

**To Bio or not to Bio: Qualitative and
Quantitative Research into the Acceptance
of Biodegradable Packaging.**

Jonneke Heins

Economic Psychology, Tilburg University

Supervisors:

Dr. S. A. Schwinghammer, Tilburg University

A. Sarvestani, M. A., NNZ bv.





Abstract

The goal of this paper was to investigate for NNZ a packaging network, the reasons why some companies do not use biodegradable packaging. NNZ provides a product line of biodegradable packaging materials under the name of Ökopack. A qualitative research was conducted with 15 customers of NNZ. Most important problems according to these customers were price, the sound of the packaging upon touching and the unfamiliarity with the packaging material. With the results of this research a questionnaire was formulated which was filled out by 100 end consumers. Results from both studies showed that many of the reasons for not choosing biodegradable packaging that customers of NNZ expressed (e.g. the willingness to pay more for products with a biodegradable packaging, the sound of the film upon touching) were not perceived as problems by end consumers.





Contents

Abstract	1
Contents	3
Introduction	4
<i>To Bio or not to Bio: Qualitative and Quantitative Research into the Acceptance of Biodegradable Packaging.</i>	4
<i>Ökopack</i>	5
<i>Research question</i>	6
<i>Status-Quo Bias</i>	7
<i>Willingness To Pay</i>	9
<i>Personal Norm</i>	10
Study 1: Qualitative Research	11
<i>Method</i>	11
Participants and Design	11
Procedure	11
Results and Discussion	12
Study 2: Quantitative Research	16
<i>Method</i>	16
Participants and Design.	16
Procedure.	16
Results and Discussion	17
<i>General Discussion</i>	22
<i>Critical Comments</i>	25
Conclusion	27
References	28
Footnotes	29






Introduction

To Bio or not to Bio: Qualitative and Quantitative Research into the Acceptance of Biodegradable Packaging.

The world of packaging is very dynamic, within six decades plastics have taken over the world. And although packaging is very useful in a lot of areas, we are all concerned about the waste all this packaging material causes. Since every human being is responsible for the condition of our earth, a lot of emphasis is put into reducing packaging material. However, this is not always possible, and more importantly, it does not always result into less waste. Every year a lot of food is discarded because of bad storage and packaging. Thus, using less packaging materials might actually mean more waste. Is there a solution for this problem at all? There might be. Since approximately ten years, researchers have been developing a new kind of packaging material, made from annually renewable resources such as corn or potatoes; biodegradable packaging materials. These materials can break down under specific circumstances into oxygen and carbon dioxide, and are therefore less demanding on the environment. SVM-PACT, the organization that executed the 'packaging covenant' which task was to look at packaging and waste states that for the production of packaging materials raw materials and energy are needed. The extraction of raw materials is a burden on the environment and the use of energy contributes to the greenhouse effect. Worn-out packaging leads to waste and collecting and processing waste costs energy and toxic elements could be released. (www.svm-pact.com). Of course, producing packaging made from natural resources also requires energy, however there are no toxic elements involved. The biggest difference though, is that the raw material for conventional packaging is crude oil. For biodegradable packaging this is corn or other natural materials, which can be grown back every year. Crude oil will disappear some day, because we are using it faster than nature gets its chance to replace it. The other big difference is that no matter what method is used to get rid of conventional plastics, they will never disappear completely. Biodegradable






packaging however, breaks down into nothing more than oxygen and carbon dioxide. These are two very important reasons to use biodegradable packaging as a substitute for conventional packaging.

Ökopack

Ökopack is a product line that consists of packaging made from annually renewable resources. It is the result of ten years of research from NNZ. NNZ is a family company, founded in 1922 by Mr. M. G. Boot in Groningen. The company focuses on both agricultural and industrial packaging and has always been a strong supporter of innovative packaging. The mission of the company is to solve customers packaging problems (www.nnz.com). This is also the reason the company has a strong interest in biodegradable packaging. This is the reason NNZ now provides biodegradable packaging materials. The Ökopack range consists of different films, trays and netting, all made from corn starch, lactic acid or potato starch. From these natural materials, through different processes, a granulate is abstracted which can be turned into all different kinds of packaging materials. These packaging materials have a lot of external similarities with normal plastics such as polyethylene and polypropylene, although very different in composition. Biodegradable film will be the focus of this research, because this is a very versatile packaging material used for agricultural and industrial applications. Some properties are the same as conventional plastics; it is a shiny, transparent material with an appearance very similar to oriented polypropylene. There are also differences with conventional plastics such as a higher price, and the barriers (to what extent the material is permeable) are different from conventional plastics (this can be an advantage for some breathing products such as lettuce). Moreover, it can be printed without using coatings. And finally, the film makes more sound upon touching, other than oriented polypropylene: it sounds like cellophane.





