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# Upcycled Food Adoption: Impact of Food Neophobia, Price Consciousness, and Moderating Role of Gender

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**Abstract**

For achievement of sustainable development goal (SDG) of preventing hunger, there is an increased focus on the study of solutions to reduce food wastage by practitioners and academicians. Upcycled food represents one of the innovative solutions to deal with the issue of food wastage. Consumers often display fear in adopting innovative food and often prefer to adopt innovative solutions at low prices. The objective of the present study is to investigate the influence of price consciousness and food neophobia on attitude towards adoption of upcycled food. This study also examined the moderation impact of gender on the relationship of price consciousness, food neophobia and attitude towards upcycled food adoption. Data was collected from 189 Indian respondents with the help of questionnaire. The findings revealed a positive influence of price consciousness and a negative influence of food neophobia on attitude towards upcycled food adoption. The study did not find moderation of gender. The results of study provide both the theoretical underpinning as well as the valuable insights to managers to frame policies to position such food products in the market.

**Keywords:** Upcycled Food, Price Consciousness, Food Neophobia, Adoption Attitude, Gender

## Introduction

Upcycled food has been a topic of interest to academicians, researchers and practitioners in the discipline of marketing. Upcycled food has become an innovative solution to combat with the problem of food wastage. This solution is in line with SDG goal of UN to reduce food wastage to half. Several environmental crisis are being faced due to the food wastage as it is being dumped in landfills (Melikoglu et al., 2013). UNEP in its report of 2021 stated that, "If food loss and waste were a country, it would be the third largest source of greenhouse gas emissions." In India, 40% of the food produced ends up in bins (FAO, 2019). Food wastage occurs at every stage from food production to food consumption and it is an issue of grave concern as on one hand 1/3$^{rd}$ of the food produced is wasted while on the other hand one billion people starve for food (FAO, 2019). With the rise of consumers' awareness regarding the negative impact of wasted food, the emphasis on its solution is growing (Melikoglu et al., 2013; Guglani & Singh, 2014; Bhatt et al., 2018).

According to a recent report of EAT-Lancet commission (2019), reduction in food waste is a crucial dimension of the sustainable food system. Upcycled food is one approach to reduce food waste and create opportunities for entrepreneurship (Zhang et al., 2020). Now a days, consumers' are becoming more conscious about environmental impacts of their consumption activities and play a significant role in reduction of the future food wastage (Bhatia & Panwar, 2016; McCarthy et al., 2020). Thus the interest of consumers' is growing towards the acceptance of innovative solutions to conserve environment.

Past research has addressed various factors that affect consumers' willingness to consume upcycled food

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(Aschemann-Witzel & Peschel, 2019; Coderoni & Perito, 2020; Rahmani & Gil, 2021). Specifically, studies have examined the influence different determinants like environmental awareness, knowledge, labels etc. Whereas food neophobia, as well as price consciousness, also significantly effect on consumer's willingness to adopt novel food (McCarthy et al., 2020; Peschel & Ashmann Witzel, 2020). While both of these are important predictors of attitude towards upcycled food adoption, only few researchers have studied the effect of price consciousness (McCarthy et al., 2020; Zheng et al., 2021) and food neophobia (Perito et al., 2019; Coderoni & Perito, 2020) on the willingness of consumers to buy the upcycled food, and most of the previous studies have reported inconsistent results. In addition, all the studies were conducted in developed countries, and no study has been conducted in emerging economies.

Furthermore, there is lack of research on the combined effect of price consciousness and food neophobia on the attitude towards upcycled food adoption. This paper aims to fill this gap by exploring the impact of price consciousness and food neophobia on attitude towards upcycled food adoption. This research also examines the contribution of gender to the relationship between price consciousness and attitude towards upcycled food adoption, as well as the association between food neophobia and attitude towards upcycled food adoption.

## Literature Review

### Upcycled Food

Foods that are upcycled often have ingredients that would not ordinarily be intended for human consumption, such as damaged crops, by-products, and food processing leftovers (Bhatt et al., 2018). This approach involves reinserting by-products from production streams that are safe and healthy for consumption, like fruits and vegetable residues, and turning them into high-value products (Spratt et al., 2021). The rejected materials are reused to produce upcycled food products (Peschel & Aschemann-Witzel, 2020). Upcycled Food Association (2018) has defined upcycled food as, "Upcycled foods use ingredients that otherwise would not have gone to human consumption, are procured and produced using verifiable supply chains, and have a positive impact on the environment." Upcycling increases the nutrients of a product that increases its value (Aschemann-Witzel & Peschel, 2019). An example of upcycled food is food prepared by 'Saving Grains' in Bangalore, India. 'Saving Grains' creates flour, called 'Good Flour', from the brewer spent grains which is a byproduct of beer production and this flour is used to make different snacks and healthy food. Spent grains are often thrown away, but they are totally safe to eat and packed with nutrients like protein and fibre.

