

Development of Canned Mungbean Soup or *Ginisang Munggo*

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Abstract: This study aims to develop a ready-to-eat (RTE) *ginisang munggo* packed in cans. The process involves three phases: Phase 1- Determination of the soaking time of mungbeans prior to boiling point and processing method of *ginisang munggo*. Phase 2-Determination of the processing time of canned *ginisang munggo* at 115.6°C. Phase 3-Product evaluation, consumer acceptance and product costing. Data from the results of sensory evaluation were statistically treated using Analysis of Variance.

Ginisang Munggo thermally processed using the hot packed method for 45 minutes at 115.6°C at 10 psi was acceptable. Cut-out and commercial sterility tests showed established data. Consumer acceptance test showed that *ginisang munggo* can be thermally processed with pork chicharon and smoked fish. The cost of production is relatively low.

Key Words: RTE Mungbean Soup; thermal processing; sensory evaluation; consumer acceptance; product costing

I. INTRODUCTION

Mungbeans or *munggo* are small seeds with three common types: green, red and yellow. It may be served in several ways as a main dish or as snack items in the form of *hopiang munggo* or as *ginataan*. It can also be utilized as baby food when mashed to a very soft puree. (De leon, et.al 1986) It is also used as main raw material in the processing of *sotanghon* and *togue* production.

As main dish, it is commonly known as *ginisang munggo*. It is boiled and cooked with sautéed garlic, onion, tomatoes, and seasonings complimented by smoked fish, *chicharon* or pork to add flavor. It is usually served with fried or roasted fish and meat. In some Asian countries, mungbeans are soaked in water for at least 4 hours to shorten the boiling time prior to cooking. With today's technological advances and changing lifestyle, people would look at convenience especially when it comes to food preparation. Today, some foods reach the consumers in the form of processed and packed which what we now call as ready to eat (RTE) or ready to cook (RTC). One type of dish that has the potential to be available as one is the *ginisang munggo*. In this study, the author came up with the application of high heat and hermetic sealing known as canning or thermal processing to *ginisang munggo*. The heating process sterilizes the container and its

contents sufficient enough to allow the resulting products to attain "commercial sterility". Commercial sterility of thermally processed food is the condition achieved by application of heat, alone or in combination with other appropriate treatment, sufficient to render the food free from microorganisms capable of growing in the food at ambient conditions at which the food is likely to be held during distribution and storage (Codex, 1979).

The soaking time of mungbeans in water prior to boiling, appropriate processing method, processing time, product evaluation, consumer acceptance and product costing were the focused of the study that will eventually introduce in the market a ready to eat *ginisang munggo* and at the same time a new processing method for mungbeans.

2. METHODOLOGY

A. Determination of the soaking time of mungbeans prior to boiling and processing method of *ginisang munggo*

A.1 Determination of soaking time

The mungbeans were washed then soaked in water at a ratio of 1 part mungbeans to 2 parts

water by weight. Soaking time varies at 4 hours, 6 hours, 8 hours and unsoaked as the control (R). After soaking, the mungbeans was drained and boiled in 4 cups of water for 30 minutes at 95°C. The boiled mungbeans was subjected for sensory evaluation.

A.2 Determination of processing method

For hot packed method, the boiled mungbeans is completely cooked for 20 minutes by sautéing onion, garlic, tomatoes and smoked fish in a pan. The *ginisang munggo* was filled hot in glass jars at 300 grams in weight with ½ inch headspace. After filling/packing, exhausting was followed to remove the entrapped air at 82°C then immediately sealed and processed at 10psi for 30 minutes at 115.6°C.

For cold packed method, the sterilized glass jars were filled with the boiled mungbeans and was set aside. The packing medium was prepared by sautéing the onion, garlic, tomatoes and smoked fish. The cooled packing medium was poured on the glass jars with the previously boiled and weighed mungbeans. After filling/packing, exhausting was followed to remove entrapped air at 82°C then immediately sealed and processed at 10psi for 30 minutes at 115.6°C.

B. Determination of the processing time of canned *ginisang munggo* at 115.6°C.

The procedure used in Phase 1 for the hot packed method was adopted with varying processing time: a) 30 minutes; b) 45 minutes and, c) 60 minutes. C. Product evaluation, consumer acceptance and product costing

C. Product evaluation, consumer acceptance and product costing.

For the product evaluation *ginisang munngo* in cans undergo cut-out test and commercial sterility test. For the consumers test, the acceptable *ginisang munggo* with pork *chicharon* and smoked fish were presented to the sensory panel composed of fifty students. For the Product costing, the computation of the production cost was based on pilot scale production.