To be allowed to say a packaging material is biodegradable, the material should meet some demands. These demands are included in the CEN 13432 certification. Whenever packaging material has this certification, has been extensively tested and found to be truly biodegradable. But what does biodegradable exactly mean? The most important condition is that the material should be compostable in an industrial composting installation within four to six weeks (www.dincertco.com). Biodegradable packaging materials certified by the CEN13432 are allowed to carry the 'seedling logo' that communicates towards the consumer that this is a biodegradable packaging, and that the end consumers in most cases can discard of the package together with their garden, fruits and vegetable waste. Nowadays, however, not all biodegradable packaging materials are composted. But even when these materials would be burned this would cause less harm to the environment than burning conventional packaging, because of the crude oil and toxic fumes that will be released when burning conventional packaging. Recycling is not yet used with biodegradable packaging. A lot of research is done in this field to look at the possibilities.

Research question

Biodegradable packaging is rather new compared to conventional packaging, which has been used for over sixty years. Packing companies have grown accustomed to using conventional packaging, like polyethylene or polypropylene, to pack products. NNZ has experienced that a lot of packing companies do not want to switch from conventional to biodegradable packaging. The goal of this research was to answer the questions: "*What are the reasons biodegradable packaging is not yet used by packing companies?*" and "*How do end consumer feel about biodegradable packaging?*" It was expected that the most important reason for packing companies not to use biodegradable packaging was its (allegedly high) price. Because both packing companies and end consumers are important chains in the market, it was tested whether price was also seen as an obstacle to use biodegradable





packing by end consumers. It was predicted that this will not be the case. In addition, because biodegradable packaging is still very new and not widely used, I tested whether unfamiliarity with the packaging material might be an explanation for packaging companies' hesitance to use biodegradable packaging. It was expected that this will be the case, because they are not familiar with the material and its properties. Furthermore, I expected unfamiliarity to play an even bigger role for end consumers because they never get into contact with the materials. The only information end consumers get are the different logo's placed on products. All the different logo's used on products can be very confusing. If end consumers do not know what good properties a new kind of packaging has, they are less likely to buy this kind of packaging consciously.

To answer the above questions a qualitative research was conducted amongst representatives of packaging companies in Study 1. Study 2 was a quantitative research amongst end consumers that will focus on the problems that came up in the qualitative research. A few aspects that were expected to play a role in the two Studies will be explained next.

Status-Quo Bias

As stated before, we have all grown accustomed to using conventional plastics for more than sixty years. This fact alone could be the reason why companies and consumers do not use biodegradable plastics, or at least why they are reluctant to hand in conventional for biodegradable plastics. In psychological literature, the term 'status quo bias' is used to explain this phenomenon. Status-quo bias occurs when people have a tendency of 'doing nothing or maintaining one's current or previous decision' (Ritov & Baron, 1992; Samuelson & Zeckhauser, 1988). People are reluctant to change from this current state of things, which in this case is using conventional plastics. The status quo bias could be an important factor in the field of biodegradable packaging. This reluctance to change the current state of things





has previously been studied under the names of the endowment effect (Kahneman, Knetsch & Thaler, 1990), loss aversion (Kahneman & Tversky, 1984) and the status-quo bias (Ritov & Baron, 1992; Samuelson & Zeckhauser, 1988). The preference to stay in one's current state is generally explained by the 'loss aversion' effect in risky as well as riskless situations (Thaler, 1980; Kahneman & Tversky, 1984). Loss aversion refers to people's preference for avoiding losses over acquiring gains. Loss aversion could lead to risk aversion; the reluctance of a person to accept a bargain with an uncertain payoff rather than another bargain with a more certain but possibly lower expected payoff. The current state serves as a reference point and a change usually entails expected losses on some dimensions and expected gains on other dimensions. As people are loss and risk averse, the losses are weighed more heavily than the gains. People prefer the alternative with the smallest losses, even when the expected gains are only slightly higher than the expected losses (Ritov & Baron, 1992). This could also be the case in choosing between biodegradable vs. conventional packaging: Companies are using conventional packaging because they want to remain the status-quo and they are loss-averse. This means that handing in conventional packaging (losing a product) has a larger negative impact, than that starting to use biodegradable packaging (gaining a product) is perceived positive, also because it is not quite clear how large the benefits are, when using biodegradable packaging. This was also found in research of Spranca, Minsk and Baron (in press). They gave as an explanation for the status-quo bias that people favor harmful omissions (to do nothing) over harmful commissions. Even when the alternative option is not only harmful but has benefits as well, people favor to do nothing and stay with the status-quo option. This means that a new product, such as biodegradable packaging, should have a lot of additional value to the company to overcome this effect.






Willingness To Pay

Another possible reason packing companies do not yet use biodegradable packaging could be that this kind of packaging is still more expensive than conventional packaging. The main reason for this is that biodegradable packaging is sold in such small quantities, that it costs a lot to produce. Some biodegradable packaging materials have prices that can be even three to four times as high as comparable conventional packaging materials. However, the larger the quantities, the more prices will decrease. Price is for most companies a very important factor that defines which products to use. In the end, profit is the measure for success for most companies. The question is whether consumers, both packing companies and end consumers, are willing to pay more for biodegradable packaging.

