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Innovation of Tarragon Leaves, Curry Leaves and Garlic Vine into Local Herbs

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Abstract

This research focused on the innovation of Tarragon Leaves, Curry Leaves, and Garlic Vines for the purpose of utilizing some herbs that are mostly unnoticed in the Philippines but have culinary potentials. The process involved a careful selection of raw materials, drying, formulation, testing, packaging, and labeling. To come up with a fully organic and desirable flavor, formulations were tested and evaluated by 10 food experts to determine the product's general acceptability in terms of its quality attributes. Paired T-test was used for data interpretation using SPSS. The results showed that the product yields 44 calories per 9 grams of serving with a very low moisture content of 6.24%, therefore proving that it is safe and not susceptible to microbial growth. The product can also last for a month at room temperature or longer under proper storage conditions. Sensory evaluation results revealed that based on general acceptability, TCG local herbs highly complements grilled chicken, beef, pork, and fish respectively with a mean rating of 8.0, 7.3, 7.2, and 6.2 wherein seasoned chicken was perceived as "like very much" and seasoned fish with "like slightly". As careful steps were completed, this research made the innovation of organic and underutilized herbs possible.

Keywords: *innovation of tarragon leaves, curry leaves, garlic vines, local herbs*

1. INTRODUCTION

Food has always been an integral part of any culture and Filipinos, in particular are not an exemption since Filipino people love to eat (Hammer, 2018). In fact, in today's generation, Filipinos use food flavors, and food preservatives for daily food preparation to match different food flavors brought by other nations (Fernandez, 2012). The acceptability of different varieties of food additives or food seasonings is one of the most developed goals in the food market as food industry begins to adapt more convenient and efficient products for the consumers as commercial mixtures of food additives are also made. These seasonings include substances such as spice, pepper, salt, or an herb that are used to enhance palatability of food.

Being one of the most intricate aspects of cooking, seasoning is very common for peoples' daily lives as it helps to improve the taste of the food. It allows a mix and match of

food flavors depending on the desired taste of the food consumers. Different food manufacturers bring bold flavors in a variety of applications on all types of snack foods that can lend a distinct flavor to food and beverages.

Exploring a variety of tastes using food additives and herbs has been a style but the nutritional effects are sometimes being set aside and only those that are familiar to the mass were being used and utilized at some extent. Furthermore, consumers benefit from organic foods due to its limited exposure to potentially harmful substances as several studies also show that organic foods contain more nutrients than nonorganic ones (Ishiwata, 2000).

Just as technology and society are changing, same goes for food industry. Continuous development has been evident ranging from agriculture improvement, to the creation of advanced equipment, and to the emerging of food engineering, and automation in the food industry is observed. With these efforts to solve challenges through practical manner, the food has become quite unsafe due to substances that are damaging to health which can possibly result to various diseases (Little, 2016).

With this situation, the researchers developed a mixed herbs composed of Tarragon, Curry Leaves and Garlic Vines that could be healthier alternatives for ready mix seasonings. Advantages of this study include the use of unutilized mixed herbs such as Garlic Vines and Curry Leaves that contain no preservative that can harm to human body. The mixture is made of all natural/organic ingredients and does not contain any artificial substances or chemical solutions.

2. RESULT AND DISCUSSION

The herbal seasonings was innovated because there are lots of unfamiliar leaves that are not noticed by the public, hence, provides certain aroma and taste that can be used in food. Tarragon, Curry Leaves, and Garlic Vines are gathered from University of the Philippines - Los Baños (UPLB), Bureau of Plant and Industry - Los Baños, Laguna. The researchers only considered mature leaves that are freshly picked on the site before 10 am to ensure good quality of the herbs. The product was done in the Technological University of the Philippines Manila.

Sensory evaluation was conducted in school, restaurants, and hotels where the ten food expert evaluators are working. The sensory evaluation instrument used 9-point Hedonic rating scale to assess the product's quality attributes in terms of appearance, aroma, taste, texture and general acceptability manage to ascertain the acceptance which could predict the product potentials as seasoned to grilled meats comprised of chicken, pork, fish and beef. The study was conducted at Technological University of the Philippines-Manila throughout the S.Y. 2017-2018.