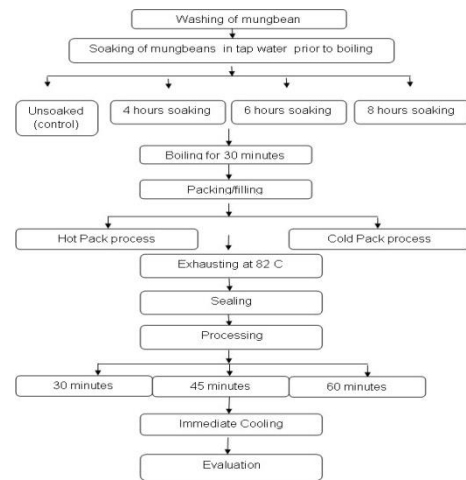


Figure 1: Flow Diagram for the development of the canned *Ginisang Munggo*

3. RESULTS AND DISCUSSION

A. Determination of the soaking time of mungbeans prior to boiling and processing method of *ginisang munggo*.

A.1 Establishment of soaking time for mungbeans



Figure 2: Graph for the mean scores for colour evaluation of mungbeans with varying soaking time

For color. For trial 1, 8 hours soaking got the highest mean of 4.67, for trial 2, 6 hours soaking got the highest mean of 5.07 and for trial 3, 6 hours soaking got the highest mean of 4.63 with all an equivalent rating of “Equal to R”. Statistically, there are no significant differences at 5% level of significance among the mungbeans soaked at varying time in terms of color. This implied that color of mungbeans is very stable and not

affected by soaking time and medium like water.



Figure 3: Graph for the mean scores for texture evaluation of mungbeans with varying soaking time

For Texture. For trial 1 and trial 3, 8 hours soaking got the highest mean of 4.00 and 3.37 consecutively with both equivalent rating of “Slightly better than R”. For trial 2, 8 hours soaking got the highest mean of 3.47 with equivalent rating of “Moderately better than R”. Statistically, there are no significant differences at 5% level of significance among the mungbeans in terms of texture. This is an indication that texture is not affected by soaking time, this is due maybe to the seed coat of mungbeans that does loosen or peeled off during soaking like other legumes. Effects may be seen upon application of heat.

A.2 Determination of the appropriate processing method

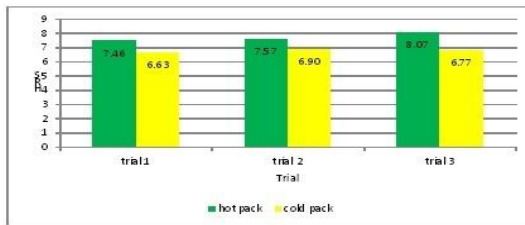


Figure 4: Graph for color of *ginisang munggo*, hot and cold packed

For Color. For trial 1,2 and 3, the hot packed method was favoured by the sensory panel. Statistically, there is a significant difference minutes. This implied that color is affected by processing time. The longer the processing time, the greater is the change in color from yellow green to light brown which is the effect of color degradation in thermally processed GM.

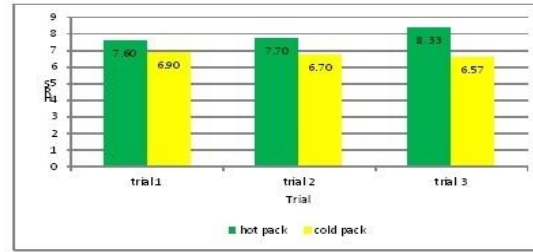


Figure 5: Graph for texture of *ginisang munggo*, hot and cold packed

For Texture. For trial 1,2 and 3, hot packed method was favoured by the sensory panel. Statistically, there is a significant difference at 5% level of significance between the hot packed and cold packed GM. This implied that texture is affected by processing method. A more mushy consistency was attained during thermal processing.

