers were investigated by Suresh [32]. The development of active filling agents for polylactic acid films for food packaging applications was investigated by Mohamad [33]. Quantitative determination of electron beam radiation dose for inactivation of SARS-CoV-2 for decontamination of frozen food packaging was investigated by Wang

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The manufacture of a composite film of chitosan/peony leaf extract of *Paeonia* (*Paeonia suffruticosa* Andr.) and its application in sustainable active food packaging was investigated by Ma [40]. The healthy expectation of high hydrostatic pressure treatment in the food processing industry was investigated by Huang [41]. The prospect of sustainable and renewable source-based carbon quantum dots for food packaging applications was investigated by Ezati [42]. Pineapple peel extract incorporates poly(vinyl alcohol)-corn starch films for active food packaging: Preparation, characterization, and antioxidant activity studied by P. Kumar [43]. Trade in Food Quality due to Price Changes: Is There a Nutritional Effect? studied by Revoredo-Giha [44]. A review of nanomaterial and nanohybrid based bio-nanocomposites for food packaging was investigated by Perera [45]. The development and characterization of PVA starch combined with coconut shell extract and sepiolite clay as an antioxidant film for active food packaging applications was investigated by Tanwar [46]. The nutritional composition of the food supply: a comparison of soft drinks and breakfast cereals between three European countries by label was investigated by Vin [47].

Recent advances in smart food packaging materials: Principles, preparation and applications researched by Cheng [48]. Unraveling the drivers underlying the use of single-use food packaging was researched by Chakori [49]. Evaluation of the phosphorus, calcium and magnesium content in a commercially available food formulated for healthy cats was investigated by Summers [50]. Edible films and coatings for food packaging applications: a review researched by Kumar [51]. Bio-Based Sensors for Smart Food Packaging—Current Applications and Future Trends researched by Rodrigues [52]. Healthy and Climate Friendly Diets in the New Zealand Context was researched by Drew [53]. The affordability design of plastic food packaging for consumer sorting behavior was researched by Nemat [54]. Application of nanomaterials in the food packaging industry: An overview researched by Tiwari [55]. The Nutraceutical Potential and Processing Aspects of Oyster Mushroom (*Pleurotus* Species) was studied by Kumar [56]. Expanding the definition of healthy eating: Including food packaging, kitchen equipment, and food storage was investigated by Wang [57]. Ergonomics education training program for preventing work-related musculoskeletal disorders to novice and experienced workers in the poultry processing industry: a quasi-experimental study investigated by Denadai [58]. The Potential and Challenges of Used Food Products (Food Leftovers) as Alternative Feed Materials was studied by Luciano [59]. From these problems, KKN 09 provided an innovation to develop USEP KM Cassava Chips and Peyek by carrying out packaging updates and brand labeling, making automatic dryers.

## 2. Method

The implementation method used in community service activities is Asset Based Community Development (ABCD) in the sense that the community is appreciated as a network of extraordinary potential. Communities have been born, live and develop so that they have assets, both social, economic and cultural assets. This method takes advantage of the potential that is around. Several previous researchers have conducted research on ABCD. Asset-Based Community “Responses”: A Model Promoting Effective Student–Community Engagement in Disaster Scenarios was researched by Kratochvil [60]. Exploring the assets of people with memory problems and dementia in the public sphere: A qualitative study researched by Sturge [61]. Sustainable local economic development indicators framework: Tools for property redevelopment projects researched by Wilson [62]. Mission Captive Poverty in the Church—and Its Release Strategies was researched by Presler [63]. Working with the community: Meeting the health needs of those living in vulnerable communities when Primary Health Care and Universal Health Care are not available was studied by DeHaven [64]. Views from Robinswood Hill: the story of asset-based community development and participatory community-based research partnerships in South Gloucestershire researched by Willatt [65].

Indigenous peoples involved in tourism development in Arizona, USA was researched by Pubill [66]. Belief as an asset in community development projects: The case of Madagascar investigated by

Rakotoarison [67]. Community-based informal adult environmental learning: Using theory as a lens to identify steps towards mindfulness was researched by Clegg [68]. Bottom-up and top-down development: the relationship between asset-based community development and unconditional cash transfers was investigated by Reddy [69]. Interrogating the motivational mechanisms and claims of asset-based community development with the theory of self-determination researched by Cunningham [70]. Asset-based community development to promote healthy aging in a rural context in Western Canada: notes from a field study by Kobayashi [71]. Examining natural resource management through a community development theoretical lens was researched by Oliver [72]. Environmental justice in Phoenix, Arizona: environmental deficits and asset values investigated by Boucher [73]. Three Local Organizing Strategies for Implementing Place-Based School Integration Initiatives in Mixed-Income Communities was researched by Jackson [74].

