

# THE INFLUENCING FACTORS ON CONSUMERS' PURCHASE INTENTIONS FOR GREY OYSTER MUSHROOM POWDER AS A FOOD SUPPLEMENT

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**Abstract-** This research aims to examine the influencing factors that contribute to consumers' purchase intentions for grey oyster mushroom in powder (GOMP) form as a food supplement in combination with different foods. The theory of planned behaviour (TPB) is used to explain consumers' purchase intentions by considering the variables of attitudes, subjective norms, perceived behavioural control, packaging, health concern, and health consciousness. Packaging and its influence on the variables of health concern and health consciousness were found to be important in affecting purchase intentions towards GOMP as a food supplement. However, packaging played only a limited role in reducing the difficulty of making the purchase of GOMP across most food combinations. This study contributes to elucidating the factors that could be useful for marketing GOMP.

**Index Terms-** grey oyster mushroom, mushroom powder, health concern, packaging, purchase intention, theory of planned behaviour

## I. INTRODUCTION

Nowadays, consumers are knowledgeable regarding the health benefits of using mushrooms as part of their cooking ingredients or consuming mushrooms as a food supplement. Mushrooms can mitigate health conditions by, for instance, lowering the blood pressure, boosting the immune system, and decreasing weight. According to Ganesan and Xu (2018), frequent mushroom consumption is helpful in the treatment of metabolic syndrome, which includes being overweight or obese. Furthermore, polysaccharides containing  $\beta$ -glucan, an enzyme that affects many cellular functions, including cellular glucose intake, which promotes the degradation of fats, are found in mushrooms (Jantaramanant, Sermwittayawong, Noipha, Hutadilok-Towatana, & Wititsuwannakul, 2014). Dubey, Chaturvedi, Mishra, Bajpeyee, Tiwari, and Singh (2019) also claim that mushrooms such as the grey oyster mushroom (GOM) could be used to treat diabetes and obesity because of the presence of dietary fibre and anti-diabetic compounds in mushrooms.

Mushrooms generally have an earthy scent, and they usually taste musky or nutty. However, with a mixture of certain spices and cooking methods, mushrooms can taste similar to meat. This umami or glutamate taste acts as a functional component in meat replacement products that are popular among vegetarians (Das, Nanda, Dandapat, Bandyopadhyay, Gullón, Sivaraman, McClements, Gullón & Lorenzo, 2021). Due to this characteristic, scholars have suggested that mushrooms could be produced in powder form as a functional food product and also as a carrier ingredient, to bring extra flavor or health benefits, in combination with other food products (Bahri & Rosli, 2017; Nordiana, Wan Rosli, & Wan Amir Nizam, 2019). Furthermore, product development and innovation together with good packaging will help the powdered mushroom business to grow. Indeed, Lefebvre, Cook, & Griffiths, (2019) found that there was a significant relationship between packaging and attitudes, which led to purchase intentions. Overall, there is an opportunity to conduct a research study on GOM powder as a food supplement. Due to the importance of mushrooms and the potential for packaging to support their consumption, there is an opportunity to conduct a research study on GOM powder as a food supplement to determine the effect of mushroom's benefits with packaging.

In general, the grey oyster mushroom (GOM) (*Pleurotus sajor-caju*) is high in protein, minerals, vitamins, and antioxidants. GOM is the most popular mushroom consumed in Malaysia (Ibrahim, Yasin, Mat Arshad & Sayed Hasan 2015). According to the Department of Agriculture, the local demand for mushrooms is projected to grow (NST Business, 12 July 2021). Similarly, other species of mushrooms each have their own unique health benefits (Mulcahy, 11 Jan. 2022). The GOM is claimed to be rich in fibre, low in fat, and to have high antioxidant activity, meaning that the GOM can be considered a functional food for health benefits (Rashidi & Yang, 2016). Due to these health benefits, mushrooms should become a part of a healthy diet for people who wish to follow a healthy lifestyle (Osonoi, et al., 2016).