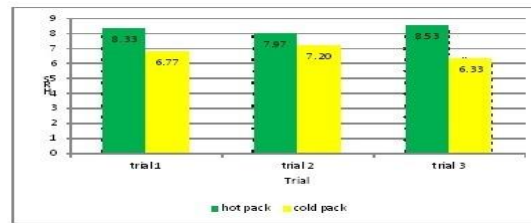


Figure 6: Graph for flavor of *ginisang munggo*, hot and cold packed

For Flavor. For trial 1,2 and 3, hot packed method was favoured by the sensory panel. Statistically, there is a significant difference at 5% level of significance between the hot and cold packed GM. This means that flavor is affected by processing method. The hot packed GM gave a more beany and smoked fish flavor that oozed on sautéing and further thermal processing while cold packed GM has a less beany, smoked fish flavour and quite bland due to the elimination of sautéing.

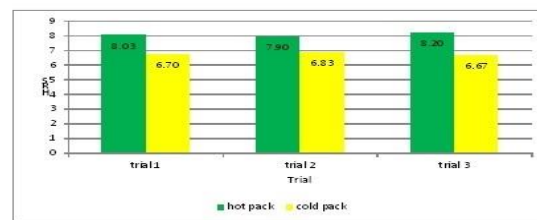


Figure 7: Graph for general acceptability of *ginisang munggo*, hot and cold packed

General acceptability. For trial 1,2 and 3, hot packed method was favoured by the sensory panel. Statistically, there is a significant difference at 5% level of significance between the hot and cold packed GM. This means that the general acceptability is affected by processing method. The sautéing and thermal processing greatly affects the color, texture, flavour and over all acceptability.

B. Determination of the appropriate processing time for *ginisang munggo*

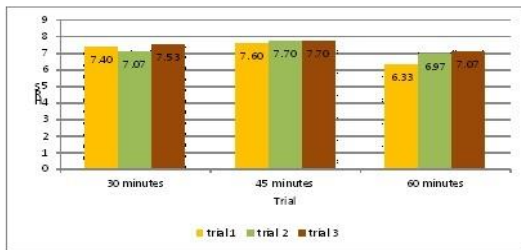


Figure 8: Graph for the mean scores of the color evaluation of *ginisang munggo* processed at varying time

For color. For trial 1,2 and 3, 45 minutes processing time was favoured by the sensory panel. Statistically, significant differences exist among the *ginisang munggo* in terms of color at 5 % level and DMRT was used to determine the significant differences and results reveal that GM processed for 45 minutes is significantly different from that processed for 60 minutes but not with 30 minutes. This implied that color is affected by processing time, the longer the processing time, the greater is the change in color from yellow green to light brown which is the effect of color degradation in thermally processed GM.

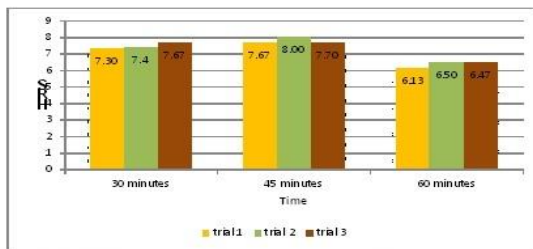


Figure 9: Graph for the mean scores of the texture evaluation of *ginisang munggo* processed at varying time

For texture. For trial 1,2 and 3, 45 minutes processing time was favoured by the sensory panel. Statistically, there are significant

differences at 5% level of significance among the *ginisang munggo* processed at varying time and DMRT was used to determine the significant differences and results show that GM processed for 45 minutes is significantly different from that processed at 60 minutes and 30 minutes; GM processed for 60 minutes is significantly different from that processed at 45 minutes and 30 minutes and GM processed for 30 minutes is significantly different from that processed at 45 minutes and 60 minutes. This indicated that texture is affected by processing time, the longer the processing time the texture becomes so soft and mushy that made GM so consistent that can be compared to baby foods.

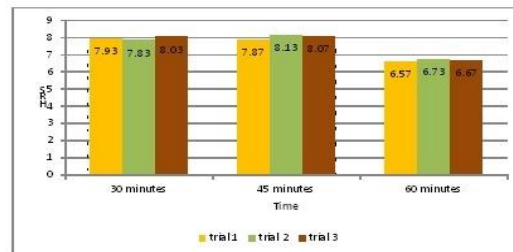


Figure 10: Graph for the mean scores of the flavor evaluation of *ginisang munggo* processed at varying time

For Flavor. For trial 1, 30 minutes processing time was favoured by the panel but for trial 2 and 3, 45 minutes processing time was favoured by the sensory panel. Statistically, there are significant differences at 5% level of significance among GM processed at varying time and DMRT was used and results revealed that GM processed at 45 minutes is significantly different from that of 60 minutes but not from that of 30 minutes. GM processed for 60 minutes is significantly different from that of 30 minutes and 45 minutes. This implied that processing time affects flavour, the longer the processing time, the more beany flavour was perceived by the sensory panel. Longer processing time made the GM so soft and mushy that eventually contributed to the beany flavour.