Based on the test and evaluation conducted on the effectiveness of the product, the following are the findings of the study:

The dehydrated and flaked herbs namely: tarragon, curry leaves and garlic vines were successfully utilized and applied seasoning to chicken, pork, fish and beef. TCG local herbs renders a combinations of nutty and minty flavor with strong aroma, therefore, served as a new variety of food flavoring that is not yet locally available in the market. It is organic and has the ability to enhance grilled meat dishes without using salt and pepper.

The mixed herbs had undergone several tests to identify the different proximate composition, microbial analysis, nutrition facts and shelf-life. The result showed that the mixed herbs contain moisture yet remains to be acceptable. The mixed herbs' proximate and nutritional analyses implied that the product has a very little nutritional value since culinary herbs are being used in small amounts and its nutrients can still be reduced during the cooking process like grilling. The microbial analysis demonstrated that in terms of molds and yeast, both shows that there are no detrimental microorganisms existing in the blended herbs. The Nutrition Facts composed of 44 calories which has total protein comprises of 8 calories and total carbohydrates comprises of 36 calories per 9 grams of

serving. The life span of usability of the TCG local herbs is safe to consume for a month and be kept longer if stored properly.

The evaluation results revealed that product attributes in terms of appearance, aroma, texture, taste and general acceptability, grilled chicken got the highest mean rating in all aspect, followed by grilled beef, pork and fish respectively. TCG local herbs complements poultry meat.

2.1 Product Description

The Tarragon, Curry Leaves, and Garlic Vines (TCG) local herbs, is planned to recover the utilization of herbs in culinary rather than using the typical flavorings or seasonings that are available in the market which contain MSG that can influence the well-being of the customers. The product innovation utilized only organic herbs which were fully dried to prevent growth of spoilage microorganisms. It renders strong aroma with combination of nutty and minty flavors suitable for grilled meats. This blended herbs are used without trading off the nourishing actualities of the seasoning, thus, served as another assortment of food flavoring that are locally accessible in the country.

2.2 Product Test Results

This section consists of the results of the analyses conducted on the innovated TCG local herbs, obtained from the Adamson University Technology Research and Development Center (AUTRDC). Through this, future researchers can use the data for further studies and product development.

Table 1: Proximate Analysis of Tarragon, Curry Leaves and Garlic Vines (Approx. 9 grams)
[Source: Adamson University Technology Research and Development Center (AUTRDC)]

Analytes	Results	Methods
Ash	10.42 %	Gravimetric
Moisture	6.24 %	Air-oven
Crude Fiber	2.81%	Wendee
Crude Fat	Not detected	Soxhlet
Protein	16.01%	Kjeldahl

Table 1 shows the proximate analysis result of Tarragon, Cury Leaves andGarlic Vines from different parameters with specified testing methods. The following are the results: Ash with 10.42 percent through Gravimetric method: Moisture with 6.24 percent through Air-oven method: Crude fiber with 2.81 percent through Wendee method: Crude protein with 16.01 percent through Kjekdahl method: and 0 percent for the Crude Fat through Soxhlet method. Through this test, shelf-life was also determined indicating that TCG local herb has low moisture content, therefore not susceptible microbial growth. The product can last for a month of storage at room temperature and can be prolonged under proper storage conditions.

Table 2: Nutritional Analysis of Tarragon, Curry Leaves and Garlic Vines (Approx. 9 grams)
[Source: Adamson University Technology Research and Development Center (AUTRDC)]

Amounts per serving	Grams	%Daily values	Calories
Total Fat	0	0	0
Toatal Protein	2	3	8
Total Carbohydrates	9	3	36

The Table 2 shows that there is a total of 44 calories per bottle, consisting nine (9) grams of TCG local herbs. Total carbohydrates yield 36 calories, and total protein yields 8

calories. Therefore, TCG local herbs can only provide very little amount of nutrients especially if applied as seasoning.

