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EDITORIAL

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Leaders in key decision-making positions around the world are paying increased attention to the role of technological innovation and development in engineering applications. To support these efforts, this book explores innovative ideas that enhance economic growth, global competitiveness, and environmental sustainability. The 2017 program focuses on the prospects of technological leapfrogging using the mean tools and techniques of the industrial system engineering. By discussing issues ranging from research practices, techniques, and methodologies, it offers an opportunity for industrial organizations to think about where we are nowadays and where we are going.

The book contains reviewed papers presented at the XXII Summer School "Francesco Turco" held in Palermo, Italy, organized by the SSD ING_IND/17 (Industrial Systems Engineering) of the Department of Industrial and Digital Innovation, University of Palermo. This Conference promotes interaction and cooperation among researchers coming from different universities. Furthermore this conference has long since become a traditional, well established meeting that gathers together renowned scientists and researchers from all over the continent. The 2017 Edition of the Summer School "Francesco Turco", organized with European Academy on Industrial Management (AIM), continues the fruitful collaboration with our association AIDI, being a forum for the exchange of innovative scientific research tools and topics. AIM promotes networking both in scientific research and educational activities involving main IE&M schools in EHEA.

The specific topic of this edition is "Innovation and development in engineering applications".

All papers selected and organized in this book have been carefully reviewed, on the basis of technical soundness, relevance, originality, and clarity, by up to three reviewers. These papers are categorized into XX sessions and classified according to the paper's topic and its relevance to each session theme:

Session 1: Logistic & supply chain management
Session 2 : Operation, project and energy management
Session 3 : Sustainability, Industrial Safety, Risk and Maintenance Engineering
Session 4 : Industrial service, ergonomics and healthcare engineering
Session 5 : Industrial plant design and analysis
Session 6 : Decision support systems and performance mesures in industrial system engineering

This book is the result of the collective effort of my colleagues at University of Palermo. In particular, I would like to acknowledge our gratitude to all authors who contributed their invaluable time to this work. I would especially like to thank the reviewing committee and all those who participated in the rigorous reviewing process that led to the selected papers in this book.

October 2017 General chair

Prof. Mario Enea

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Evaluation of new functional pasta using TOPSIS methodology

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Abstract: Nowadays several studies are focused on the introduction of *Opuntia* in frequently consumed foods, such as pasta and bakery products. Food products containing *Opuntia* are in fact able to reduce body weight and plasma LDL cholesterol, lipids and glucose. Foods, that may provide health and wellness benefits, are known as "functional foods". The aim of this paper is the evaluation of a new functional pasta comprising *Opuntia* able to guarantee health benefits without altering the organoleptic properties of the final product. For this purpose, a set of samples, based on different concentration of *Opuntia* solution and process parameters, was prepared for the production of short and long pasta. The choice of the best sample was achieved by using a Multi-Criteria Decision-Making (MCDM) procedure in order to consider the quality of the final product and the production cost. In particular, Technique Ordered Preference by Similarity to the Ideal Solution (TOPSIS), one of the most widely used MCDM methods in decision support systems, was here implemented.

Keywords: Functional Foods, *Opuntia*, Multi Criteria Decision Making, TOPSIS technique