One could consider biodegradable packaging to be an ethical feature of the product. In earlier research, consumers were willing to pay extra for products with ethical features (Auger, Burke, Devinney & Louviere, 2003). It was believed that policy or protestors had a great influence on companies to start using products with ethical features, but Auger et al. (2003) state that for companies the most important motivator to use these ethical features is that their customers are willing to pay for these features. So, if end consumers are actually willing to pay more for ethical features, such as biodegradable packaging, this would be an important motivation for companies to start using these ethical features.

The willingness to pay (further mentioned as WTP) more for products with ethical features by consumers is documented by numerous researchers. Laroche, Bergeron and Barbaro-Forleo (2001), for example documented that in 1989, 67 percent of Americans were willing to pay 5-10 percent extra for ecologically compatible products, in 1991 environmental conscious consumers were willing to pay 15-20 percent more for green products and in 1993, 79 percent of female consumers in the UK were willing to pay 40 percent extra for a green





product if all other features stayed the same. Robins & Rogers (Robins & Rogers, as cited in Gallastegui, 2002) showed that in 1992, 75 percent of German consumers were willing to buy environmental friendly production at a higher price. Walker and Thomas (Walker & Thomas, as cited in Gallastegui, 2002) found out that in 1990, 82 percent of USA consumers were willing to pay 5 percent extra for 'greener' products. If consumers are as willing to pay extra for biodegradable packaging as was established in previous research, this could be a motive for packaging companies to start using biodegradable packaging.

Personal Norm

Several studies on consumer behavior have demonstrated that social and personal norms and values have an important influence on pro-environmental behavior and willingness to pay more for ethical product features (Schultz, & Zelezny, 1998; Thøgerson, 1999; Corraliza & Berenguer, 2000; De Pelsmacker, Driesen & Rayp, 2005). For example, the norm-activation model shows that problem awareness is essential to turn people's values into actual pro-environmental behavior (Schultz, & Zelezny, 1998). In the article of Thøgerson (1999), a model is presented that shows how the social environment of people can influence environmental friendly packaging choice. Important issues are the perceived effectiveness of consumers (PCE) and problem awareness. These, together with social norm, influence personal norm. Personal norm, in turn, is the biggest direct influence on environmentally friendly packaging choice and the willingness to pay. De Pelsmacker et al. (2005) also stated that personal norms are of great influence on the willingness to pay more for the fair-trade attribute of products. In the second study, this will be tested amongst end consumers regarding biodegradable packaging. In buying situations, it should be salient in which way a purchase contributes to a better environment. This way, moral environmental reasoning can be spread, if there are no other aspects of the purchase that are too highly involving (Thøgerson, 1999).





Study 1: Qualitative Research

The goal of Study 1 was to discover the main reasons why packing companies use biodegradable packaging or not. This qualitative research was carried out amongst customers and prospect-customers of NNZ bv. This research was explorative in nature, and the results served as a guideline for the quantitative research of Study 2. The question to be answered in Study 1 was: “*What are the reasons biodegradable packaging is not yet used by packing companies?*” It was predicted that the WTP extra for biodegradable packaging was a very important reason, as well as unfamiliarity with the material, thus risk and loss aversion.

Method

Participants and Design

Employees (1 female, 14 males) of different companies, mostly from the agricultural sector with main activities production, packing and/ or distribution of fruits and vegetables, took part in this interview voluntarily. In most cases I interviewed the person within the company who is responsible for the packaging material or the owner/ executive. The interviews were conducted face-to-face or by telephone with mostly open questions. Some questions were closed to make them easier to answer and get more information on certain subjects. The information retrieved from these interviews was treated confidentially.

Procedure

To be able to answer the research question of this study, I designed a questionnaire divided into several subjects. First of all, I asked the participants some general information about their job and the company. Whether the company already used biodegradable packaging and if so, what share of the total packaging material was biodegradable and what kind of biodegradable packaging material the company used. I also asked whether the participants





used biodegradable packaging from NNZ, if NNZ has ever offered them biodegradable packaging and if they were familiar with the different products NNZ can supply.

The next part of the questionnaire was about the familiarity of the participants with biodegradable packaging and the knowledge concerning the logo of biodegradable packaging materials, and different definitions of biodegradability. Also questions about the perceived future of biodegradable packaging were included.

In the third section of the interview I asked some questions about the perceived differences, advantages and disadvantages of biodegradable packaging. In this section I aimed to find out what the most important reasons for these companies were to either use biodegradable packaging or not. For the same reason, some questions were included about economic considerations companies make when they would have to choose between conventional and biodegradable packaging.

Results and Discussion

The goal of this study was to discover the reasons why packing companies choose to use biodegradable packaging or not. From the first part of the questionnaire a very striking point was that some of the companies were never approached to talk about the use of biodegradable packaging. This could be a reason why these companies did not already use biodegradable packaging. Nine out of fifteen companies interviewed already used biodegradable packaging in some way or another. This showed that companies were willing to depart from their Status-Quo and start using a different kind of packaging.