From a local perspective, in 2008, Malaysian individuals only consumed mushrooms at a rate of 1.0 kg/person, and the rate of consumption gradually increased to 2.4 kg/person in 2020 (Rosmiza, Davies, Rosniza Aznie, and Mazdi, 2016). However, the consumption is still considered low, despite the fact that

mushrooms, such as *Agaricus*, *Auricularia*, *Polyporus*, and *Ganoderma*, grow well locally. Moreover, the study of mushroom consumption is critical in the Malaysian context because according to the World Health Organization (2019), Malaysia has the highest rate of overweight individuals and obesity among the Asian countries. Furthermore, for Malaysians, eating mushrooms is considered highly preferable, which is a concern as adolescents continue to face high perceived barriers to eating healthy foods. Indeed, according to Sharif Ishak, Chin, Mohd Taib, and Mohd Shariff (2020), there are many barriers to healthy eating. For example, there are often more unhealthy food options available at home, school, or even outside. Furthermore, there is also a lack of awareness regarding healthy eating and a lack of knowledge about the benefits of eating healthy food.

This research identifies the influencing factors (such as health variables and GOM packaging) on consumers' purchase intentions for GOM as a food supplement in combination with different foods. This study contributes to the literature by developing an understanding of how to increase the demand for mushrooms in powder form. Mushrooms are a type of fungus that easily spoils, meaning they have a short shelf life (Tao, Chen, & Jia, 2020). Considering this characteristic, preserving and extending the shelf life of GOM, such as by turning GOM into a powder form, has become a solution (Hyde, Xu, & Stadler, 2019). Current businesses foresee the potential of the mushroom industry in Malaysia; specifically, instead of selling raw mushrooms on the shelves, the mushrooms can be commercialised into a powder form and sold as a food supplement that is available at all times. Previous studies have focused on oyster mushroom powders for biscuits or desserts (Rosli, Nurhanan & Aishah, 2012; Gadallah, & Ashoush, 2016; Das, Sarker, Lata, Islam, Al Faik, & Sarkar, 2020), snacks and meatballs (Ho, Zulkifli, & Tan, 2020), seasoning (Bahri & Rosli, 2017), pasta (Nordiana, Wan Rosli, & Wan Amir Nizam, 2019), soup (Muyanja, Kyambadde & Namugumya, 2014; Srivastava, Attri & Verma 2019), rice-based products such as porridge (Aishah & Wan Rosli, 2013; Zaenal, Syahrial & Masyhar, 2022), and pizza toppings (Magnaghi, 2022). Problematically, consuming mushrooms in a powder form is not popular in Malaysian culture, as mushrooms are easily grown and can be eaten fresh. Remanufacturing raw foods such as mushrooms into a powder form (Keong, Kumar, & Abbasi, 2020) may have potential in the local market and is a necessity for commercialization. Therefore, this research aims to understand the factors influencing purchase intentions for GOM powder as a food supplement among consumers, particularly in terms of the role of health concern, health consciousness, and packaging.

## II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The research study used Ajzen's (1991) theory of planned behaviour (TPB) as the foundation. The TPB extends from the theory of reasoned action, which was introduced by Fishbein and Ajzen in 1975. The TPB serves as a helpful conceptual framework for addressing the intricacies of human social behaviour (Ajzen,

1991). Specifically, this theory suggests that behavioural intentions can be predicted based on the relationships between attitudes toward the behaviour, subjective norms, which refer to individual or group beliefs that support a particular behaviour, and perceived control over the behaviour. As this research focuses on the introduction of GOM powder as a food supplement to consumers, it is suitable to adopt this theory for this study.

Past studies have used the TPB to explain consumers' food choices and eating behaviour. For example, Jun & Arendt (2016) applied the TPB to explain consumers' selection of healthy menu items at dining restaurants. Furthermore, Jung, Shin, & Dougherty (2020) employed the TPB to examine college students' perceptions of local food. This framework was again used to measure the behavioural, normative, and control beliefs among low-income older adults regarding fruit and vegetable intake. Scalco, Noventa, Sartori, and Ceschi (2017) designed a meta-analysis to collate studies using TPB in relation to organic food purchases. The results showed that attitude plays a major role in individual purchase intentions, followed by subjective norms and perceived behavioural control. However, these studies only explained the consumers' behaviour in terms of the selection and purchase of healthy food products rather than examining behaviour in relation to a specific product. In this research, subjective norms refer to the perceived expectations of an individual or group in terms of purchasing GOMP as a food supplement. A study by Nyugen, Phan, Nguyen, Dang, and Nguyen (2019) reported that subjective norms had significant effects on attitudes toward functional foods and vitamin supplements. Therefore, subjective norms subjective norms may influence attitudes in relation to purchasing GOMP.