### Food Neophobia

Food neophobia is characterized as the unwillingness or refusal to eat novel or unfamiliar foods, and is thought to be a significant indicator of human food consumption behavior (Pliner & Hobden, 1992). Food neophobia is a pertinent factor to study the attitude towards the adoption of new food items and it has been observed to have mixed effect on the purchase of new food items. Coderoni and Perito (2020) found that people with food neophobia are less likely to purchase novel food products like upcycled foods. But others have shown that there is no effect of food neophobia on the consumption of upcycled food (Perito et al., 2019; Asioli & Grasso, 2021). Thus, it has been observed that consumers who are highly food neophobic are less likely to consume new food category (Hellali & Korai, 2023). Considering the previous literature it is proposed that the lack of knowledge regarding new and healthier food options like organic food products and upcycled food results in fear of consuming such items (Coderoni & Perito, 2020).

### Price Consciousness

Previous research has examined the impact of price consciousness on the consumer behavior (Janssen, 2018; McCarthy et al., 2020; Peschel & Ashmann Witzel, 2020; Zheng et al., 2021). Price Consciousness has been studied in several contexts but it is often presented as the level of importance given by the consumer to the products which are priced moderately (Alford & Biswas, 2002). The consumers who are highly price conscious derive thrill of shopping and addition in their emotional values by searching for low priced alternatives from the marketplace (Alford & Biswas, 2002). The upcycled food which emerges as a solution for the food wastage is more demanded by the consumers when it is cheaper than the convetional food products (Peschel & Ashmann Witzel, 2020; Mc Carthy et al., 2020). Zheng et al. (2021) suggested

that consumers are more likely to buy suboptimal products when these are offered on discount. According to social exchange theory, price discounts and perception about quality have significant role in predicting the consumers' buying intention (Rousseau, 1989). Consumers who are price conscious tend to be more likely to adopt upcycled food products when they are priced moderately or low and have no quality concerns (McCarthy et al., 2020). Thus in present study it is argued that there is a positive influence of consumer's price consciousness on attitude towards upcycled food adoption.

### Gender as a Moderator

There has been mixed findings regarding the moderating impact of gender on the relationship of price consciousness, food neophobia and attitude towards upcycled food adoption. Research has indicated that male consumers' have a favourable opinion of novel food products while other studies confirmed unfavourable attitude of male consumers (Ashemann-Witzel & Peschel, 2019; McCarthy et al., 2020; Rahmani & Gil, 2021). However, female consumers demonstrate an unfavourable attitude towards upcycled food items (Bhatt et al., 2018). Upcycled foods may not appeal to women because they are more risk-averse and health-conscious than men (Aschemann-Witzel & Peschel, 2019; Rahmani & Gil, 2021), because they probably think these foods are bad choices. Ali et al., 2021 in his study reported that gender has not significant impact on the consumption pattern of consumers. In the current study the gender has been studied as moderating variable between the relationship of price consciousness, food neophobia and attitude towards upcyclde food adoption.

## Objectives of the Study

After reviewing the literature, it has been found that a few studies have studied the role of price consciousness, food neophobia and gender in predicting the upcycled food adoption. The current study has tried to fill this gap by achieving the following objectives:

- To assess the effect of price consciousness and food neophobia on attitude towards upcycled food adoption.
- To observe the moderating impact of gender on the relationship of price consciousness, food neophobia and attitude towards upcycled food adoption.

## Hypotheses Development

Based on the review of literature on price consciousness, food neophobia and attitude towards upcycled food adoption, following hypotheses have been proposed (Fig. 1):

*H1:* Food Neophobia (FN) negatively impacts attitude towards upcycled food adoption (ATT).

*H2:* Price consciousness (PC) positively impacts attitude towards upcycled food.

*H3:* Gender moderates the relationship between food neophobia and attitude towards upcycled food adoption.

*H4:* Gender moderates the relationship between price consciousness and attitude towards upcycled food adoption.