From the second part of the interviews, which was about the familiarity with, and knowledge of the company with biodegradable packaging, it was remarkable that a number of definitions





were mixed up by representatives of the packing companies. In addition, two of the representatives never even saw the seedling logo before. Only four of the fifteen representatives thought the logo was recognizable for consumers. These results showed that there was still a lot of unfamiliarity about the different definitions of biodegradable packaging. This was a first sign that a lot of companies know very little about this kind of packaging and do not have a lot of confidence concerning biodegradable packaging. In the next part of the questionnaire, questions were asked about the specific properties of the biodegradable film.

The most mentioned difference between conventional and biodegradable packaging was biodegradability. This was the 'Top Of Mind Awareness', which means that this answer was the most actively available answer in people's consciousness. Price also appeared to be a very distinct feature of biodegradable packaging.

The next part of the questionnaire was used to find out how much delegates of the companies know about the properties of biodegradable packaging materials, and how they feel about the performance of these packaging materials. I asked the participants to compare several properties of packaging materials, and asked them to judge whether these properties in biodegradable packaging materials are better, the same or worse than those of conventional packaging. On most properties, biodegradable packaging was scoring equally good as, or worse than conventional packaging. The breathability of biodegradable packaging, however, was perceived to be better than that of conventional packaging. Interestingly, many representatives did not know a lot about the properties of biodegradable packaging materials; 47 percent did not know if there would be differences in the amount of energy used with biodegradable packaging, 33 percent did not know if the sealing temperature of this material was higher or lower than that of conventional packaging and the same percentage of representatives did not know what the sealing strength of this kind of packaging was. Forty-seven percent did not know about the oxygen transmission properties





of biodegradable packaging. Eighty-seven percent of the participants agreed that the price of biodegradable packaging was worse (i.e. higher) than that of conventional packaging. However, when inquiring after the perceived price differences between conventional and biodegradable packaging, participants gave estimates of 10 to 400 percent¹. The fact that participants did not have much knowledge about differences between conventional and biodegradable packaging and the various definitions could make a company insecure about this new kind of packaging. Insecurity causes risk aversion and this might result in 'status-quo bias', as explained before.

The next part of the questionnaire was about perceived advantages and disadvantages of biodegradable packaging that are important for the companies. As expected, the most reported reason for not using this kind of packaging was price. Another disadvantage mentioned was that the biodegradable film makes a creaky sound upon touching. According to packing companies, this sound would be a reason for end consumers not to buy products with a biodegradable packaging. Also, the expected worse processibility of the packaging on packing machines was perceived as a disadvantage. The biggest advantage of biodegradable packaging was that this kind of packaging is less demanding on the environment. This could be a marketing advantage for companies, as a 'unique selling point' for a product. This will only work if end consumers attach value to this environmental issue and whether this influences their buying intention. This will also be examined in Study 2.

Remarkable was that more disadvantages than advantages were expressed, but on the question which weighed heavier in their decision for biodegradable packaging, advantages were mentioned as often as disadvantages. Also of interest was that the opinion and desire of the customer was seen as most decisive, and not the company's feelings about this kind of packaging. This shows that packing companies like to keep the situation the way it is.





Unless customers indicate they want the change, companies will stick to the 'status quo' situation.

The final part of the interview was about economic considerations companies make in their choice for biodegradable packaging. Almost every company indicated it was willing to pay more for biodegradable packaging. The range of amounts companies were willing to pay more for biodegradable than for conventional packaging materials was very broad, running from 5 percent (percentage of the total product including package) up to 400 percent (percentage of the packaging material). Most companies were prepared to pay 10 percent extra on top of the total product price, if the packaging was biodegradable. Thus, companies were actually willing to pay more for their packaging materials to be biodegradable. Around two-third of the companies expected to be able to calculate the extra costs through to their customers. In Study 2, I examined whether this would be a viable option, thus, whether end consumers were willing to pay more for products with a biodegradable packaging.

Most striking result of this qualitative research was that a lot of representatives of companies did not possess that much knowledge on the properties of biodegradable film or the meaning of the word 'biodegradable'. If people whose job it is to make packaging choices do not know extensively what biodegradable packaging entails, it is to be expected that this knowledge will be extremely low with end consumers. Representatives of packing companies considered the logo of biodegradable packaging unrecognizable, in the second Study it will be tested if this is also the case with end consumers.





Study 2: Quantitative Research

With the results of Study 1, a questionnaire was designed. Goal of this quantitative research was to find out how end consumers feel about biodegradable packaging and whether they share the disadvantages reported by the packing companies. The most important topics of this questionnaire were familiarity with biodegradable packaging and the logo, the willingness to pay extra for products with a biodegradable packaging and the attitude of consumers towards packaging materials that makes sound upon touching. Also important were the values consumers have concerning the environment, and if this influences willingness to pay and buying intentions of consumers.

Method

Participants and Design.


Customers (71 females, 29 males, $M_{\text{age}} = 44,7$) of an Albert Heijn and an Albert Heijn XL supermarket were approached to participate in this research voluntarily. They filled out the questionnaire truthfully and the information retrieved from these questionnaires was treated confidentially.

Procedure.

The questionnaire was handed out to customers of the Albert Heijn supermarkets, after payment at the cash register. The questionnaire consisted of 34 questions. Most questions were to be answered on a 7-point Likert scale. Also, several multiple choice and open questions were included.