Previous research suggests that attitudes influence purchase intentions for synthetic functional foods (Rezai, Kit Teng, Mohamed, & Shamsudin, 2014), functional foods (Mohd Noor, Salleh, Mohd Nafi, & Muhammad, 2014), supplement products made of edible bird nests (Sharifuddin, Ramalingam, Mohamed, & Rezai, 2014), food combinations of carriers and functional ingredients (Krutulyte, Grunert, Scholderer, Lahteenmaki, Hagemann, Elgaard, Nielsen, & Graverholt, 2011), and soy-based dietary supplements in Chinese consumers (Chung & Stoel, 2012). The relationship between subjective norms (i.e., the expectations of people who are influential to the individual) and purchase intentions has also been acknowledged by several researchers in food product behaviour. For example, studies have reported this relationship in terms of Malaysian consumers' purchase intentions for supplement products and consumers' purchase of state-branded food products (Shin, Jung, Im and Severt, 2020),

Various studies also support the relationship between perceived behavioural control and purchase intentions for food products (Shin, et. al., 2020), supplement products made of edible bird nests (Sharifuddin, et. al., 2014), synthetic functional foods (Rezai, et. al., 2014), functional foods (Lu, 2014), and food combinations of carriers and functional ingredients (Krutulyte, et. al., 2011). Therefore, the following hypotheses are proposed in relation to foods with GOMP as a food supplement:

H1: Attitude towards GOMP has a positive and significant effect on purchase intentions for food with GOMP as a food supplement.

H2: Subjective norms towards GOMP have a positive and significant effect on purchase intentions for food with GOMP as a food supplement.

H3: Perceived behavioural control has a positive and significant effect on purchase intentions for food with GOMP as a food supplement.

This research study extends the TPB framework by adopting Krutulyte et al.'s (2011) research design for examining the relationship between health concern and carrier-ingredient food. The aspect of health concern is added into the framework as consumer health concern may affect purchase intentions toward GOMP. Krutulyte et al. (2011) also redefined perceived behavioural control as the perceived fit of the carrier-ingredient combination. Based on their study, the perceived fit of the carrier-ingredient combination was a strong predictor of purchase intention.

Various studies focusing on the benefits of healthy eating have included the aspects of health concern and health consciousness. In terms of health concern, many researchers have found that health concern has a relationship with purchase intentions, such as toward organic food in Vietnamese consumers (Nguyen, 2021, Truong, 2012), organic coconut cosmetics products (Photcharoen, Chung, & Sann, 2020), functional foods (Temesi, Bacsó, Grunert, & Lakner, 2019), and food combinations of carriers and functional ingredients (Krutulyte, et. Al., 2011).

Furthermore, this study also extends the TPB framework by adopting the aspect of health consciousness, which was used by Shin et al. (2020) to determine the effect of consumers' health concern on purchase intentions toward GOMP. Health consciousness has been revealed to be a significant predictor of individuals' food-related intentions by previous studies. For example, studies have found a relationship between health consciousness and purchase intentions in relation to organic food in India (Nagaraj, 2021, Yadav, & Pathak, 2016), gym supplements (Nagar, 2020), food product behaviour (Shin, et. Al., 2020), sugar-free chewing gum (Jung, et. Al., 2020), green products for consumption (Alhosseini Almodarresi, Tabataba'i-Nasab, Bagheri Garabollagh, & Mohammadi Almodarresi, 2019), genetically modified foods (Singhal, 2018), organic foods in Chinese consumers (Chu, 2018), and organic food (Michaelidou, & Hassan, 2008). Therefore, this additional antecedent is included in this study to highlight its importance for understanding consumer purchase behaviour, which is key when examining the introduction of a new local product such as GOMP into a new market and trying to compete with the market competitors. Therefore, the following hypotheses are proposed in relation to food with GOMP as a food supplement:

H4: Consumers' health concern has a positive and significant effect on purchase intentions for food with GOMP as a food supplement.

H5: Consumers' health consciousness has a positive and significant effect on purchase intentions for food with GOMP as a food supplement.

This research study also encompasses packaging, which is an important variable for purchase intentions, especially in new product development and innovation. As indicated by the Four Ps of marketing mix proposed by Kotler and Armstrong (2020), packaging is part of product decisions (besides design, features, brand name, and quality). Furthermore, according to Pandey and Firoz (2018), product packaging plays a vital role in the consumers' consumption experiences and impacts consumers' purchase intentions or decisions. The relationship between packaging and purchase intentions has also been documented by other researchers, and they have highlighted the importance of packaging design (Bigoin-Gagnan, & Lacoste-Badie, 2018), nutrition information labels on packaging (Menger-Ogle, & Graham, 2018), and packaging concept (Wang, 2015). Therefore, we propose the following hypotheses.

