INDONESIAN LOCAL FERMENTATION FUNCTIONAL FOOD DEVELOPMENT STRATEGY IN THE ERA OF PANDEMIC COVID 19

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Abstract: Local fermented foods in Indonesia are highly diversified. It is commercially prospective to develop into higher value added products. Indonesian traditional custom food regional-based has special characters to enter specific market segmentation, especially for local fermented food. Several processed and fermented products are tempeh, kefir, tauco, tape, nata de coco, bekasam, etc. The Covid 19 pandemic era has provided changes in market segmentation to start consuming functional foods that provide health benefits. Several bioactive components and health benefits can be found in those local fermented foods. This situation also provided a change in the online marketing system-based that beneficial for those to access and shortens the supply chain, however, constrain of fermented product is their different “best time” to consume due to biological microbe mechanism. This issue need to solve by implementing excellent strategy, a combination of fulfillment on demand side timely and excellent quality product that affect by biological microbe mechanism. The strategy in ensuring product quality by controlling a several factors during processing and distribution so that the functional local fermented food products are still fit to consume and provide health benefits. In this paper, we examine important strategies for the development of local fermented functional food in Indonesia in the Covid 19 Pandemic Era.

Keywords: Strategy, Functional Food, Local Fermentation, The Covid Pandemic 19
Introduction

Local fermented foods in Indonesia are highly diversified. It is commercially prospective to develop into higher value added products. Indonesian traditional custom food regional-based has special characters to enter specific market segmentation, especially for local fermented food.

Several processed and fermented products are *tempeh*, *kefir*, *tauco*, *tape*, nata de coco, *bakasang*, etc. The Covid 19 pandemic era has provided changes in market segmentation to start consuming functional foods that provide health benefits. Several bioactive components and health benefits can be found in those local fermented foods.

This situation also provided changes in the online marketing system-based that beneficial for those to access and shortens the supply chain, however, constrain of fermented product is their different “best time” to consume due to biological microbe mechanism. This issue need to solve by implementing excellent strategy, a combination of fulfillment on demand side timely and excellent quality product that affect by biological microbe mechanism.

The strategy in ensuring product quality during processing and distribution by controlling several factors so that the functional local fermented food products are still fit to consume and to provide health benefits. In this paper, we try to examine important strategies for the development of local fermented functional food in Indonesia in the Covid 19 Pandemic Era.

Fermentation Food

Local fermented foods in Indonesia are highly diversified. It is commercially prospective to develop into higher value added products. Indonesian traditional custom food regional-based has special characters to enter specific market segmentation, especially for local fermented food. Several processed and fermented products are *tempeh*, *kefir*, *tauco*, *tape*, nata de coco, *bekasam*, etc.

In this paper, we try to examine important strategies for the development of local fermented functional food in Indonesia in the Covid 19 Pandemic Era.

<table>
<thead>
<tr>
<th>No</th>
<th>Product</th>
<th>Main Raw Material</th>
<th>Source Region</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tempe</td>
<td>Soybean</td>
<td>Java</td>
<td>Mulyowidarso et al (1989)</td>
</tr>
<tr>
<td>2</td>
<td>Bakasang</td>
<td>Fish</td>
<td>Sumatra</td>
<td>Lawalata et al. (2011)</td>
</tr>
<tr>
<td>3</td>
<td>Tauco</td>
<td>Soybean</td>
<td>West Java</td>
<td>Winarno et al. (1983)</td>
</tr>
<tr>
<td>5</td>
<td>Tape</td>
<td>Cassava, Glutinous Rice</td>
<td>Central Java, East Java, West Java</td>
<td>Aryanta (1998) and Uchimura et al. (1998)</td>
</tr>
<tr>
<td>6</td>
<td>Kefir</td>
<td>Milk</td>
<td>Sumatra</td>
<td>Ide (2008)</td>
</tr>
</tbody>
</table>

Table 1: Fermentation Local Food from Indonesia
Local Functional Food
The Covid 19 pandemic brings changes in market segmentation to start consuming functional foods that provide health benefits. Several bioactive components and health benefits can be found in those local fermented foods. Some food products use mold as the core microbes to produce these products. However, bacteria such as BAL are often found in these fermentation products. As is the case with tempeh products which generally use mold from Rhizopus sp such as Rhizopus oligosporus, R. oryzae, and R. Arrhizus (Nout dan Kiers, 2005; Astawan et al. (2013)).