After demographic questions regarding age, gender, household size and main shopper activities within the household, participants were asked some questions about their buying behavior considering fruits and vegetables: whether they bought fruits and vegetables, where





they bought it, and what factors they normally take into account when buying fruits and vegetables. This research was limited to the use of biodegradable packaging in combination with fruits and vegetables, because biodegradable packaging is already used in this field, mostly with biologically grown fruits and vegetables. In that case, the connection with biodegradable packaging is rather easy to make; it makes sense to use an environmentally friendly packaging material on an environmentally friendly product.

The next part of the questionnaire dealt with more in-depth questions about packaging: whether participants bought pre-packaged fruits and/ or vegetables and when they did, what factors they kept in mind while doing so. They were also asked about their opinion on packaging materials making sound upon touching. In a few sentences it was explained to end consumers what biodegradable packaging materials are. After this introduction the consumers were asked if they were familiar with this kind of packaging and the 'seedling logo', how they feel about this development and if they were willing to pay more for a pre-packaged bell pepper (conventional price €0,99) if this bell pepper had a biodegradable package.

The last part of the questionnaire consisted of a number of questions concerning the environment (e.g. to what extent participants saw themselves as environmentally concerned and what actions they normally undertake to save the environment).

Results and Discussion

After checking the outliers of the most important items in the questionnaire it was decided that 8 participants should not be included in the final dataset. These participants had very extreme scores on some items important for further analyses (e.g. some indicated that they never shopped for fruits or vegetables). This means the final dataset consisted of 92





participants (69 females, 23 males, $M_{age} = 44,3$). The dataset contained several missing values, but because these were mostly on filler questions these participants were not excluded from the dataset.

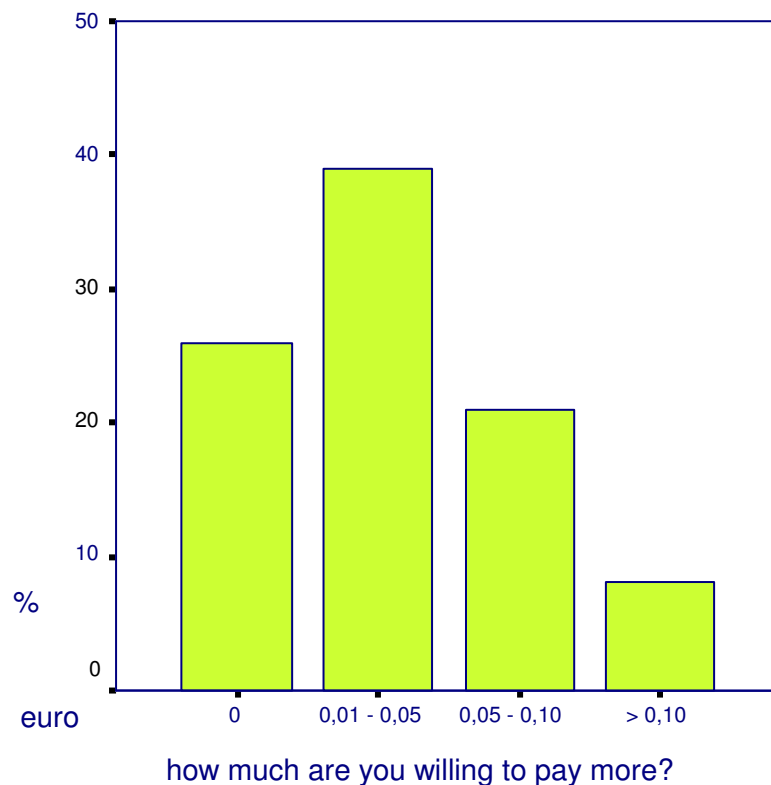
Goal of this second study was to find out whether end consumers were sensitive to the reasons why packing companies do not use biodegradable packaging. These reasons were price, the sound of the packaging upon touching and the unfamiliarity with biodegradable packaging materials. Moreover, it will be interesting to see if the personal norm of being environmentally aware played a role in the choices end consumers made concerning packaging materials.

The willingness of consumers to pay more for a product with a biodegradable packaging was measured by asking participants: “How much are you willing to pay more for a pre-packaged bell pepper of €0,99, packaged in a biodegradable packaging?” No less than 68,4 percent of the participants claimed to be willing to pay more for this product, of which 39,1 percent was willing to pay €0,01 up to €0,05 extra, 22,8 percent was willing to pay €0,05 up to €0,10 extra and 6,7 percent of the participants was even willing to pay more than €0,10 extra for this product. Per package the actual difference between a conventional and biodegradable packaging will probably only be €0,01 to €0,02. This shows that the vast majority of the participants would be willing to pay this much extra for a product with a biodegradable packaging. There was a positive relation between WTP and buying intention ($r = .42, p < .01$), which means that the more people are willing to pay extra for a product with a biodegradable packaging, the higher their intention to buy such a product.