H6: GOMP packaging has a positive and significant effect on purchase intentions for food with GOMP as a food supplement.

H7: GOMP packaging has a positive and significant effect on attitudes toward food with GOMP as a food supplement.

The relationship between health consciousness and attitude toward certain healthier products has also been supported by researchers in studies focusing on gym supplements (Nagar, 2020), sugar-free chewing gum (Jung, et. Al., 2020), certified functional foods (Wang & Chu, 2020), and artificial sweeteners (Ndofirepi, Mamsa, & Rambe, 2020). Therefore, the following hypothesis is proposed:

H8: Consumers' health consciousness has a positive and significant effect on attitude toward food GOMP as a food supplement.

Certain aspects of packaging are related to health concern, such as the packaging colour and related health claims (Theben, Gerards, M., & Folkvord, 2020), the packaging materials and graphics (Steenis, 2017), the functional, informative, and technical quality (Gomez, Martin-Consuegra, & Molina, 2015), packing with health claims (Wong, Mendoza, Henson, Qi, Lou, & L'Abbe, 2014), the packaging design (Becker, Rompay, Schifferstein, & Galetzka, 2011), the pictures and colour (Ares, Besio, Giménez, & Deliza, 2010), and the picture and brand (Underwood, & Klien, 2002). Researchers have found that there is a relationship between packaging and health concern, including for the packaging colour and related health claims (Theben, Gerards, M., & Folkvord, 2020) and packaging showing informational, operational, physical, and visual elements (Konstantoglou, Folinias, & Fotiadis, 2020). Therefore, the following hypothesis is proposed for this study in relation to GOMP:

H9: GOMP packaging has a positive and significant effect on consumers' health concern.

Previous research has also reported a relationship between packaging and health consciousness, including in terms of milk packaging innovation (Merlino, Brun, Versino, & Blanc, 2020),

packaging colour (Van Esch, Heller, & Northey, 2019; Mai, Symmank, & Seeberg-Elverfeldt, 2016), packaging label information (Dörnyei, & Gyulavári, 2015), and nutrition symbols (Andrews, Burton, & Kees, 2011). Therefore, we examine this relationship for GOMP by proposing the following hypothesis:

H10: GOMP packaging has a positive and significant effect on consumers' health consciousness.

Various studies (e.g. Martinez and Lewis, 2016, La Barbera and Ajzen, 2020a, 2020b) have found that perceived behavioural control has a significant moderating role in the relationships between (1) attitudes and purchase intentions and (2) subjective norms and purchase intentions. Therefore, this study builds on this contention and posits that packaging may moderate the

### III. METHOD

The research study used an online survey consisting of two languages: English and Bahasa Malaysia. A total of 446 respondents were recruited, but after screening and clean-up, data from only 384 respondents were used in the analysis. The sampling area focused on the Klang Valley, Malaysia, which covers Kuala Lumpur, the Municipal Council of Klang, Kajang Subang Jaya, Petaling Jaya Shah Alam, Ampang Jaya, Putrajaya, and Sepang. The Klang Valley was chosen due to the financial demographic, as individuals in this area have more purchasing power compared to other areas, so may be more able to purchase GOMP as a food supplement product. According to the State Socioeconomic Report 2019 (2020), among the states in Malaysia, Selangor (24.2%) and Kuala Lumpur (KL) (16.4%) were the highest contributors to the total Malaysian gross domestic product (GDP) in 2019. The authors of the report also mentioned that KL recorded the highest median income at RM 10,549, while Selangor had a median income of RM 8,210. These results demonstrate the consumers' purchasing power within these states. Furthermore, the second reason for choosing Klang Valley, Malaysia, was the high population, which allowed a representative sample to be obtained. According to the Demographic Statistics Fourth Quarter 2020, Malaysia (2021), in the fourth quarter of 2020, the total population reached almost 8.2 million, with 6.5 million in Selangor, 1.7 million in the Federal State of Kuala Lumpur, and 0.1 million in the Federal State of Putrajaya. Therefore, the total sample size gathered from the Klang Valley region would provide sufficient insights into the purchase behaviour among consumers. The questionnaires comprised three sections: Section A on attitude, Section B on health concern, health consciousness, packaging, and Section C on demographic variables, subjective norms and behavioural information, and purchase intentions. The questionnaires were adapted from the literature on attitudes and health concern (Krutulyte et al., 2011), health consciousness (Michaelidou, & Hassan, 2008); packaging (Gomez, Martin-Consuegra, & Molina, 2015), subjective norms, perceived behavioural control, and purchase intentions (Krutulyte et al., 2011; Shin et al., 2020).