In reference to the actual usage of the researchers, about 2.25 grams of TCG local herbs was seasoned to 200 grams of meat, which only yield 11 calories, however, these nutrients were still reduced during the grilling process since direct heat was applied.

Table 3: *Microbial Testing of Tarragon, Curry Leaves and Garlic Vines*
[Source: Adamson University Technology Research and Development Center (AUTRDC)]

Analyte	Result	Unit	Methods
Yeast and Molds	5x10	CFU/g	BAM Chapter 18

Table 3 shows the microbial testing results on yeast and molds which has 5x10 CFU/g. Based on the FDA Circular No. 2013-010, Revised Guidelines for the Assessment of Microbiological Quality of Processed Foods, specifically determines the safe levels that are achievable under Good Manufacturing Practices (GMP) for processed spices, dried mixes, fruits, vegetables, nuts, and seeds states that the acceptable level of microorganisms as determined by the specified method is 5 x 102. Therefore, TCG local herbs was safe to consume.

2.3 Product Evaluation Result

The evaluation process was conducted using a 9 point hedonic scaling for ten (10) food experts in order. In order to identify the characteristics of Tarragon, Curry leaf and Garlic Vine local herbs, the following process quality attributes such as appearance, aroma, taste, texture and general acceptability were highly considered. In addition, results were analyzed and computed using Paired T-test with the aid of Statistical Package for Social Sciences (SPSS) to determine on which type of meat does the product complement.

Table 4: *Appearance*

Sample of meat	Mean	Standard Deviation	Standard Error
Sample A- Chicken	8.200	1.0328	.3266
Sample B- Pork	7.100	.7379	.2333
Sample C- Fish	6.800	.9189	.2906
Sample D- Beef	6.800	.9189	.2906

Table 4 shows that the mean, standard deviation and standard error of the 10 respondents in the four dishes. Chicken has a mean of 8.200 with standard deviation of 1.0328, while pork has a mean rating of 7.100 with standard deviation of 0.7379, and fish and beef with the same mean rating of 6.800 with also the same standard deviation of 0.9189. Therefore, chicken has the highest mean among the three dishes.

Table 5: *Paired Samples Test*

	Mean difference	t-value	df	P-value
Pair 1 Chicken- Pork	1.1000	3.161	9	.012
Pair 2 Chicken- Fish	1.4000	2.806	9	.021
Pair 3 Chicken- Beef	1.4000	6.332	9	.000
Pair 4 Pork- Fish	.3000	.758	9	.468
Pair 5 Pork- Beef	.3000	1.406	9	.193
Pair 6 Fish- Beef	.0000	.000	9	1.000

Table 5 shows the result of the paired sample t-test for appearance. Chicken and pork has a mean of 1.1000, with a t- value, and p-value of 3.161 and .012 respectively. Since p-value is < 0.05 it means that there is a significant difference between chicken and pork. Therefore, chicken is preferable than pork in terms of appearance. Chicken and fish has a mean of 1.4000, with a t- value and p-value of 2.806 and .021 respectively. Since p- value is < 0.05 it means that there is a significant difference between chicken and fish. Therefore, chicken is preferable than fish in terms of appearance. Chicken and beef has a mean of 1.1000, with a t- value and p-value of 6.332 and .0000 respectively. Since p- value is < 0.05 it means that there is a significant difference between chicken and beef. Therefore, chicken is preferable than beef in terms of appearance. Pork and fish has a mean of .3000, with a t-value and p-value of .758 and .468 respectively. Since p- value is < 0.05 it means that there is a significant difference between pork and fish. Therefore, pork is preferable than fish in terms of appearance. Pork and beef has a mean of .3000, with a t- value and p-value of 1.406 and .193 respectively. Since p- value is <

0.05 it means that there is a significant difference between pork and beef. Therefore, pork is preferable than beef in terms of appearance. Fish and beef has a mean of .0000, with a t- value and p-value of .000 and 1.000 respectively. Since p- value is < 0.05 it means that there is no significant difference between fish and beef.