“How much are you willing to pay more for a pre-packaged bell pepper of €0,99, packaged in a biodegradable packaging?”:



Buying intention itself was also measured. Answers were given on a 7-point Likert scale with extremes from 1 (probably not) up to 7 (probably yes). Mean score of the participants was 3,98. This indicated that most of the consumers had a neutral buying intention. To check if the participants truly had a neutral opinion on the kind of packaging used for their fruits and vegetables, a couple of items measured to what factors consumers pay attention when buying a product. One of these items measured attention to packaging material. Answers were given on a 7-point Likert scale with 1 (not at all) and 7 (very much). The answers on this item followed a normal distribution, with a mean of 4,32. This result shows that the participants had a neutral opinion concerning the packaging that is used for the product.

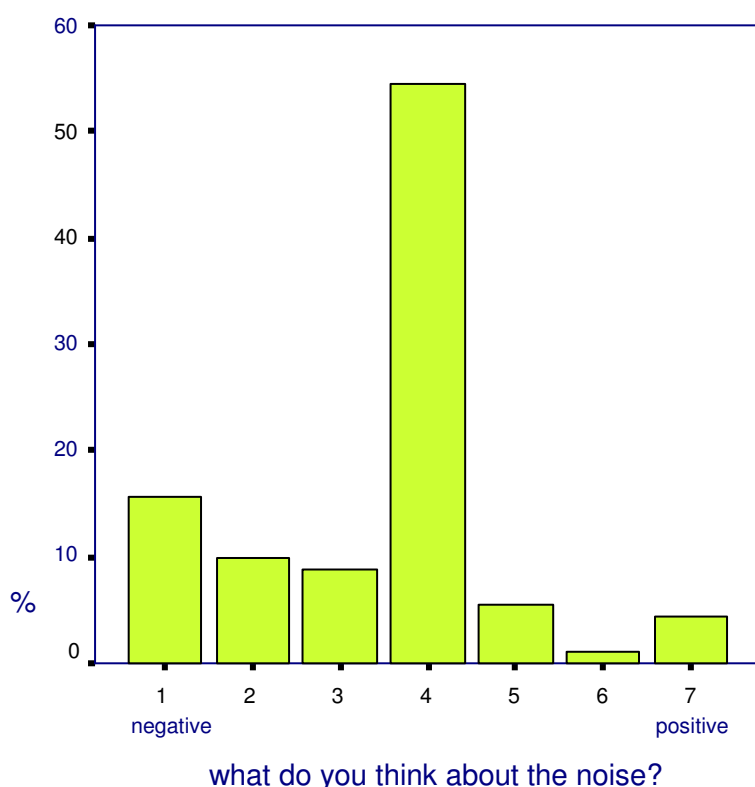




Thus, it seems that consumers were indifferent when it came to the kind of packaging material used for their fruits and vegetables. However, when it was clear that the used packaging material was biodegradable these consumers were willing to pay more for the product.

Because the packing companies indicated they had difficulties with the sound of biodegradable film upon touching, this was an interesting topic to test amongst end consumers. To the question: “How do you think about packaging materials making noise upon touching?”, participants could give answers from 1 (negative) to 7 (positive). The answers followed a normal distribution. The mean of these answers was 3,42 which means that a large part of the participants had a rather neutral opinion towards noise-making packaging materials.

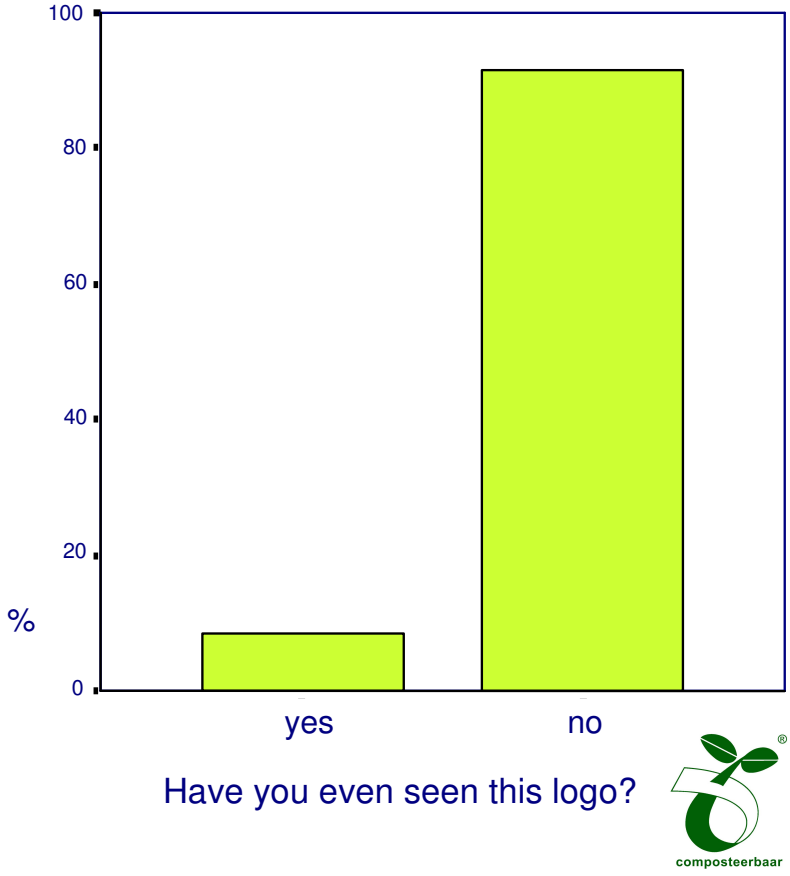
“How do you think about packaging materials making noise upon touching?”:






In addition, the unfamiliarity of end consumers with biodegradable packaging materials seemed to be a legitimate problem. Although 39,1 percent of the participants stated they were familiar with this kind of packaging, 88,0 percent of the participants never saw the logo which is present on biodegradable packaging materials. In the supermarket, the logo was the only way to recognize biodegradable packaging materials.