1.Introduction

In the last decade, consumers began to view their diets from a radically different vantage point and foods quality is perceived in terms of prevention nutrition-related diseases and improvements of physical and mental well-being. Under this 'positive' or 'pro-active' eating paradigm, the self-care phenomenon, currently a leading factor motivating healthy food purchasing decisions (Sloan, 2000), will continue to grow imposing itself in the marketplace for the next 30 years (Sloan, 1999). Within this contest, the development of innovative functional foods could represent a key opportunity for the food companies (Siró et al., 2008). Functional foods have been defined as foods that, by virtue of the presence of physiologically active components, provide a health benefit beyond basic nutrition (International Life Sciences Institute North America Food Component Reports, 1999). A functional food can be (1) a natural food, (2) a food to which a component has been added, (3) a food from which a component has been removed, (4) a food where one or more components has been modified, (5) a food in which the bioavailability has been modified or (6) any combination of these (Fangueiro et al., 2016). Numerous studies (Wang, 2006; Chalamaiah et al., 2015; Sogi et al., 2013) have been oriented to discover and analyse the functional properties of many traditional foods and to produce new foods (Marchiani et al., 2015; Laiño et al., 2013; La Scalia et al., 2017) that may be enriched with functional ingredients. Among foods with beneficial effects, the dried pasta is widely consumed in Italy because it constitutes a central element of the Mediterranean diet. Currently, there is a considerable variety of dried pasta (e.g. gluten-free and low-protein) that can be consumed by individuals affected by particular pathologies such as celiac and kidney diseases. Recently the beneficial properties of β-glucans in treating diabetic and hypercholesteromic patients were exploited to produce a new type of dried pasta (Barera et al., 2016). Furthermore, several international patents (Cornelli, 2009; Garza-Lopez et al. 2006, Juarez and Cortes, 2005) have focused their attention to the production of bakery products enriched with *Opuntia*. *Opuntia* cladodes and fruits are used for treating arteriosclerosis, diabetes, gastritis and hypercholesterolemia (El-Safy, 2013, Jana, 2012). Thus, the production of a new functional dried pasta comprising *Opuntia* could represent a high-quality product for its relevant nutritional effect and potential health characteristics. In this study, eight samples respectively of short and long pasta were prepared using different percentage of *Opuntia* solution and process parameters. First of all, each sample was assessed by a panel of experts to determine their textural properties, then the choice of the best one was achieved by using a Multi Criteria Decision Making (MCDM) method with respect to qualitative and quantitative criteria, which take into account the quality of the final product and the production cost. In particular, Technique Ordered Preference by Similarity to the Ideal Solution (TOPSIS), one of the most widely used MCDM methods in decision support systems (Lai et al., 1994), was here implemented.

The remainder of this paper is organized as follows: Section 2 describes the material and methods implemented in this study in terms of description of the production process, evaluation of the criteria used in the MCDM approach and definition of the TOPSIS procedure. Section 3 shows the results obtained and proposes a ranking of short and long pasta samples, finally Section 4 concludes the paper with a short discussion on the proposed methodology and an outlook into on-going research work.

2 Material and methods

2.1 The production process

Eight samples of two types of functional dried pasta enriched with different percentage of *Opuntia* solution were prepared in a pilot plant located in a Sicilian company (Tomasello Spa, Santa Flavia, Pa, Italy). The pilot plant comprises an extruder (MOD. MAC 60 VR) and a static dryer (SANDY1-1 LAB) produced by Namad (Rome, Italy). The dough obtained into a mixing basin, was extruded and pushed into the pasta die. Finally, it was cut in the desired length and profile. The maximum production rate of the extruder depends on the raw material utilized and on the type of pasta produced; its value is about 60 Kg/hour. The static dryer of SANDY1-1 LAB series is equipped with sequential programmer (PLC) to manage the drying cycle precisely and automatically. The dryer plant guarantees a temperature up to 75 °C, a production rate from 13 to 20 Kg/cycle and the installed power is 10 kW. The samples present different production parameters related to each phase of the process. In particular, during the mixing phase the main parameters are the percentage of *Opuntia* solution and the mixing time, in the extrusion phase is the thickness of die and finally in the drying phase are the time, the temperature and the relative humidity. These parameters were selected and heuristically varied on the basis of the experience of the producer starting from the parameters generally used in the production of dried pasta. The dough was prepared with durum wheat semolina (particle size of 250 – 400 μm) and an extract of *Opuntia* in substitution of the water used in the traditional process. The concentration of fibers in the *Opuntia* solution is 10 wt %. Eight different samples were prepared for the production respectively of short and long pasta. In the following table the % of *Opuntia* extract for 1 Kg of durum wheat semolina (C_1), the thickness of die (C_2) and the concentration of *Opuntia* in the final product (C_3) are reported.

Table 1: Production parameters for pasta samples

Samples	C_1 (%)	C_2(mm)	C_3(%)
T32a	32 %	1.7	2.76 %
T32b	32 %	1.8	2.76 %
T34a	34 %	1.7	2.93 %
T34b	34 %	1.8	2.93 %
T36a	36 %	1.7	3.09 %
T36b	36 %	1.8	3.09 %
T38a	38 %	1.7	3.26 %
T38b	38 %	1.8	3.26 %
L30	30%	1.7	2.59 %
L31	31%	1.7	2.68 %
L32	32%	1.7	2.76 %
L33	33%	1.7	2.85 %
L34	34%	1.7	2.93 %
L35	35%	1.7	3.01 %
L36	36%	1.7	3.09 %
L38	38%	1.7	3.26 %

The first parameter was varied within the same range of the water content used in the traditional process while the second one was experimentally determined in order to avoid the bulge during the extraction.