Only the pair chicken-pork, chicken-fish and chicken-beef has a p-value less than alpha .05, meaning they are the only pairs that is significantly difference from one another. This implies that the 10 respondents preferred chicken than the others dishes in terms of appearance.

Table 6: Aroma

Sample of meat	mean	Standard Deviation	Standard Error
Sample A- Chicken	7.300	1.0593	.3350
Sample B- Pork	6.700	1.4944	.4726
Sample C- Fish	6.500	1.7795	.5627
Sample D- Beef	7.200	1.1353	.3590

Table 6 shows that the rating of the 10 respondent in chicken has a mean of 7.300 with standard deviation of 1.0593, while pork has a mean rating of 6.700 with standard deviation of 1.4944, fish has a men rating of 6.500 with standard deviation of 1.7795 and beef with mean rating of 7.200 and standard deviation of 1.1353. Therefore, chicken has the highest mean among the three dishes.

Table 7: Paired Samples Test

	Mean Difference	t	df	P-value
Pair 1 Chicken- Pork	.6000	1.964	9	.081
Pair 2 Chicken- Fish	.8000	1.149	9	.280
Pair 3 Chicken- Beef	.1000	.287	9	.780
Pair 4 Pork- Fish	.2000	.309	9	.764
Pair 5 Pork- Beef	-.5000	-1.103	9	.299
Pair 6 Fish- Beef	-.7000	-.871	9	.406

Table 7 shows the result of the paired sample test for aroma. Chicken and pork has a mean of .6000, with a t- value, and p-value of 1.964 and .081 respectively. Since p- value is < 0.05 it means that there is a significant difference between chicken and pork. Therefore, chicken is preferable than pork in terms of aroma. Chicken and fish has a mean of .8000, with a t- value and p-value of 1.149 and .280 respectively. Since p- value is < 0.05 it means

that there is no significant difference between chicken and fish. Chicken and beef has a mean of .1000, with a t- value and p-value of .287 and .780 respectively. Since p- value is < 0.05 it means that there is no significant difference between chicken and beef. Pork and fish has a mean of .2000, with a t- value and p-value of .309 and .764 respectively. Since p- value is < 0.05 it means that there is no significant difference between pork and fish. Pork and beef has a mean of -.5000, with a t- value and p-value of -1.103 and .299 respectively. Since p-value is < 0.05 it means that there is no significant difference between pork and beef. Fish and beef has a mean of -.7000, with a t- value and p-value of -.871 and .406 respectively. Since p- value is < 0.05 it means that there is no significant difference between fish and beef. Only the pair chicken-pork has a p-value less than alpha .05, meaning they are the only pairs that is significantly difference from one another. This implies that the 10 respondents preferred chicken than the others dishes in terms of aroma.

Table 8: *Taste*

Sample of meat	mean	Standard Deviation	Standard Error
Sample A- Chicken	8.100	.9944	.3145
Sample B- Pork	7.000	1.1547	.3651
Sample C- Fish	6.300	2.7909	.8825
Sample D- Beef	7.400	1.1738	.3712

Table 8 shows that the rating of the 10 respondent in Chicken has a mean of 8.100 with standard deviation of .9944, while pork has a mean rating of 7.000 with standard deviation of 1.1547, fish has a men rating of 6.300 with standard deviation of 2.7909, and beef with mean rating of 7.400 and standard deviation of 1.1738. Therefore chicken has the highest mean among the three dishes.