“88,0 percent of the participants never saw the logo which is present on biodegradable packaging materials”:



Analyses showed that there was a significant relation between the extent to which consumers rate themselves to be environmentalistic and the acts consumers perform to spare the environment ($r = .27, p < .05$). However, neither the acts consumers perform, nor the extent to which they rate themselves to be environmentalistic, showed a correlation with






the willingness of people to pay extra for products with a biodegradable packaging nor with the buying intentions of consumers. These results show that the personal norm 'environmentalism' of consumers does not have an influence on the WTP and buying intentions of consumers.

General Discussion

During the past few years, a new kind of packaging material has been developed, based on annually renewable resources such as corn. This new packaging material is a good alternative for conventional packages, for several products, such as fruits and vegetables. In spite of the fact that these materials have great advantages they are not used in large quantities yet. Different links in the market should be approached to give more insight into the source of this problem. In this research two parties were chosen because they seem to have a profound impact into the usage of this kind of packaging; packing companies and end consumers. There are several scientific factors that could be influential in this subject, such as WTP, risk and loss aversion and personal norms. The reason to conduct this research was to see whether these factors play a part when packing companies and end consumers are deciding between biodegradable packaging or conventional packaging.

The first study concentrated on answering the question: "*What are the reasons biodegradable packaging is not yet used by packing companies?*" This question was answered by interviewing delegates from different packing companies. This qualitative research showed that there are several reasons that withhold companies from the usage of biodegradable packaging for their products. Price was the first thing most companies mentioned as a disadvantage of biodegradable packaging, although a lot of the companies were willing to pay extra for biodegradable packaging. Another disadvantage was the sound the film makes upon touching. Many companies also expressed the concern that end






consumers are unfamiliar with this kind of packaging, which they thought could result in a smaller willingness to buy products with this kind of packaging by end consumers. These results demanded a second study, where the outcomes of the first study were tested amongst people who would actually buy these products with a biodegradable packaging material: possible end consumers.

The second study was designed to answer the next question: “*How do end consumers feel about biodegradable packaging?*” The goal of this study was to find out whether the problems the packing companies expected were actually experienced by end consumers to be insurmountable. The central topics that came up in the qualitative research, WTP, sound of the film upon touching, and unfamiliarity with biodegradable packaging, were incorporated in a questionnaire that was presented to end consumers.

The quantitative research showed that a lot of consumers were willing to pay more if a product had a biodegradable packaging. They also had a neutral attitude against packaging materials that made noise upon touching. One objection of packing companies not to use biodegradable packaging was found to be grounded. As shown in Study 2, most end consumers had a positive attitude towards biodegradable packaging, but although a lot of end consumers indicated to be familiar with natural, biodegradable packaging, only a small part of the participants ever actually saw the ‘seedling-logo’; the only proof of the biodegradability of a packaging material.

From the interviews with the packing companies, it seemed that their customers (retail and supermarkets) have the final saying in the decision to either use biodegradable packaging or not. If these segments would decide they want to start using biodegradable packaging materials for their products, all the disadvantages packing companies had can thus be put aside. If supermarkets would demand on using biodegradable packaging materials for their



fruits and vegetables, there would only be fruits and vegetables in supermarkets with biodegradable packaging. Since there would only be biodegradable packaging materials available in supermarkets, end consumers would not have to make the consideration between paying an extra amount for biodegradable packaging or not. Because this research has shown that end consumers are willing to pay extra for the new kind of packaging, I would foresee no problems with the transition in supermarkets from using conventional to using biodegradable packaging materials. However, the initiative lies with the supermarkets.

Supermarkets could use this transition as a marketing tool; by stressing environmental features as distinctive, a supermarket could win the goodwill of end consumers. However, the personal norm 'environmentalism' did not seem to have any effect on end consumers' buying intentions of products with a biodegradable packaging, nor on the willingness to pay more for products with a packaging that is less demanding on the environment. In the article by Thøgersen (1999) this was the case. However, personal norm was measured by questions that reflected the variable personal norm to avoid packaging waste. In the current research, personal norm was measured in a different way. This means that the willingness to pay more for this kind of packaging material that was found should be the result of some other factor. For future research, it could be a very interesting point to investigate whether a personality trait could be a possible moderating factor. According to Triandis (1993) and McCarty and Shrum (1994) state that collectivism is an important factor that could be influential on friendliness to the environment by end consumers (as cited in Laroche, Bergeron and Barbaro-Forleo, 2001). It would be interesting to see whether this is also the case in biodegradable packaging materials. That way supermarkets could aim at the collectivism of end consumers in their marketing campaigns.