A five-point Likert-type scale was used for the responses in Section A and Section B, and a combination of multiple-choice

relationship between perceived behavioural control and purchase intentions for food with GOMP. Since this study suggests that packaging plays an important role in purchasing food supplements such as GOMP, we hypothesise that it may also play a role in influencing an individual's perceptions of the ease of making a purchase of such mushroom powder. Therefore, the following hypothesis is proposed:

H11: GOMP packaging moderates the relationship between perceived behavioural control and purchase intentions for food with GOMP as a food supplement.

and open-ended questions was used for the responses in Section C. Section A and Section B assessed conceptual constructs, and Section C assessed the respondents' profiles. The respondents' profiles were placed at the end of the survey (Section C) as a strategy to avoid respondents leaving the survey early with incomplete answers (Gehlbach & Artino, 2018).

Before distribution, the questionnaires were reviewed by an expert and experienced panel of academicians and industry representatives to ensure that each question in the questionnaire had been adapted appropriately. The main aim of this process was to ensure that the content of the questionnaire was equipped with the comprehensive information required and measured the variables relevant to the research study. In line with the suggestions of Sudman (1983), a pilot test was performed using 45 respondents. The results from the reliability test of the pilot test showed that each variable exceeded the recommended requirements (Hair et al., 2014a), which is over 0.70. For improvement, some minor changes were made to clarify some items.

The descriptive statistics were computed using Statistical Package Social Science (SPSS) version 26.0, while the data analysis was conducted using Smart-PLS version 3.3.3, including the evaluation of the model quality using the measurement and structural model assessment and hypothesis testing. For each food combination, the coefficients of determination, ( $R^2$ ), the effect sizes ( $f^2$ ), the predictive relevance ( $Q^2$ ), and the path coefficient were used. Lastly, an outlier test was performed on the dataset. This test was conducted to eliminate inconsistencies in the data set to allow comparisons with other datasets (Barnett and Lewis, 1985). For this study, the results indicating Z-score values  $\geq 3.29$  were removed from the data set (Field, 2013).

In the present study, descriptive statistics were computed using Statistical Package Social Science (SPSS) version 26.0, while the data analysis was performed using Smart-PLS version 3.3.3 (Ringle, Wende & Becker, 2015). This study used PLS-SEM (partial least squares structural equation modelling) via Smart-PLS version 3.3.3 for two reasons. Indeed, this method is gaining popularity because of its ability to compute highly complex models such as models with many constructs, structural models,

models with many indicators, and models with reflective measured constructs (Sarstedt et al., 2014; Hair et al., 2014c). According to Hair et al. (2014a), PLS-SEM is performed and interpreted in two stages: it is a measurement model and a structural model. The measurement model for this study was employed to ensure the validity and reliability between the constructs and the indicators. The study tested the reliability using Cronbach's alpha (CA), as well as the convergent validity using the average variance extracted (AVE), the internal consistency using the composite reliability (CR), and the discriminant validity using the Fornell-Larker criterion, cross-loadings, and the heterotrait-monotrait ratio (HTMT). The structural model for this study was then presented with the goal of analyzing the relationships between the constructs. This study included measurements of the collinearity, the R-square or coefficients of determination ( $R^2$ ), the effect sizes ( $f^2$ ), and the predictive relevance of the model ( $Q^2$ ).