The Asset-Based Adaptation Project Promoting Tree and Shrub Diversity and Above-Soil Carbon Stock in Smallholder Agroforestry Systems in Western Kenya was researched by Fuchs [75]. Climate change vulnerability and resilience of the urban poor in Khulna, Bangladesh: the role of an asset-based community development approach investigated by Hossain [76]. Process evaluation of a whole community systems approach to addressing childhood obesity in western Victoria, Australia was investigated by Jenkins [77]. Community Collaboration Theory for Advancing Age Friendly Community Change researched by Greenfield [78]. Asset-based community sports development: putting community first was researched by Bates [79]. Building Resilience and Generating Income: Tools for Holistic Leadership Training in the Ugandan Context was researched by Duthiers [80]. Supporting community participation in the pandemic was researched by Russell [81]. Radical re-imagining: concentrating the BIPOC library workforce in autoethnography An asset-based community development approach to reducing the harms of alcohol: Exploring barriers and facilitators to community mobilization in the early implementation phase was researched by Ure [82]. Participatory asset-based community analysis of natural hazards in Naphuno, Greater Tzaneen Municipality, Limpopo province, South Africa conducted by Shokane [83]. Sporting events and community development: civic considerations and community goals researched by Kaplanidou [85]. Teacher identified assets for teaching Accounting Education in rural secondary schools in KwaZulu-Natal were studied by Ngwenya [86]. Arts-Based Adult Learning in Peace Building: An Emerging Area of Potential Significance for Development Practitioners? studied by Ware [87]. Bringing together humanitarian technology and social work in a public health crisis: social innovation response to COVID-19 in Hong Kong researched by Chui [88]. Analysis of Sustainable Livelihoods in Response to Crisis in the Community and Voluntary Sector was researched by Goldstraw [89].

Nangsri Kidul Village has abundant nature so it has great potential to make processed food products that can be sold and generate income. In carrying out this USEP KM assistance it is carried out using the Asset Based Community Development (ABCD) method which is shown in Figure 1. The figure shows that there are five steps in the method, namely:

### **2.1. Discovery**

Discovery is a discovery of something that actually exists, but is not known to anyone. Discovery is used by the community service team to find a problem that exists in SMEs. The Community Service Team and KKN 09 Group conducted observations and interviews with USEP KM Cassava Chips and Projects

### **2.2. Dreams**

Dream is a series of thoughts, images, and sensations that occur in a person's mind during sleep. cherished aspirations, ambitions, or goals. Dream is used by the community service team to realize the dreams of the MSME group. The community service team and KKN 09 group provided packaging and technological innovations for the development of USEP KM Si ngkong Chips and Peyek.

### **2.3. Design**

Design is a plan or design that is carried out before the manufacture of an object, system, component or structure. The design is used by the community service team to make plans to improve the packaging of goods produced by the MSME group. The community service team and KKN 09 group updated the packaging for making product labels.

## 2.4. Define

Define is interpreting the data that you have collected regarding user problems in the previous stage. Define is used by the community service team to interpret the data that has been collected regarding the packaging of goods produced by the MSME group. The KKN 09 group conducted packaging training with USEP KM Cassava Chips and Projects into new product packaging and labels

## 2.5. Destiny

Destiny is a power that according to people controls what will happen and beyond human control. Destiny is used by the community service team as a force for marketing goods produced by MSME groups. The KKN 09 group helped carry out marketing starting from product photos to starting distribution on social media.



**Fig. 1.** Asset based community development (abcd) model

## 3. Results and Discussion

Based on the results of observations, documentation, and interviews, the problems faced by USEP KM are administration, product packaging and labeling, and the technology used. From the problems faced by the KKN 09 group, several solutions were made to overcome these problems, namely:

### 1. Increasing Quality Assurance of Processed Food Products

In the service activity, an introduction was made regarding product packaging that can be used to make the product more attractive to buyers. This activity begins with the provision of material related to packaging. Packaging is a design that reminds shape, structure, material, color, image, typography and design elements with product information so that the product can be easily remembered by consumers. Packaging is used to wrap, protect, ship, store, identify and differentiate from other products. Packaging is an important part of the product because packaging affects the attractiveness of consumers to buy the product.

The KKN 09 group, after carrying out socialization related to product packaging, did renewal of the packaging shown in Figure 2 and labeling for Cassava Chips shown in Figure 3 and labels for Projects shown in Figure 4. At first the packaging used by USEP KM used packaging in the form of ordinary clear plastic and oil paper was used for the base and to cover Top it using a candle flame then fold the plastic tip a little then bring it closer to the candle flame. It can be called a simple clip mode and doesn't have a brand label. After that, the KKN 09 group made innovations to the packaging which originally used clear plastic and changed to using plastic clip standing puoch packaging which could be closed again if the chips were not eaten immediately. And for brand labels, the KKN 09 group made brand label stickers to be affixed in the middle of the packaging. This was done to update the old packaging to make it look attractive and to change the target market research which was only for parents now for all people.