The last parameter (C_3) represents the percentage of *Opuntia* fiber present in the final product. These values were obtained taking into account an initial humidity of the semolina of about 15 % and imposing a relative humidity in the dry pasta not higher than 12.5 %, coherently with the Italian legislation (D.P.R 187/01, art. 6). In all considered samples, the amount of *Opuntia* used is such as to ensure about 2 grams of *Opuntia* fiber per daily food portions (about 80 grams of pasta). In fact, as reported in Cornelli (2009) a daily intake of about 2 g of *Opuntia* fiber for 15 days is very effective in reducing body weight, plasma LDL cholesterol, lipids and glucose.

Then, different times for dough mixing have been set. During the experimentation an increase of 25 – 30 % of the mixing time respect to the traditional process that uses water was detected. This phenomenon is due to the viscosity of the *Opuntia* extract, which slows the hydration of the wheat semolina. To resolve this inconvenient the *Opuntia* solution was heated to 20 °C in order to hydrate and homogenize the dough. Table 2 shows the mixing times for all the samples produced:

Table 2: Mixing times

Short pasta		Long pasta	
Samples	Time (min)	Samples	Time (min)
T32a	25	L30	25
T32b	25	L31	25
T34a	30	L32	25
T34b	30	L33	25
T36a	30	L34	30
T36b	30	L35	30
T38a	35	L36	35
T38b	35	L38	35

For each sample the drying steps were set using different values of temperature, relative humidity and dryer time. These parameters are reported in appendix A.

2.2 Evaluation criteria

Texture and appearance of pasta are the major attributes that affects the final acceptability of the product by the consumer (Lee et al., 2002). The quality of pasta is associated to different factors that are influenced by the raw materials composition, the process variables and the recipes (Dawe, 2001). This quality can be determined taking into account criteria, such as colour, firmness, texture, etc. Several studies (Cubadda, 1988; Sozer et al., 2007) reported that predominant criteria that have an impact on the quality of pasta are correlated with appearance and textural properties such as colour, stickiness (or adhesiveness) and bulkiness, whereas other authors impute a positive effect on the quality of the product with high values of firmness and elasticity (Antognelli, 1980; Pomeranz, 1987). The colour of pasta is a significant quality factor that affects consumer acceptance. This factor is primarily related to the yellow index as described in Abecassis et al., 1984. Another meaningful element that contributes to the quality of the final product is its level of relative humidity; the safety of pasta is strictly connected to the amount of this parameter (Kill, 2001). Moreover, the stability of the product is related to the reduction of the relative humidity content obtained during the drying phase (Pagani et al., 2007). Finally, pasta's quality depends on its thickness. The high value of this variable leads to a longer cooking time, a low quality and a hardly digestive product.

Taking into account the observations above reported, each sample of pasta produced was assessed by a sensory analysis coherently to the study of D'Egidio et al. (1990). Each sample of pasta (100 g) was cooked in 1 L of boiling water, without salt for 13 minutes and assessed by a panel of three experts. They analysed the samples and assigned a score for firmness, stickiness and bulkiness. In detail, the scores were evaluated in a linguistic manner and then translated in numerical values by means of the evaluation scale reported in table 3.

Table 3: Evaluation scales

Firmness		Stickiness and Bulkiness	
Evaluation scale		Evaluation scale	
Linguistic	Quantitative	Linguistic	Quantitative
Absent	10 - 20	Very high	10 - 20
Rare	21 - 40	High	21 - 40
Sufficient	41 - 60	Rare	41 - 60
Good	61 - 80	Minimal	61 - 80
Very good	81 - 100	Absent	81 - 100

Finally, the Sensory Judgment (SJ) was computed as the arithmetic mean of the scores.

Firmness: it represents the resistance of the cooked pasta when chewed or shared between the teeth.

Stickiness: it is the quantity of starch on the surface of cooked pasta. A high concentration of material adhering on cooked pasta surface is negatively judged.

Bulkiness (only for long pasta): it is the adherence degree of pasta strand among them. The smaller the tendency of the bulkiness is the higher the score of the criterion is.

The firmness, stickiness and bulkiness criteria have to be maximized.