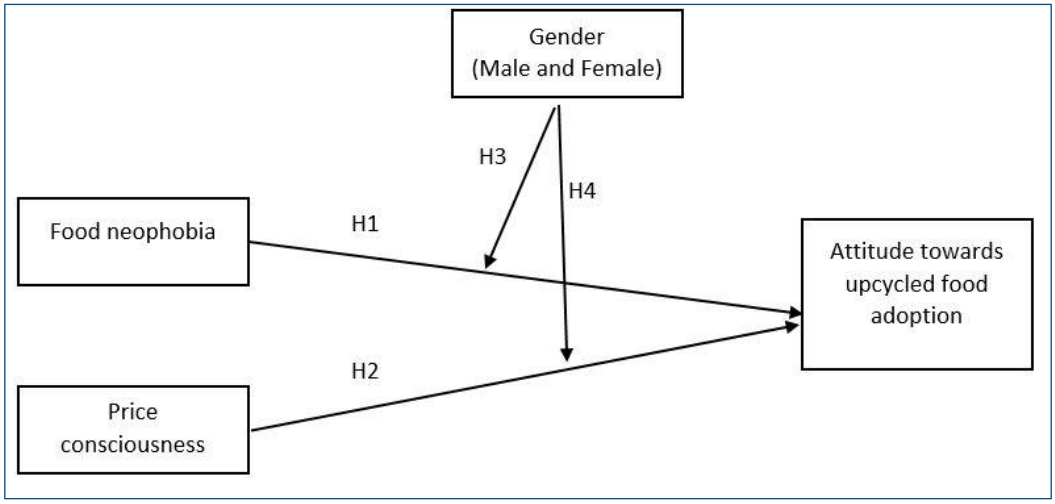


**Fig. 1: Theoretical Model**

# Methodology

## Measurement Scale

To validate the hypotheses of the study, a structured questionnaire was used to collect data. The questionnaire was divided into two sections. The first section constitute the questions related to consumers' characteristics (gender, age, education, income, marital status). Second section of the questionnaire consists of statements regarding food neophobia, price consciousness, and attitude towards upcycled food adoption. All the measurement items were adapted from the previous literature (see Table 1) and were measured on seven point Likert-scale ranging from 1 ("strongly disagree") to 7 ("strongly agree").

**Table 1: Variables and Indicators**

| *Variable* | *Indicators* | *Source* |
|---|---|---|
| Food Neophobia | FN 1. I constantly try new and different foods (R) | Pliner and Hobden (1992) |
| | FN 2. I don't trust new foods. | |
| | FN 3. If I don't know about food, I won't try it. | |
| | FN 4. At dinner parties, I try new foods (R). | |
| | FN 5. I like to try new ethnic restaurants (R). | |
| Price Consciousness | PC 1. I think price is an important factor while buying upcycled food. | McCarthy et al. (2020) |
| | PC 2. The price of the upcycled food must be reasonable. | |
| | PC 3. I compare prices of upcycled food and conventional food to buy food with lower prices. | |
| | PC 4. The price of upcycled food must be lower than the conventional food items. | |
| Attitude towards upcycled food adoption | ATT 1. Consuming upcycled food is extremely good. | McCarthy et al. (2019) |
| | ATT 2. I am strongly in favour of consuming upcycled food. | |
| | ATT 3. I like consuming upcycled food. | |
| | ATT 4. I am willing to make a special effort to buy foods which are made from upcycled ingredients. | |
| | ATT 5. I will prefer upcycled food over conventional food in case the product quality is similar. | |

## Data Collection

A sample of 250 respondents was randomly selected using convenience sampling to complete the questionnaire. The sample of the study is university students. Out of these, 189 questionnaires were completed, resulting in a 75.6% response rate. The sample size is adequate as it should be ten times the items used in the questionnaire (Hair et al., 2010). As this study includes 14 items and minimum sample size is 140 respondents, therefore 189 respondents is adequate sample size. The demographics of the sample are outlined in Table 2.