#### IV. RESULTS

The sample comprised 186 males and 198 females. The results revealed that most of the respondents were in the age group of 25–39 years old (77.3%), followed by 18–24 years old (12.4%), 40–55 years old (8.3%), and 56 years and older (2%). Overall, Malay-born respondents (81.3%) formed the majority of the sample, followed by Chinese (7.6%), Bumiputera (Sabah/Sarawak) (7.3%), and others (1.3%). Most respondents (60.7%) had a bachelor's degree qualification, followed by a postgraduate qualification (20.6%), a certificate/diploma (13%), high school qualification (5.8%). The respondents worked in several sectors, including the private sector (66.4%) and public sector (13.3%), while the rest of the group were unemployed, such as students (10.2%), and retired individuals (1.6%). The results also showed the most common monthly household income of the respondents was between RM2,500–RM3,999 (24%), followed by RM0–RM2,499 (17.4%), RM5,000–RM7,099 (16.9%), RM7,100–RM10,999 (15.6%), RM4,000–RM4,999 (14.3%), and RM11,000 and over (11.7%). The most common total number in the household number of the respondents was three persons (25%), followed by four persons (18.5%), one person (17.2%), five persons (13.8%), two persons (13%), and over five persons (12.5%). The respondents were mostly from Kuala Lumpur (50.3%), followed by Petaling Jaya (17.7%), Shah Alam (8.9%), Sepang (3.6%), and the rest of the Klang Valley. In terms of their spending behaviour, when the respondents were asked about their willingness to pay a premium price for GOMP, 44.5% of respondents were willing to purchase, and the others were not. However, 56.8% of the respondents reported that they would purchase the product at a premium price if the presence of GOMP increased the nutritional value of the overall product.

Most of the respondents spent between RM100–RM199 (28.9%) on the purchase of any supplements, followed by RM1–RM99 (27.9%), RM200–RM299 (10.9%), RM300–RM399 (4.2%), RM500 and over (2.9%), RM400–RM499 (1.3%). Additionally, 24% of them reported not spending their money on supplements.

In terms of the types of mushrooms consumed by the respondents, they most commonly consumed button mushrooms (71.4%), followed by shiitake or lentinus mushrooms (53.1%), grey oyster mushrooms (52.3%), white oyster mushrooms (47.9%), and enoki or flammulina mushrooms (45.3%). Regarding their consumption frequency, 41.7% of respondents reported consuming mushrooms once per week, 16.1% reported consuming mushrooms two or three times per week, 4.2% reported consuming mushrooms over four times a week, 2.1% reported consuming mushrooms every day, and 35.9% reported not being weekly consumers of mushrooms.

Based on the consumers' psychographic profile, most of them consumed mushrooms because of the good taste and smell of the mushrooms (58.6%), followed by consuming mushrooms as a protein substitute (20.3%), and consuming mushrooms due to understanding their benefits, including antioxidant properties (17.4%), reducing the level of cholesterol (12%), anti-ageing properties (11.7%), reducing the risk of blood pressure or heart disease (11.2%), boosting the brain (9.4%), and anti-cancer properties (7.3%), among others.

In terms of product promotions when purchasing GOMP, most of the respondents reported preferring to receive gifts (66.4%), followed by other offers such as buy two get one free (52.1%), discount coupons (40.9%), vouchers (39.1%), and others. In terms of receiving the promotion, the consumers reported preferring promotions from social media channels like Facebook and Instagram (70.8%), followed by receiving them from word-of-mouth (33.6%), websites (33%), television (26%), and emails and salespersons (25.3%), among others.

In terms of purchasing any supplement, the consumers mostly preferred purchasing from a pharmacy (60.7%), followed by a hypermarket (48.7%), Shopee (45.8%), an outlet at the mall and the Taobao online platform (40.8%), and organic shops (32.6%), among others. Specifically, the respondents preferred to purchase GOMP from a hypermarket (65.6%), followed by Shopee (65.1%), an outlet at the malls (51.3%), social media platforms like Facebook and Instagram (48.6%), organic shops (45.8%), and Lazada (44.3%), among others. Most of the respondents identified that pharmacies (28.1%), followed by social media platforms like Facebook and Instagram (16.7%), Shopee (16.1%), and hypermarkets (15.6%) have provided attractive offers when purchasing food supplements.

For 100 g of GOMP, most of the respondents agreed that less than RM15 (62%) is a reasonable price, followed by RM16–RM25 (29.7%), RM26–RM55 (8.1%), and more than RM55 (0.3%). However, for 100 g of GOMP, most reported that the product would be economical if the price were less than RM15 (68.5%), followed by RM16–RM25 (24.7%), and RM26–RM55 (6.8%). Finally, in terms of purchasing 100 g of GOMP if the product could help them to reduce their body weight, most respondents reported that they would purchase the product if the price were less than RM15 (54.4%), RM16–RM25 (34.1%), RM26–RM55 (8.9%), and more than RM55 (2.6%).