Table 2: BAL Types Exist in Fermented Product

<table>
<thead>
<tr>
<th>No</th>
<th>Product</th>
<th>Main type of microbes</th>
<th>BAL types</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tempeh</td>
<td>Rizhopus oligosporus</td>
<td>Lb. fermentum, Lb. plantarum, P. pentosaceus, W. confusa, Lb. delbrueckii ssp. delbrueckii</td>
<td>Aryanta (2000); Tou (2014)</td>
</tr>
<tr>
<td>2</td>
<td>Bekasang</td>
<td>P. acidilactici; Candida, Debaryomyces, Rhodotorula, and Torulopsis</td>
<td>P. acidilactici; Saccharomyces spp. And Acetobacter spp</td>
<td>Lawalata et al. (2011); Balia and Utama (2017)</td>
</tr>
<tr>
<td>3</td>
<td>Tauco</td>
<td>R. oligosporus , Rz. oryzae , A. oryzae , Lb. delbrueckii , Hansenula sp.</td>
<td>Lb. delbrueckii</td>
<td>Winarno et al. (1973)</td>
</tr>
<tr>
<td>No.</td>
<td>Type</td>
<td>Bacteria/Species</td>
<td>Reference</td>
<td></td>
</tr>
<tr>
<td>-----</td>
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<td></td>
</tr>
<tr>
<td>4</td>
<td>Oncom</td>
<td>N. sitophila, Rz. oligosporus, Stapilococcus hominis</td>
<td>Sastraatmadja et al. (2002), Hoo (1986), Afifah et al. (2014), Sulchan and Nur (2007), and Sumi and Yatagai (2006); Harun et al. (2018)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Tape</td>
<td>Amylomyces rouxii, Endomycopsis burtonii, Saccharomyces cerevisiae, Rhizopus sp., and Hansenula sp.</td>
<td>Suliantari and Rahayu (1990); Aryanta (2000); Sunjaya et al. (2001)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Kefir</td>
<td>Lactococcus lactis, Lactobacillus acidophilus, Lactobacillus kefir, Lactobacillus kefirgranum, Lactobacillus Lactobacillus kefiranofaciens, Lactobacillus brevis,</td>
<td>Ide (2008)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Dadih</td>
<td>Lactobacillus, Streptococcus, Lactococcus</td>
<td>Pato et al. (2005); Hasono et al. (1989); Surono and Nurani (2001)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Gatot</td>
<td>Rhizopus oligosporus, Aspergillus niger and Mucor griseocyanus</td>
<td>Budhiatti et al. (1995); Astriani et al. (2018); Rahayu et al (2011)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Mocaf</td>
<td>MOCAF Starter, Lactobacillus plantarum Saccharomyces cerevisiae, Rhizopus oryzae, L. plantarum</td>
<td>Putri et al. (2018); Kurniati et al. (2012)</td>
<td></td>
</tr>
</tbody>
</table>
The existence of BAL become source of probiotics in the fermentation products which potential for restoring the digestive tract. This pandemic era also provided a changes in the online marketing system-based that beneficial for those to access and shortens the supply chain. However, constrain of fermented product is their different “best time” to consume due to biological microbe mechanism. This issue essential to solve by implementing excellent strategy, a combination of fulfillment on demand side timely and excellent quality product that affect by biological microbe mechanism.

To guarantee physical, chemical and organoleptic quality, fermented products in over ripe conditions can be processed and made in the form of flour for further use as seasoning products. The specific odor caused by fermentation products in over-ripe conditions is essential for the peculiarity of the flavor odor. In certain phases, microbial growth inhibited by activating its performance by processing it into for example tempeh chips. Other alternatives are vacuum and pack it using aluminum foil or stored in chilled or frozen condition so that the microbes are dormant and inhibited the growth. This treatment will increase the product value added and extend the shelf life. However, it should be noted, if the fermentation product is desired to have functional properties containing BAL as a probiotic component, the presence of microbial inactivation is not fulfilled. This should be adjusted to the objectives, consumption methods and health benefits to be achieved when consuming the fermented product.

**Market Strategy In Covid 19 Era**

The strategy to ensure product quality by controlling a several factors during the processing and distribution so that the functional local fermented food products are still fit to consume and to provide health benefits. The conventional chain of fermentation product marketing system in Indonesia is as illustrated in the figure below.

![Tempe Chips Marketing Chain (Case Study West Ungaran in Semarang sub district) (Pratiwi et al. 2018) (a) and Tempe Marketing Chain Cipedes in Tasikmalaya sub district (Sundari et al. 2017)](image-url)
The era of the Covid 19 pandemic, which limits the movement of consumers, has made a shift in online-based consumption patterns. Identification of a market share based marketing system with identified opportunities using the SWOT approach and internal and external identification. Online marketing strategy mechanisms developed through webbased marketing applications or digitization. Marketing system to expand distribution reach, can be synergized with optimization to extend product shelf life.

Figure 2. Online-Based Marketing Network Mechanism for Fermented Food

The changes in the marketing pattern, convenience of the access and product presentation are important priorities concerned by the public in the Covid 19 era. Quality assurance of products fitness to consume is challenging to provide both health benefit and product quality due to extensive supply chain.

Conclusion
Indonesian traditional custom food regional-based has special characters to enter specific market segmentation, especially for local fermented food. Several processed and fermented products are tempeh, kefir, tauco, tape, nata de coco, bekasam, etc. Several bioactive components and health benefits can be found in those local fermented foods. The era of the Covid 19 pandemic, which limits the movement of consumers, has made a shift in onlinebased consumption patterns. Quality assurance of products fitness to consume is challenging to provide both health benefit and product quality due to extensive supply chain.

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