**Table 2: Demographic Distribution of Sample**

| *Variable* | | *Frequency* | *Percentage* |
|---|---|---|---|
| Gender | Male | 47 | 24.8% |
| | Female | 142 | 75.2% |
| Age (in years) | Below 25 | 147 | 77.8% |
| | 25-45 | 41 | 21.7% |
| | 46-65 | 1 | 0.5% |
| Level of Education | Up to Senior Secondary | 7 | 3.7% |
| | Graduate | 97 | 51.3% |
| | Post graduate | 81 | 42.8% |
| | Professional | 2 | 1% |
| | Doctorate | 3 | 1.6% |
| Family Monthly Income (in Rs.) | Up to 10000 | 19 | 10% |
| | 10001-30000 | 24 | 12.7% |
| | 30001-60000 | 40 | 21.2% |
| | 60001-100000 | 56 | 29.6% |
| | More than 100000 | 50 | 26.5% |
| Marital Status | Married | 16 | 8.5% |
| | Single | 173 | 91.5% |

## Method

This study employed PLS path-modeling (Smart PLS 4) to predict the dependent variable and moderation impact. PLS SEM is a good technique to analyse the multivariate data, as it has been used in the previous studies to find the impact of predictors on the dependent variables (Kaur et al., 2023).

This study used PLS SEM 4 software for model estimation. Significance testing uses bootstrapping (10,000 samples), percentile, and two-tailed testing. Evaluation of findings begins with measurement models and focuses on structural model (Hair et al., 2020).

## Findings and Discussion

### Measurement Model

This study evaluated the measurement model prior to the SEM analysis, as it is necessary to look at composite reliability (CR), average variance extracted (AVE) of the variables, and reliability. To measure the reliability, the study used Composite reliability and Cronbach's alpha (CA). Table 3 displays the values of composite reliability and alpha of ATT, FN, and PC, all of which exceeds the threshold limit of 0.70 (Hair et al., 2020). Therefore, all the values are acceptable. Furthermore, AVE >0.50 (ref Table 2), convergent validity is established (Henseler et al., 2016).

**Table 3: Measurement Model**

| *Construct* | *Item Code* | *Loading* | *Outer Weight* | *VIF* | *CA* | *Rho_A* | *CR* | *AVE* |
|---|---|---|---|---|---|---|---|---|
| Attitude towards Upcycled Food Adoption | ATT1 | 0.762 | 0.274 | 2.079 | 0.774 | 0.777 | 0.845 | 0.524 |
| | ATT2 | 0.789 | 0.253 | 2.426 | | | | |
| | ATT3 | 0.663 | 0.206 | 1.472 | | | | |
| | ATT4 | 0.760 | 0.333 | 1.476 | | | | |
| | ATT5 | 0.633 | 0.319 | 1.231 | | | | |
| Food Neophobia | FN1 | 0.793 | 0.398 | 1.486 | 0.765 | 0.825 | 0.830 | 0.503 |
| | FN2 | 0.620 | 0.171 | 1.583 | | | | |
| | FN3 | 0.477 | 0.093 | 1.381 | | | | |
| | FN4 | 0.734 | 0.292 | 1.655 | | | | |
| | FN5 | 0.857 | 0.373 | 2.033 | | | | |
| Price Consciousness | PC1 | 0.728 | 0.254 | 1.619 | 0.749 | 0.789 | 0.837 | 0.563 |
| | PC2 | 0.757 | 0.316 | 1.610 | | | | |
| | PC3 | 0.699 | 0.284 | 1.343 | | | | |
| | PC4 | 0.812 | 0.465 | 1.362 | | | | |

Heterotrait-Monotrait (HTMT) is used to confirm the discriminant validity. The values of HTMT ratio <0.90 (Table 4), so confirming the discriminant validity. Furthermore, the values of VIF <3.3 (Table 3), thus demonstrating that there is no issue of multicollinearity (Hair et al., 2020).

**Table 4: Heterotrait-Monotrait Ratio (HTMT)**

| | *ATT* | *FN* |
|---|---|---|
| FN | 0.486 | |
| PC | 0.342 | 0.250 |

### Assessment Model

In this study, Smart-PLS software is used to assess the structural model with 5000 bootstraps. Determination of coefficient $R^2$ revealed that structural model explained 24% variance in Attitude towards upcycled food adoption. According to Chin (1998), the values of $R^2$ must be >0.1 or zero and $Q^2$ must be >zero. In this study, $R^2$ and $Q^2$ both are >0.1 (ref Table 5), thus demonstrating the predictive significance of the model.