For each sample of pasta the yellow index, the relative humidity and the thickness (only for short pasta) were also estimated:

Yellow index: this criterion strongly impacts on the appearance of the pasta. Consumers are more likely to buy pasta having a yellow appearance.

Relative humidity (%): it is the amount of liquid in the dried pasta. The claim reported in the Italian legislation (D.P.R 187/01, art. 6) sets the values of 12.5% as the upper bound for the level of this parameter. It is not easy to determine the preference versus for this criterion, in fact, even if several studies (Manthey and Schorno, 2002, Zweifel et al. 2003) show that the selection of adequate drying conditions are important in determining the quality of dried pasta, few studies (Ogawa et al., 2016) exploited the dependence of this quality on the relative humidity. Economic considerations were then taken into account to determine the preference versus for this criterion. From the producer perspective, high relative humidity contents imply lower semolina quantity, this leads to a consequent reduction of the cost of pasta because this value depends on its weight. On the other hand, from the consumer perspective, the decrease of cost to buy dried pasta is negligible. Based on these considerations the producer perspective is considered.

Thickness (mm): this criterion, considered only for short pasta, was selected in order to consider two different situations. In specific, during the extraction phase some products have presented a bulge due to the *Opuntia* fibers. It is, hence, essential to monitor this phenomenon as a function of the thickness. In addition, the thickness of the dried pasta is correlated with the cooking time; in fact, short pasta with high thickness has a long cooking time. This consideration was taking into account to establish the preference versus for this criterion.

Finally, the Production cost in terms of quantity of *Opuntia* solution (8 €/L) used and energy consumption (0.18 €/kWh) was calculated.

The yellow index and the relative humidity criteria have to be maximized whereas the thickness and the production cost have to be minimized.

2.3 Topsis technique

The first step of this methodology involves the definition of a decision matrix. The decision matrix is a table in which the *m* rows represent the samples and the *n* columns represent the selected criteria. A value found at the intersection of row and column in the table represents the performance of a decision alternative according to a criterion.

$$R=[r_{ij}]_{mn} \quad (1)$$

For the case study the decision matrix is shown in table 4.

Table 4 Decision matrix

Short	Firmness	Stickiness	Yellow index	Relative humidity (%)	Thickness (mm)	Cost [€]
T32a	65	65	25.1	11.36%	1.70	26.71
T32b	70	65	24.9	12.29%	1.81	26.71
T34a	60	60	25.1	11.96%	1.70	27.02
T34b	65	55	24.1	12.41%	1.82	27.02
T36a	55	60	23.2	12.73%	1.72	28.98
T36b	60	60	23.4	12.35%	1.84	28.98
T38a	65	55	21.1	12.62%	1.73	30.19
T38b	60	55	21.6	13.50%	1.86	30.19
Long	**Bulkiness**	**Firmness**	**Stickiness**	**Yellow index**	**Relative humidity (%)**	**Cost [€]**
L30	65	55	60	25.4	11.54%	39.15
L31	60	60	65	26.0	11.63%	39.23
L32	65	65	65	25.3	11.02%	39.31
L33	70	65	60	24.6	11.98%	39.39
L34	65	70	55	23.7	12.46%	41.42
L35	60	60	60	24.2	12.57%	41.50
L36	55	65	60	23.2	12.28%	43.53
L38	55	60	55	22.8	12.86%	45.49

As said before, this research takes into account the claim of the D.P.R 187/01 (art. 6). It sets an upper bound value for the relative humidity level equal to 12.5%, therefore the samples T36a, T38a, T38b for short pasta and L35, L38 for long pasta, are not admissible solutions.

The second step of the proposed multi criteria methodology is to construct the weighted normalized decision matrix *V*, multiplying each element of the normalized decision matrix *R'* by the weights *wj* of the corresponding criteria.

$$v_{ij} = w_j \cdot r'_{ij} \quad \forall i, \forall j \tag{2}$$

Subsequently, according to the Topsis methodology, the positive ideal solution Azimuth (A*) and negative ideal solutions Nadir (A-), have been identified.

$$A^* = \{v_1^*, ..., v_n^*\} = \left\{\left(\max_{\forall i} v_{ij} \middle| j \in I'\right), \left(\min_{\forall i} v_{ij} \middle| j \in I''\right)\right\}, \tag{3.1}$$

$$A^- = \{v_1^-, ..., v_n^-\} = \left\{\left(\min_{\forall i} v_{ij} \middle| j \in I'\right), \left(\max_{\forall i} v_{ij} \middle| j \in I''\right)\right\} \tag{3.2}$$