Table 9: Paired Samples Test

	Mean Difference	t	Df	P-value
Pair 1 Chicken- Pork	1.1000	3.161	9	.012
Pair 2 Chicken- Fish	1.8000	2.586	9	.029
Pair 3 Chicken- Beef	.7000	1.413	9	.191
Pair 4 Pork- Fish	.7000	.857	9	.414
Pair 5 Pork- Beef	.4000	-.885	9	.399
Pair 6 Fish- Beef	1.1000	1.049	9	.321

Table 9 shows the result of the paired sample test for taste. Chicken and pork has a mean of 1.1000, with a t- value, and p-value of 3.161 and .012 respectively. Since p- value is < 0.05 it means that there is a significant difference between chicken and pork. Therefore, chicken is preferable than pork in terms of taste. Chicken and fish has a mean of 1.8000, with a t- value and p-value of 2.586 and .029 respectively. Since p- value is <

0.05 it means that there is a significant difference between chicken and fish. Therefore, chicken is preferable than fish in terms of taste. Chicken and beef has a mean of .7000, with a t-value and p-value of 1.413 and .191 respectively. Since p- value is < 0.05 it means that there is no significant difference between chicken and beef. Pork and fish has a mean of .7000, with a t- value and p-value of .857 and .414 respectively. Since p- value is < 0.05 it means that there is no significant difference between pork and fish. Pork and beef has a mean of .4000, with a t- value and p-value of -.885 and .399 respectively. Since p- value is < 0.05 it means that there is no significant difference between pork and beef. Fish and beef has a mean of 1.1000, with a t- value and p-value of 1.049 and .321 respectively. Since p- value is < 0.05 it means that there is no significant difference between fish and beef.

Only the pair chicken-pork and chicken-fish has a p-value less than alpha .05, meaning they are the only pairs that is significantly difference from one another. This implies that the 10 respondents preferred chicken than the others dishes in terms of taste.

Table 10: Texture

Sample of meat	mean	Standard Deviation	Standard Error
Sample A- Chicken	7.900	.9944	.3145
Sample B- Pork	7.100	1.2867	.4069
Sample C- Fish	7.300	2.3118	.7311
Sample D- Beef	7.000	1.3333	.4216

Table 10 shows that the rating of the 10 respondents in Chicken has a mean of 7.900 with standard deviation of .9944, while pork has a mean rating of 7.100 with standard deviation of 1.2867, fish has a men rating of 7.300 with standard deviation of 2.3118 and beef with mean rating of 7.000 and standard deviation of 1.1333. Therefore, Chicken has the highest mean among the three dishes.

Table 11: Paired Samples Test

	Mean	t	df	P-value
Pair 1 Chicken- Pork	.8000	1.922	9	.087
Pair 2 Chicken- Fish	.6000	.758	9	.468
Pair 3 Chicken- Beef	.9000	2.586	9	.029
Pair 4 Pork- Fish	-.2000	-.391	9	.705
Pair 5 Pork- Beef	.1000	.198	9	.847
Pair 6 Fish- Beef	.3000	.326	9	.752

Table 11 shows the result of the paired sample test for texture. Chicken and pork has a mean of .8000, with a t- value, and p-value of 1.922 and .087 respectively. Since p- value is < 0.05 it means that there is a significant difference between chicken and pork. Therefore, chicken is preferable than pork in terms of texture. Chicken and fish has a mean of .6000, with a t- value and p-value of .758 and .468 respectively. Since p- value is

< 0.05 it means that there is no significant difference between chicken and fish. Chicken and beef has a mean of .9000, with a t- value and p-value of 2.586 and .029 respectively. Since p- value is < 0.05 it means that there is a significant difference between chicken and beef. Therefore, chicken is preferable than beef in terms of texture. Pork and fish has a mean of -.2000, with a t- value and p-value of -.391 and .705 respectively. Since p-value is < 0.05 it means that there is no significant difference between pork and fish. Pork and beef has a mean of .1000, with a t- value and p-value of .198 and .847 respectively. Since p- value is < 0.05 it means that there is no significant difference between pork and beef. Fish and beef has a mean of .3000, with a t- value and p-value of .326 and .752 respectively. Since p- value is < 0.05 it means that there is no significant difference between fish and beef.

Only the pair chicken-pork and chicken-beef has a p-value less than alpha .05, meaning they are the only pairs that is significantly difference from one another. This implies that the 10 respondents preferred chicken than the others dishes in terms of texture.