#### A. Measurement model

The results of the convergent and discriminant validity tests for each food combination met the prescribed threshold of CA >0.70. Indeed, the CA values exceeded 0.70, suggesting good internal consistency for each of the constructs (Hair et al., 2014a). The CR values were greater than 0.60, indicating the internal consistency of each construct (Hair, et al., 2014b). Furthermore, the results of AVE were greater than 0.50, which, as suggested by Hair et al. (2014b), means the indicators explain more than half of the variance in the constructs.

To ensure the discriminant validity, for any latent variable, the square root of AVE should be higher than its correlation with any other latent variable (Fornell & Larcker, 1981; Hair et al., 2014a). The results showed that the values from each construct were higher than their underlying values, hence confirming the discriminant validity. The discriminant validity of the reflective constructs was also ensured by examining the heterotrait-monotrait (HTMT) ratio; the results showed that none of the HTMT values of the constructs exceeded 0.85, thus reconfirming the discriminant validity (Henseler, Ringle, & Sarstedt, 2015). Overall, both tests confirmed the internal consistency and reliability of the measures.

Convergent validity was ensured by examining the outer loadings (factor loadings) of each item in each of the constructs. Research suggests that an outer loading of over 0.70 is acceptable and that constructs with values less than 0.40 should always be eliminated (Hair et al., 2014a). As a result, from 37 questions, only 30 questions were taken into consideration in this research, as the other 7 questions showed lower outer loading. The questions that were removed from this research included question 4 for health consciousness, question 7 and question 9 for attitude, question 19 for packaging, and question 31, question 36, and question 37 for health consciousness. After the exclusion of these questions, the results demonstrated the cross-loadings of the items, meaning the item loadings for the item's own construct were relatively higher than the loadings for the other constructs, confirming the discriminant validity of the items.

The Fornell-Larcker criterion was used to ensure discriminant validity, as suggested by Fornell & Larcker (1981) and Hair et al. (2014a). This criterion was measured by comparing the square root of the average variance extracted (AVE) with the coefficient of the correlation values of a paired construct. The results showed that the square roots of the AVEs of all the constructs were greater than the highest correlation value for the other constructs, hence confirming the discriminant validity. Subsequently, the discriminant validity of the reflective constructs was also ensured by examining the heterotrait-monotrait (HTMT) ratio, and the results demonstrated that none of the HTMT values of the constructs exceeded 0.85, thus reconfirming the discriminant validity (Henseler, Ringle, & Starstedt, 2015).

**B. Structural model**

The model fit was ensured by examining the coefficient of determination ( $R^2$ ) and the model fit indices, including the goodness-of-fit value. The coefficient of determination indicates the nomological validity, explanatory power, and predictive validity of the structural model on a scale of 0 to 1. For all food

combinations, health consciousness consistently explained 8.8% of the variance in packaging, health concern explained between 6.2% and 6.3% of the variance in packaging, attitude consistently explained 3.6% of the variance in health consciousness and packaging, and purchase intentions explained between 6.5% and 7.4% of the variance in health concerns, attitudes, health consciousness, packaging, subjective norms, and perceived behavioural control. The goodness-of-fit value for the model is the square root of the product of the AVE; for this model, the goodness-of-fit values were between 0.65 and 0.74 (with moderation), and a value greater than 0.36 is adequate (Hair et al., 2014a; Tenenhaus, Vinzi, Chatelin, & Lauro, 2005). Therefore, overall, the predictive validity and model fit indices were satisfactory.

This study proposed 11 hypotheses, including 10 causal hypotheses and a moderation hypothesis. The results of the PLS-SEM technique validated the TPB model in predicting GOMP consumer behaviour, and various statistically significant results were found for all the hypotheses in Table 1.

	Coffee	Drinking Stick	Frozen Food	Pasta	Pizza topping	Rice	Seasoning	Snack	Soup
H1	.00	.07	.03	.08	.10 *	.07	.10*	.07	.15 **
H2	.53 ***	.47 ***	.39 ***	.39 ***	.40 ** *	.10 **	.33 ***	.35 ** *	.33 ***
H3	.36 ***	.41 ***	.47 ***	.40 ***	.40 ** *	.33 ** *	.48 ***	.48 ** *	.35 ***
H4	-.02	.021	.027	-.01	.01	.01	-.03	- .04	.00
H5	-.05	-.07	-.01	-.01	- .00	-.11 ** *	-.07 **	- .05	-.08 **
H6	-.03	-.09 *	.10 **	.10 *	.09 *	.11 *	.11 **	.06	.20 ***
H7	.51 ***	.51 ***	.51 ***	.51 ***	.51 ** *	.51 ** *	.51 ***	.51 ** *	.51 ***
H8	.20 ***	.20 ***	.20 ***	.20 ***	.20 ** *	.20 ** *	.20 ***	.20 ** *	.19 ***
H9	.25 ***	.25 ***	.25 ***	.25** *	.25 ** *	.25 ** *	.25 ***	.25 ** *	.25 ***
H10	.30 ***	.30 ***	.30 ***	.30 ***	.30 ** *	.30 ** *	.30 ***	.30 ** *	.30 ***
H11	-.06	.14	.06 *	.08	.08 **	.47 ** *	.08 *	.09	.08