The third step of the methodology consists in the calculation of the relative distances.

$$S_i^* = \sqrt{\sum_{j=1}^{k} (v_{ij} - v_j^*)^2} \quad i = 1, \cdots, n \tag{4.1}$$

$$S_i^- = \sqrt{\sum_{j=1}^{k} (v_{ij} - v_j^-)^2} \quad i = 1, \cdots, n \tag{4.2}$$

The final step combines the two distances in order to obtain the relative coefficient closeness by the following equation:

$$C_i^* = S_i^- / (S_i^- + S_i^*) \quad 0 \le C_i^* \le 1 \quad i = 1, \cdots, n \tag{5}$$

3.Results and discussions

In this paper the weights of the criteria were evaluated by means of the Delphi technique (Delbecq, 1975). In particular, the panel of experts has been iteratively queried by means of questionnaires until the agreement was achieved. Table 5 reports the weights obtained for each criterion for short (T) and long (L) pasta.

Table 5 Weights for each criterion

	Bulkiness	Firmness	Stickiness	YI	RH	Thickness	Economic
T	/	0.284	0.215	0.122	0.041	0.039	0.300
L	0.271	0.200	0.144	0.055	0.032	/	0.300

At this point the weighted normalized matrix for both the types of samples was built and the values of Azimuth and Nadir were determined as reported in tables 6 and 7.

Table 6 Weighted normalized matrix for short pasta and ideal solutions

	Firmness	Stickiness	Yellow Index	Relative Humidity	Thickness	Economic
T32a	0.1285	0.1022	0.0557	0.0174	0.0165	0.1313
T32b	0.1384	0.1022	0.0553	0.0188	0.0176	0.1313
T34a	0.1187	0.0944	0.0557	0.0183	0.0165	0.1328
T34b	0.1285	0.0865	0.0535	0.0190	0.0177	0.1328
T36b	0.1187	0.0944	0.0520	0.0189	0.0178	0.1424
A*	0.1384	0.1022	0.0557	0.0190	0.0165	0.1313
A-	0.1187	0.0865	0.0520	0.0174	0.0178	0.1424

Table 7 Weighted normalized matrix for long pasta and ideal solutions

	Bulkiness	Firmness	Stickiness	Yellow Index	Relative Humidity	Economic
L30	0.1132	0.0705	0.0577	0.0229	0.0125	0.1188
L31	0.1045	0.0769	0.0625	0.0234 (4.1)	0.0126	0.1190
L32	0.1132	0.0834	0.0625	0.0228	0.0120	0.1193
L33	0.1219	0.0834	0.0577	0.0222	0.0130	0.1195
L34	0.1132	0.0898	0.0529	0.0214	0.0135	0.1257
L36	0.0958	0.0834	0.0577	0.0209	0.0134	0.1321
A*	0.1219	0.0898	0.0625	0.0234	0.0135	0.1188
A-	0.0958	0.0705	0.0529	0.0209	0.0120	0.1321

Finally, the relative distances were calculated according with equations 4.1 and 4.2 in order to obtain the coefficient closeness (eq. 5). The final ranking for short pasta shows that the best sample is T32b while for long pasta is L33. These results are reported in tables 8.

Table 8 Final ranking for short (a) and long (b) pasta samples

Ranking (a)	C* (a)	Ranking (b)	C* (b)
T32b	0.9597	L33	0.7973
T32a	0.6875	L32	0.7112
T34b	0.4265	L34	0.6435
T34a	0.3802	L30	0.5094
T36b	0.2474	L31	0.4759
		L36	0.3110

The proposed approach configures as a structured methodology for determining the optimal combination in terms of quantity of *Opuntia* solution, process parameters and economic aspects. In particular, for the short pasta the best solution is the one in which the criteria of firmness, stickiness and cost were optimized while for long pasta the best solution is characterized by balanced values of all criteria considered. These considerations are strictly associated with the criteria weights and the selected methodology. Further investigation could be done in order to demonstrate the stability of the solution obtained and considering the uncertainty associated with the judgements of the experts.