Table 12: General acceptability

Sample of meat	Mean	Standard Deviation	Standard Error
Sample A- Chicken	8.000	.9428	.2981
Sample B- Pork	7.200	.9189	.2906

Sample C- Fish	6.200	2.6162	.8273
Sample D- Beef	7.300	1.1595	.3667

Table 12 shows that the rating of the 10 respondent in Chicken has a mean of 8.000 with standard deviation of .9428, while pork has a mean rating of 7.200 with standard deviation of .9189, fish has a men rating of 6.200 with standard deviation of 2.6162 and beef with mean rating of 7.300 and standard deviation of 1.1595. Therefore, chicken has the highest mean among the three dishes.

Table 13: Paired Samples Test

	Mean Difference	t	df	P-value
Pair 1 Chicken- Pork	.8000	2.449	9	.037
Pair 2 Chicken- Fish	1.8000	2.176	9	.058
Pair 3 Chicken- Beef	.7000	1.413	9	.191
Pair 4 Pork- Fish	1.0000	1.500	9	.168
Pair 5 Pork- Beef	-.1000	-.218	9	.832
Pair 6 Fish- Beef	-1.1000	-1.160	9	.276

Table 13 shows the result of the paired sample test for general acceptability. Chicken and pork has a mean of .8000, with a t- value, and p-value of 2.449 and .037 respectively. Since p- value is < 0.05 it means that there is a significant difference between chicken and pork. Therefore, chicken is preferable than pork in terms of general acceptability. Chicken and fish has a mean of 1.8000, with a t- value and p-value of 2.176 and .058 respectively. Since p- value is < 0.05 it means that there is a significant difference between chicken and fish. Therefore, chicken is preferable than fish in terms of taste. Chicken and beef has a mean of .7000, with a t- value and p-value of 1.413 and .191 respectively. Since p- value is < 0.05 it means that there is no significant difference between chicken and beef. Pork and fish has a mean of 1.0000, with a t- value and p- value of 1.500 and .168 respectively. Since p- value is < 0.05 it means that there is no significant difference between pork and fish. Pork and beef has a mean of -1.1000, with a t- value and p-value of -.218 and .832 respectively. Since p- value is < 0.05 it means that there is no significant difference between pork and beef. Fish and beef has a mean of - 1.1000, with a t- value and p-value of -1.160 and .276 respectively. Since p- value is < 0.05 it means that there is no significant difference between fish and beef.

Only the pair chicken-pork and chicken-fish has a p-value less than alpha .05, meaning they are the only pairs that is significantly difference from one another. This implies that the 10 respondents preferred chicken than the others dishes in terms of general acceptability.

According to various write ups read by the researchers, chicken complements with several herbs and spices, and that includes tarragon, garlic, and curry. (Herb Guide, Food & the Fabulous, n.d.) Consequently, TCG local herbs blends well with poultry. Secondly, conferring to Hyde as cited by Monica (2011), pork is enhanced when seasoned with garlic and curry. Lastly, fish goes well with tarragon and beef matches with garlic (Herb Guide, n.d.).

3. CONCLUSION

The following conclusions were derived based on the concerns stated in the objectives of the study and the summary of findings. (1) the researchers processed the TCG Herbs by oven drying. (2) A new variety of mixed herbs was innovated made from the leaves of tarragon, curry and garlic vines as ingredients. (3) Glass container was the appropriate

packaging for herbs and labelled properly based from FDA standards. (4) The product passed the microbial analysis and shelf-life test. TCG local herbs contain carbohydrates, protein, and fiber that yield 44 calories per 9 grams of serving. (5) The product is proven to be accepted by the food experts and evaluation showed that seasoned chicken was most favoured by the panelists.

Based on the findings and conclusions, the following are the recommendations for further improvement of the Mixed Herbs. (1) Use an alternative method of drying herbs. (2) Develop creative recipes to introduce product marketability. (3) Product commercialization is advised.

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