Note \*p<0.05, \*\*p<0.01, p<0.001

Table 1 Hypothesis Test Results

Food combination	R <sup>2</sup> without moderation	R <sup>2</sup> with moderation	ΔR <sup>2</sup> results
Coffee	0.707	0.711	0.4 percent accepted
Drinking Stick	0.699	0.714	1.5 percent accepted
Frozen Food - meatballs	0.737	0.740	0.3 percent accepted
Pasta	0.692	0.696	0.5 percent accepted
Pizza	0.709	0.715	0.6 percent accepted
Rice	0.669	0.677	0.8 percent accepted
Seasoning	0.708	0.714	0.6 percent accepted
Snack	0.640	0.648	0.8 percent accepted
Soup	0.703	0.709	0.5 percent accepted

Table 2: R-Squared Test Results

For this study, the most important focus was the role of the packaging of GOMP in the conceptual model for different food types. Packaging fit in well with some of the variables of the original TPB model (i.e. attitudes and purchase intentions), as can be seen from the significant results for H6 and H7 (see Table 2) across most food types. Additionally, packaging also significantly influenced the variables of health concern and consciousness, as can be seen in H9 and H10, and the results were mostly significant across all food types. Interestingly, when packaging was treated as a moderator for the relationship between perceived behavioural control and purchase intentions, the moderating role of packaging was only significant for four food types: frozen food – meatballs, pizza topping, rice, and seasoning. There was no significant moderation effect with drink-related food types.

## V. DISCUSSION

This research aimed to study the influencing factors that contribute to the purchase intentions for GOMP as a food supplement among consumers. The theory of planned behaviour (TPB) was used in this study to explain consumers' purchase intentions, with the adoption of additional variables including packaging, health concern, and health consciousness.

In this study, the most significant and important variable in relation to GOMP across all food types was GOMP packaging. These results are also in line with those of previous studies (Theben, Gerards, & Folkvord, 2020; Konstantoglou, Folinas, & Fotiadis, 2020; Steenis, 2017; Gomez, Martin-Consuegra, & Molina, 2015; Wong, et. al., 2014; Becker, et. al., 2011; Ares, et. al., 2010; Underwood, & Klien, 2002), whereby consumers' health concern was influenced by the packaging. The influential aspects of the GOMP packaging may include the packaging details, such as the labelling, colour, health claims, materials, graphics, functional nutrition information, and technical quality. Secondly, the research also investigated the role of packaging as a moderator in the relationship between perceived behavioural control and purchase intentions for carrier-ingredient food

combinations with GOMP among consumers. This result is novel because it shows that packaging has limited influence on individuals' perceptions of the easiness or difficulty of purchasing various food types with GOMP.

## VI. CONCLUSION

The research study elucidates important insights regarding GOM, the potential for product development with GOMP, and the potential of various carrier-ingredient food combinations. GOM has key health advantages due to the presence of β-glucan, which boosts the fat degradation process and helps to treat metabolic syndrome, including being overweight and obesity. Therefore, promoting GOMP as a health supplement and carrier ingredient in combination with different foods would be advantageous for consumers. However, future work should extend the research on different product elements, such as by examining the variety, quality, design, features, brand name, and services, aside from focusing on product packaging. Considering GOMP is a new product penetrating the local market, future research should also include the five stages of consumers adopting this new product: awareness, interest, evaluation, trial, and adoption. These important stages, suggested by Kotler and Armstrong (2020), are essential for new product development.

Aside from the product, the marketing mix 4Ps include the price, place, and promotion, and these should also be considered. This marketing mix may provide more information for local businesses that wish to venture into the mushroom industry, as well as for marketers who need to develop their marketing strategies, particularly for mushroom-based food supplement consumers. Marketing strategy development is key in the new product development process before the product can be commercialised.

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