One very important task is to make the public more familiar with biodegradable packaging materials. This might result in supermarkets starting to use this kind of packaging more or



even end consumers demanding it. If supermarkets start using this, more packing companies will probably inquire after this kind of packaging and will start using it. Publicity may eventually overcome the status-quo bias that is presently active. Biodegradable packaging might eventually even become the new status-quo.

The most important tool for more familiarity and publicity for this kind of packaging is the 'seedling logo'. This logo, however, was perceived as unrecognizable by packing companies, and unknown by end consumers, although it is printed on most packaging materials that are in stores nowadays. One solution for this problem could be that it would become obligatory for companies in this branch of industry to place the 'seedling logo' on any product with a biodegradable packaging material, in order to make the logo more recognizable, and to prevent that other logo's with the same denotation are used

Who is to take charge of the publicity of biodegradable packaging materials is unclear. Perhaps it is destined to be taken care of by the companies who will profit the most, or are most benefited by this transition, which are probably the granulate producers and the government. The best solution however, would be if all companies would share the costs; this diminishes the costs per company. And after all, we all have a moral responsibility to make the waste we produce less demanding on the environment.

Critical Comments

One limitation of the first study could be that only fifteen companies participated in this research. Naturally, it would have been better to include more companies, and especially companies from different branches of the fruits and vegetables and packaging business. The companies who participated in this research were in one way or another connected to NNZ as being either a customer or prospect-customer. Nine out of the fifteen participating





companies already made use of biodegradable packaging materials, which is not a representative reflection of the situation among companies in the Netherlands. It could therefore be that this fact influenced the results of this study. Also, some of the interviews were conducted by telephone. This had the disadvantage that non-verbal information was not recognized. However, in some situations I did not have a choice, because the only way to be able to talk to delegates from these companies was by telephone.

Secondly, there is a possibility that participants have given social desirable answers. For example, on the question to what extent end consumers see themselves as being environmentally concerned. This could imply that end consumers and companies would not be willing to pay more for biodegradable packaging materials in a real buying situation. However, participants indicated to be willing to pay an extra amount for fruits and vegetables with a biodegradable packaging. This extra amount exceeded the probable extra costs for this kind of packaging materials. This would mean that in practical situations, the small amount extra that is needed to make use of biodegradable packaging might not be a problem to calculate through to the end consumers. Moreover, prices of fruits and vegetables vary from week to week in the auction houses, which could mean that supermarkets could launch a new kind of packaging without the end consumer even noticing the price difference. It would be interesting to validate this finding in an experiment.





Conclusion

In sum, this research demonstrates that end consumers are willing to accept biodegradable packaging for fruits and vegetables. The next step lies with the companies that put pre-packaged fruits and vegetables in the supermarkets. To bio or not to bio, was the question, to bio is the answer!





References

- Auger, P., Burke, P., Devinney, T. M., & Louviere, J. J. (2003). What will consumers pay for social product features? *Journal of Business Ethics*, 42, 281-304.
- Corraliza, J. A., & Berenguer, J. (2000). Environmental values, beliefs and actions. A situational approach. *Environment and Behavior*, 32, 832-848.
- De Pelsmacker, P., Driesen, L., & Rayp, G. (2005). Do consumers care about ethics? Willingness to pay for fair-trade coffee. *The Journal of Consumers Affairs*, 39, 363-385.
- Din Certco, (n. d.). *Certificate holder*. Retrieved January 10, 2007, from http://www.dincertco.de/en/certificate_owner/index.html
- Gallastegui, I., G. (2002). The use of eco-labels: A review of the literature. *European Environment*, 12, 316-331.
- Laroche, M., Bergeron, J., & Barbaro-Forleo, G. (2001). Targeting consumers who are willing to pay more for environmentally friendly products. *The Journal of Consumer Marketing*, 18, 503-520.
- NNZ, the packaging network. (n.d.). *Mission*. Retrieved January 10, 2007, from <http://www.nnz.com/en/introduction/mission>.
- Pallant, J. (2005). *SPSS survival manual: A step by step guide to data analysis using SPSS for windows version 12*. New York: Open University Press.
- Ritov, I., & Baron, J. (1992). Status-quo and omission biases. *Journal of Risk and Uncertainty*, 5, 49-61.
- Samuelson, W., & Zeckhauser, R. (1988). Status quo bias in decision making. *Journal of Risk and Uncertainty*, 1, 7-59.
- SVM-PACT, Verpakking en milieu. (n.d.). Retrieved February 22, 2006, from <http://www.svm-pact.nl>
- Thøgersen, J. (1999). The ethical consumer. Moral norms and packaging choice. *Journal of Consumer Policy*, 22, 439-460.





Footnotes

¹ These numbers are not comparable; 10 percent is the percentage of the total product price including packaging. Packaging material only accounts for a small part of the total product price. Thus, a higher percentage, like 400 percent, was the percentage of the packaging price only.