4. Conclusions

Functional foods may provide protection against the risk of chronic diseases and health benefits beyond the ones deriving from basic nutrition. In this paper an innovative functional pasta comprising *Opuntia* was analyzed in order to determine optimal production parameters in terms of quantity of *Opuntia* solution and process variables. Two different types of pasta were produced and for each one of them 8 samples were prepared. To evaluate the organoleptic characteristics and physical properties, a set of criteria was identified and the relative importance of them was achieved by means of the Delphi methodology. A multicriteria decision approach was implemented to order the samples and to select the best one. In particular the TOPSIS technique was applied and the results obtained show the optimal sample for the two kinds of pasta are T32b and L33 respectively. Further investigations are needed to improve the limited knowledge and the awareness of the consumers related to the healthy effects of the functional food, then specific activities aimed at filling this gap are a necessary prerequisite for a possible market success. Finally, an economic analysis to assess the sustainability of the production of this innovative functional pasta is mandatory.

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Appendix A. FIRST APPENDIX

Recipes	Drying steps	Time (min)	Temperature (°C)	Relative Humidity (%)
T32a	Step 1	60	35	85 %
	Step 2	180	45	78 %
	Step 3	240	55	75 %
	Step 4	240	55	70 %
	Step 5	60	45	68 %
T32b	Step 1	60	35	85 %
	Step 2	180	45	78 %
	Step 3	240	55	75 %
	Step 4	240	55	70 %
	Step 5	60	45	68 %
T34a	Step 1	60	35	85 %
	Step 2	180	45	78 %
	Step 3	240	55	75 %
	Step 4	240	55	70 %
	Step 5	60	45	68 %
T34b	Step 1	60	35	85 %
	Step 2	180	45	78 %
	Step 3	240	55	75 %
	Step 4	240	55	70 %
	Step 5	60	45	68 %
T36a	Step 1	60	35	85 %
	Step 2	180	45	80 %
	Step 3	240	55	78 %
	Step 4	300	55	75 %
	Step 5	60	45	70 %
T36b	Step 1	60	35	85 %
	Step 2	180	45	80 %
	Step 3	240	55	78 %
	Step 4	300	55	75 %
	Step 5	60	45	70 %
T38a	Step 1	60	35	85 %
	Step 2	210	45	83 %
	Step 3	240	55	78 %
	Step 4	300	55	75 %
	Step 5	60	45	70 %
T38b	Step 1	60	35	85 %
	Step 2	210	45	83 %
	Step 3	240	55	78 %
	Step 4	300	55	75 %
	Step 5	60	45	70 %

Recipes	Drying steps	Time (min)	Temperature (°C)	Relative Humidity (%)
L30	Step 1	60	35	80 %
	Step 2	420	45	85 %
	Step 3	240	50	85 %
	Step 4	180	50	75 %
	Step 5	180	60	75 %
	Step 6	120	55	70 %
L31	Step 1	60	35	80 %
	Step 2	420	45	85 %
	Step 3	240	50	85 %
	Step 4	180	50	75 %
	Step 5	180	60	75 %
	Step 6	120	55	70 %
L32	Step 1	60	35	80 %
	Step 2	420	45	85 %
	Step 3	240	50	85 %
	Step 4	180	55	75 %
	Step 5	180	60	75 %
	Step 6	120	55	70 %
L33	Step 1	60	35	85 %
	Step 2	420	45	90 %
	Step 3	240	50	85 %
	Step 4	180	55	85 %
	Step 5	180	60	75 %
	Step 6	120	55	70 %
L34	Step 1	60	35	85 %
	Step 2	420	45	90 %
	Step 3	240	50	85 %
	Step 4	180	55	85 %
	Step 5	240	60	75 %
	Step 6	120	55	70 %
L35	Step 1	60	35	85 %
	Step 2	420	45	90 %
	Step 3	240	50	85 %
	Step 4	180	55	85 %
	Step 5	240	60	75 %
	Step 6	120	55	70 %
L36	Step 1	60	35	85 %
	Step 2	420	45	90 %
	Step 3	240	55	85 %
	Step 4	240	50	85 %
	Step 5	240	60	75 %
	Step 6	120	55	70 %
L38	Step 1	60	35	85 %
	Step 2	420	45	90 %
	Step 3	300	55	85 %
	Step 4	240	55	85 %
	Step 5	240	60	75 %
	Step 6	120	55	70 %