Fig. 2. New Packaging



Fig. 3. Project Brand Label



**Fig. 4.** Brand Label of Cassava Chips

After buying packaging, the KKN 09 group took product photos to make catalog photos that could be posted on social media.

## 2. Improvement of Production Technology

In the production of cassava chips and chips, the production technology used for the drying system still uses newspaper bedding, which makes the oil that was previously usable become unusable as shown in Figure 5.



**Fig. 5.** Manual Process of Drying Peyeks

Based on the picture above, it can be seen that the project drying process still uses methods that are not yet effective. Therefore, the KKN 09 group made an automatic dryer for Cassava Chips and Crackers using simple materials to produce a simple tool as shown in Fig 6. Bearing in mind that when

buying an automatic dryer, the price of buying an automatic dryer is very expensive, it is not possible to buy the tool, so the alternative way is that the KKN 09 group makes a simple dryer to help speed up the drying process.



**Fig. 6.** Automatic Dryer

To produce maximum results, members of the KKN 09 group participate in making Cassava Chips and Projects. Following are the steps taken:

1. Stages of Making Cassava Chips

The first stage carried out in producing cassava chips is stripping the cassava as shown in Figure 7. The figure shows that at the stripping stage using an ordinary knife or using a peeler.



**Fig. 7.** Cassava Peeling Process

After peeling the cassava, put it in the water so that the cassava does not smell and is slimy as shown in Figure 8. The figure shows that this applies when the cassava has not been fried, the cassava must still be soaked in water.



**Fig. 8.** Cassava Soaking Process

The second stage, namely the processing stage, namely cutting cassava is shown in Figure 9. The cutting stage of cassava does not take a long time because USEP KM uses modern cutting tools, thus shortening production time.



**Fig. 9.** Cassava Cutting Process

In the process of frying the cassava chips, put them in a pan containing hot oil and then stir them so that the cassava chips don't burn. For the flavoring stage of cassava chips, food flavoring is only given to cassava chips that have been fried and have dried. Cooked cassava chips are put into a jar and then sprinkled with food seasoning, then the jar is closed and shaken so that the food seasoning is mixed evenly. For the packaging stage, after updating the packaging, which originally used a 2-ounce clear plastic packaging that can be purchased at local shops, now it uses a standing pouch plastic clip packaging.

## 2. Stages of Project Making

The first stage is to dissolve the flour, starch, and flavoring in a mixing bowl until well blended as shown in Figure 10. Then add the egg yolks, ground spices (garlic, coriander, kencur, hazelnut, salt), coconut milk, and water stir until it becomes a runny dough. Then add the soybeans little by little.



**Fig. 10.** Dough Mixing Process

The second stage, namely the frying stage is shown in Figure 11. First, heat clean oil in a concave-shaped pan over medium heat. Fry the peyek mixture every one spoonful of vegetables, pour it from the edge of the pan until the mixture flows down. After the pan is full, the peyek is occasionally doused with hot oil so that the peyek is released from the pan. After detaching the project back and forth so it doesn't burn. Fried peyek until brownish yellow and dry. Lift and drain.



**Fig. 11.** The Process of Frying the Peyek

The last stage is packaging as shown in Figure 12. After the project is dry, there is no oil, put the project in a plastic standing pouch and attach the brand label to the package.



**Fig. 12.** Project's New Packaging

#### **4. Conclusion**

USEP KM Cassava Chips and Peyek as an object of community service, this service activity is carried out in order to provide innovation in developing the USEP KM Cassava Chips and Peyek business in Nangsri Kidul Village. During the mentoring and productivity improvement training USEP KM Cassava Chips and Peyek went well with various activities including material training related to product packaging quality standards and updating packaging innovations and brand labels and proper packaging training, and making chips dryers so that the production technology used modern technology. USEP KM members gave a very good response and participated in all the activities held. In addition, to give appreciation to the KKN 09 GROUP for providing assistance and training to USEP KM members so that they can increase their knowledge and skills to advance their business.

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#### **Author Contribution**

The activity plan in order to implement the solutions offered that there are five series of activities, namely coordination, logo design, socialization of covid, marketing, and marketing education.

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Special thanks to the internal funder for community service from the University of Muhammadiyah Yogyakarta.

#### **Conflict of Interest**

The authors declare no conflict of interest.

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