**Table 5: R Square and PLS Predict**

| *Construct* | $R^2$ | $Q^2$ |
|---|---|---|
| ATT | 0.242 | 0.259 |

## Structural Equation Modelling

The results revealed that food neophobia negatively and significantly influence attitude of consumer towards upcycled food adoption (β = -0.411, t = 7.465, p = 0.000), H1 accepted. This finding is in line with Coderoni and Perito (2020), who also found the negative influence of food neophibia on willingness to pay for upcycled food. Furthermore, price consciousness was found to have positive and significant impact on attitude of consumer towards upcycled food adoption (β = 0.223, t = 3.888, p = 0.000), H2 accepted which is in line with the findings of McCarthy et al. (2020).

**Table 6: Path Coefficient Assessment**

| | | *ß* | *Standard Deviation* | *T Statistics* | *P Values* | *Result* |
|---|---|---|---|---|---|---|
| H1 | FN ->ATT | -0.411 | 0.055 | 7.465 | 0.000 | Accepted |
| H2 | PC-> ATT | 0.223 | 0.057 | 3.888 | 0.000 | Accepted |
| H3 | Gender x PC -> ATT | 0.105 | 0.155 | 0.677 | 0.498 | Rejected |
| H4 | Gender x FN -> ATT | -0.216 | 0.182 | 1.185 | 0.236 | Rejected |

Moreover, this study examined moderating impact of gender on the relationship between food neophobia, price consciousness and attitude towards upcycled food adoption. The result in the Table 6 shows that gender has insignificant moderating impact on these relationships. Ali et al. (2021) also reported the insignificant impact of gender on the consumption choices.

## Discussion and Conclusion

This study proposed a model of influence of food neophobia and price consciousness on attitude towards upcycled food and a moderation influence of gender between the relationship of food neophobia and attitude towards upcycled food and relationship between price consciousness and attitude towards upcycled food. When consumers are more neophobic they are less likely to accept the novel food products (Zheng et al., 2021). The study has important implications for packaging managers, they can use labelling as a tool for ensuring the health safety and environmental benefits of upcycled food. Communication managers may use emotional appeals for reducing the impact of food neophobia.

When consumers are more price conscious, they are reluctant to pay more for the upcycled food (Ashmann Witzel, 2020; McCarthy et al., 2020). The consumers having price sensitivity would accept the upcycled food if it is moderately priced. Attractive pricing policies can be used by the managers to introduce the upcycled food to price conscious consumers. They can go for buy one get one free option, low prices, add on free with other products. The acquisition cost of raw materials in case of upcycled foods is less, thereby it has a huge market potential of being moderately priced healthy as well as sustainable food category. The marketers should introduced various upcycled food as consumers are more aware and ready to accept these types of food.

The present study suffers from some limitations. First of all the study uses a small sample of respondents, future study may be carried out with a large sample. Another limitation of study is that the majority of the respondents consist of young population in the age group of below 25 years. Future studies can include both young and adult population.

## References

Alford, B. L., & Biswas, A. (2002). The effects of discount level, price consciousness and sale proneness on consumers' price perception and behavioral intention. *Journal of Business Research, 55*, 775-782. doi:10.1016/S0148-2963(00)00214-9

Ali, S., Akter, S., & Fogarassy, C. (2021). Analysis of circular thinking in consumer purchase intention to buy sustainable waste-to-value (WTV) foods. *Sustainability, 13*(10), 5390. doi:10.3390/su13105390

Aschemann-Witzel, J., Jensen, J. H., Jensen, M. H., & Kulikovskaja, V. (2017). Consumer behaviour

towards price-reduced suboptimal foods in the supermarket and the relation to food waste in households. *Appetite, 116*, 246-258. doi:10.1016/j.appet.2017.05.013

Asioli, D., & Grasso, S. (2021). Do consumers value food products containing upcycled ingredients? The effect of nutritional and environmental information. *Food Quality and Preference, 91*, 104194. doi:10.1016/j.foodqual.2021.104194

Bhatt, S., Lee, J., Deutsch, J., Ayaz, H., Fulton, B., & Suri, R. (2018). From food waste to value added surplus products (VASP): Consumer acceptance of a novel food product category. *Journal of Consumer Behaviour, 17*(1), 57-63. doi:10.1002/cb.1689

Bhatia, V., & Panwar, S. (2016). Customer perception towards organic food products in selected regions of Mumbai. *PRIMA: Practices and Research in Marketing, 7*(1 & 2), 1-7.

Chin, W. W., & Marcoulides, G. (1998). The partial least squares approach to structural equation modeling. *Advances in Hospitality and Leisure, 8*(2).