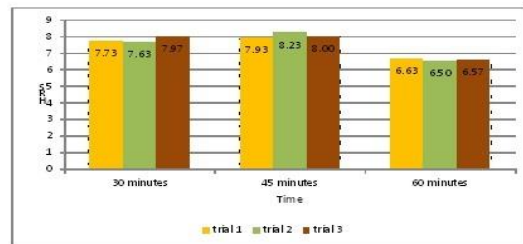


Figure 11: Graph for the mean scores of the general acceptability evaluation of *ginisang munggo* processed at varying time

For General Acceptability. For trial 1,2 and 3, 45 minutes processing time was favoured by the sensory panel. Statistically, there are significant differences at 5% level of significance among the general acceptability of GM processed at varying time. DMRT was used and results revealed that GM processed at 45 minutes is significantly different from that of 60 minutes but not with 30 minutes. GM processed at 30 is significantly different from that of 60 minutes. This implied that general acceptability is affected by processing time. The longer the processing time the overall acceptability is affected due to the effect on color, texture and flavour that has influence on the general acceptability.

C. Product evaluation, consumer acceptance and product costing

C.1 Product evaluation- Cut Out test

Table1. Result of cut-out test

Package Type	Metal Can
Dimension	211 x 300
Headspace	1/4-1/2 headspace
Net weight	220 grams
Gross weight	256 grams
Drained weight	192 grams
pH	6.0

Table 1 shows the results of the cut-out test of the *ginisang munggo*. The physical test shows that there are no abnormalities seen in the product expect for wrinkles that affect the percentage tightness due to the condition of the can sealer used. There is a slight defect but within the allowable limits.

C.2 Product evaluation- Commercial Sterility

Table2. Result of cut-out test

Sample	Cooked Meat Medium				BCP Dextrose Medium			
	35°c, 120 hours incubation		55°c, 72 hours incubation		35°c, 120 hours incubation		55°c, 72 hours incubation	
	Aerobic	Anaerobic	Aerobic	Anaerobic	Aerobic	Anaerobic	Aerobic	Anaerobic
"Ginisang Munggo"	No Growth	No Growth	No Growth	No Growth	No Growth	No Growth	No Growth	No Growth

Table 2 shows the results of the commercial sterility test of the *ginisang munggo*. The test shows that there is no growth of microorganisms on *ginisang munggo* incubated on

35°c, 120 hours and 55°c, 72 hours both aerobic and anaerobic using the Cooked Meat medium and BCP Dextrose Medium

C.3 Consumers acceptance

For consumer acceptance test, GM with pork chicharon and smoked fish were used. For GM with pork chicharon 26% like it extremely, 32% like it very much, 24% like it moderately and 16% like it slightly. For GM with smoked fish, 24% like it extremely, 36% like it very much, 24% like it moderately and 8% like it slightly. This means that thermally processed GM processed for 45 minutes with smoked fish and pork chicharon is both acceptable to the consumers.

C.4 Product Costing

The cost of production of *ginisang munggo* processed for 45 minutes in 220g can is 33.60php. The cost is quite higher than that of the non processed GM but quite affordable since this is a ready to eat dish. The computation of the production cost was based on pilot scale production

4. CONCLUSIONS

Based on the finding, the following conclusions were derived.

1. The soaking of mungbeans in water prior to boiling is not necessary for *ginisang munggo*. Soaking does not affect the color and texture of mungbeans.
2. Thermally processed *ginisang munggo* with hot packed method for 45 minutes at 115.6C at 10psi.
3. Processing method and processing time affects the sensory parameters of GM.
4. *Ginisang munggo* can be thermally processed with pork chicharon and smoked fish.
5. The GM is successfully processed or thermally processed based on the results of the product evaluation.
6. The cost of production of GM in cans is relatively low.

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