Coderoni, S., & Perito, M. A. (2020). Sustainable consumption in the circular economy. An analysis of consumers' purchase intentions for waste-to-value food. *Journal of Cleaner Production, 252*, 119870. doi:10.1016/j.jclepro.2019.119870

Coderoni, S., & Perito, M. A. (2021). Approaches for reducing wastes in the agricultural sector. An analysis of Millennials' willingness to buy food with upcycled ingredients. *Waste Management, 126*, 283-290. doi:10.1016/j.wasman.2021.03.018

FAO. (2019). *State of food and agriculture 2019: Moving forward on food loss and waste reduction.* Food and Agriculture Organisation of United States. Retrieved from https://www.fao.org/policy-support/tools-and-publications/resources-details/en/c/1242090/

Guglani, M., & Singh, T. (2014). An empirical study to assess the relationship between environmental consciousness and green purchasing decisions among youngsters. *PRIMA: Practices and Research in Marketing, 5*(1/2), 21-29.

Hair, J. F., Howard, M. C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business Research, 109*, 101-110. doi:10.1016/j.jbusres.2019.11.069

Hellali, W., & Korai, B. (2023). Understanding consumer's acceptability of the technology behind upcycled foods: An application of the technology acceptance model. *Food Quality and Preference, 110*, 104943. doi:10.1016/j.foodqual.2023.104943

Henseler, J., Hubona, G., & Ray, P. (2016). Using PLS path modeling in new technology research: Updated guidelines. *Industrial Management & Data Systems, 116*(1), 2-20. doi:10.1108/IMDS-09-2015-0382

Janssen, M. (2018). Determinants of organic food purchases: Evidence from household panel data. *Food Quality and Preference, 68*, 19-28. doi:10.1016/j.foodqual.2018.02.002

Köpcke, J. (2020). *From waste to premium: Consumers perception of value-added surplus products and their willingness to pay* (Master's Thesis, University of Twente, Enschede, The Netherland).

McCarthy, B., Kapetanaki, A. B., & & Wang, P. (2020). Completing the food waste management loop: Is there market potential for value-added surplus products (VASP)? *Journal of Cleaner Production, 256*, 120435. doi:10.1016/j.jclepro.2020.120435

Melikoglu, M., Lin, C. S., & Webb, C. (2013). Analysing global food waste problem: Pinpointing the facts and estimating the energy content. *Central European Journal of Engineering, 3*(2), 157-164. doi:10.2478/s13531-012-0058-5

Perito, M. A., Fonzo, A. D., Sansone, M., & Russo, C. (2019). Consumer acceptance of food obtained from olive by products. *British Food Journal, 122*(1), 212-226. doi:10.1108/BFJ-03-2019-0197

Peschel, A. O., & Aschemann-Witzel, J. (2020). Sell more for less or less for more? The role of transparency in consumer response to upcycled food products. *Journal of Cleaner Production, 273*, 122884. doi:10.1016/j.jclepro.2020.122884

Pliner, P., & Hobden, K. (1992). Development of a scale to measure the trait of food neophobia in humans. *Apettite, 19*(2), 105-120. doi:10.1016/0195-6663(92)90014-W

Rahmani, D., & Gil, J. (2018). *Valorisation of food surpluses and side-flows and citizens' understanding.* Retrieved from https://eu-refresh.org/valorisation-food-surpluses-and-side-flows-and-citizens%E2%80%99-understanding

Rousseau, D. M. (1989). Psychological and implied contracts in organisations. *Employee Responsibilities and Rights Journal, 2*(2), 121-139. doi:10.1007/BF01384942

Spratt, O., Suri, R., & Deutsch, J. (2021). Defining upcycled food products. *Journal of Culinary Science and Technology, 19*(6), 485-496. doi:10.1080/15428052.2020.1790074

UNEP. (2021). *UNEP food waste index report 2021*. United Nation Evironment Programme. Retrieved from https://www.unep.org/resources/report/unep-food-waste-index-report-2021

Zhang, J., Ye, H., Bhatt, S., Jeong, H., Deutsch, J., Ayaz, H., & Suri, R. (2020). Addressing food waste: How to position upcycled foods to different generations. *Journal of Consumer Behaviour, 20*(2), 242-250. doi:10.1002/cb.1844

Zheng, G.-W., Akter, N., Siddik, A. B., & Masukujjaman, M. (2021). Organic foods purchase behavior among generation Y of Bangladesh: The moderation effect of trust and price consciousness. *Foods, 10*, 2278. doi:10.3390/foods10102278