

Chapter 1 : Introduction to Retort Pouch Technology, PLACE Conference

A retort pouch is a heat resistant bag made of laminated plastic films or calendrierdelascience.com the name implies, the Retort Pouch Technology for Ready To Eat Products.

Flexible packaging dominates the global food industry as it is widespread in nearly all food categories. More and more consumers are seeking products with smaller packaging, re-sealability and cooking flexibility and flexible packaging is offering them these convenient solutions. Although, the best performing type of food packaging is rigid plastic, popularity is growing for flexible plastics as they are seen to be convenient and light. Furthermore they offer scope for innovation and development. In a world with consumers with busy lifestyles and the need for quick-to-eat food products, one packaging type may provide some solutions. To define the product, we could say that it is a heat-resistant bag made of laminated plastic films or foil. It is then heat-sealed and sterilized by pressure cooking in a retort autoclave to yield commercially sterilized state of foods. As a result, the retort pouch contains heat-treated food which is safe from micro-organisms. Brody, a professor in the Department of Food Science and Technology at the University of Georgia adds to this definition by saying: Historical Overview The retort pouch is not exactly new to the market. Scientists hailed it as the most revolutionary development in food packaging since the tin can. The retort pouch then became widely used by the US military for field rations. It was then only a matter of time before the pouch would enter the consumer market. The retort pouch was branded as the next big thing which would take market share of the dominant metal can industry. However, two decades went by and no radical changes were seen. After pet food, human food progressively made its way into the pouches. After StarKist other food manufacturers decided to launch their products in retort pouches. Pros& Not only has the retort pouch been fighting an established metal-can and rigid-plastic monopoly, it is faced with consumer indifference, and slow machinability. There is light at the end of the tunnel, however, as more and more food processors and packagers are selling their products in pouches. The players of the food industry who opted for the retort pouch considered several factors: Additionally, for the shopper, they are easier to use in cooking. Some food scientists even go on to say that pouches have a big advantage over cans as their contents remain better-tasting. Finally, the retort pouch sometimes has a re-closable zipper, which is a value-added convenience option, allowing better product conservation. The multi-portion packs used in the foodservice and restaurant sectors are especially popular. In some applications, the retort pouch can even be less expensive than rigid plastic containers. In the past, there have been quality and control concerns such as pinholes, flex cracks and leaks in the flexible packaging material and seals. Moreover, the financial factor also has its importance. Stanley Sacharow argues that, for the retort pouch to capture additional market share, an entirely new supermarket infrastructure is needed as production lines, generally, are not well adapted for the pouches. Huston Keith also points out that the cost of producing a retort pouch is higher than the cost of producing a tin can. Despite these differences in opinion, the market for retort pouches is currently a niche market as it holds immense potential and opportunities for growth. The UK One country where the retort pouch is becoming more and more mainstream is the UK, where consumers seem to have adopted the product. The UK is also a pioneering country in terms of modified atmosphere packaging. PCI argues that due to the high level of flexible packaging in the UK, it is expected that future growth will mainly occur with material substitution and retailer demand. Hence, in , the supermarket chain launched a range of nuts in a highly transparent oxygen protection laminate provided by Amcor Flexibles. Retort Pouch â€” a High-Tech Global Collaboration Retort pouches not only unite companies in the UK but require the knowhow and production technology of foreign partners. CLP claims that the dwell time in the retort chamber is short, which prevents the flavours from developing an overcooked taste that could compromise a delicate vanilla sauce or a well-balanced gravy. A shiny, nonfoil laminate was chosen for four sauces in the line, which include Turkey Gravy, Cranberries in Ruby Port Sauce, Blueberry Dessert Sauce and Vanilla Custard, because the nonfoil structure can be heated in a microwave oven. The total thickness is microns almost 4 mils. CLP prints, laminates and converts the pouches on a high-performance line equipped with a Cerutti gravure press and a Rotomec solvent-based

laminator, says CLP. Food giant Unilever, for instance, believes to have benefitted from the pouch. Unilever then decided a further roll out of soups in pouches in the European market. Unilever subsidiary Bertolli also sells its pasta sauces in a similar pouch. Prospects As previously demonstrated, all the ingredients to make the retort pouch a success are here. The consumer is the driving force for retort pouch technology, which has the ability to satisfy growing demand for easy-to-use, convenient products that save time. Some pouches do not contain aluminium which allows quick warming up in the microwave oven. With the retort pouch, the food producers themselves are given the opportunity to make their products look innovative, appealing, and even fun. The fact that retort pouch technology is consistently evolving is seen as critical for the market research company, which goes on to say that effective packaging increases market share. The retort pouch has innovated with the re-closable seal as well as the zipper mainly made of polypropylene to withstand high temperatures. Finally, one can argue that the consumer is ready for the retort pouch. Maybe back in the s, the consumer did not fully grasp its meaning. But now, with the gradual introduction of the pouch in the pet food industry followed by the food industry, the consumer is aware of its potential. Huston Keith also explains that the retort pouch is becoming more and more popular globally. In Japan, the technology has been a success with up to half the market share from tin cans, with an estimated 1. Japan is the home to some of the leading equipment suppliers which have helped the retort pouch move forward. Along with the UK, other European nations have adopted the pouch, which has become the commonplace for several products, such as pasta bake sauces, soups, tuna, microwaveable rice dishes, as well as pet food snacks of course, says Keith. Allied Development Corporation of Burnsville, Minnesota, a consulting firm primarily serving the packaging industry, says, in a September report, that global retort pouch consumption has exceeded 10 billion pouches per year. The consulting company also predicts consumption to reach nearly 19 billion pouches per year by

Chapter 2 : Retort pouch - Wikipedia

Retort pouch is acceptable and even superior to glass or metal containers. The pouch has the same shelf-life as the can or the ready-to-cook products packed in flexible plastic pouches.

Scott Williams, Vice President, Allpax Products Introduction There is no doubt that there are advantages to packaging food products in the retort pouch. There are also additional advantages which include reduced shipping costs and storage space for the empty containers. The pouch also has good shelf appeal and a growing acceptance by consumers. There are however many processing challenges in using the retortable pouch as compared to a metal can. First and most significant is that a pouch does not fill, seal, or handle like a can. The equipment needed to fill and seal pouches is more sophisticated and expensive as compared to can sealing equipment. The same is true for the handling systems pouch loaders and unloaders. The material that follows is an overview which covers those considerations which should be taken into account when planning and designing a retort pouch line. Major Equipment Components There are seven major equipment categories that comprise a retort pouch line: In designing a pouch line, the desired line speed is what drives most if not all of the other design decisions. The loader will have to collate the pouches in a manner that they can be placed in a racking system. More detail on this subject is presented further below. The layout or pattern of the rack must efficiently work with the robotic pouch loader. The loader will operate most efficiently and at the highest line speed when the number of rows in the rack match or are devisable by the number of rows being output from the filler sealers. For example, if there are two filler sealers, each with an output of 2 lanes of pouches, the optimal rack design would be 8 or 12 rows wide each devisable by 4 which is the total number of lanes being produced. A rack design with 9 rows would not work. Once the conceptual rack design is done, then retort sizing can be started. It is sometime necessary to revisit the pouch size at this point, since a small change in the dimensions of the pouch, can sometime greatly enhance the efficiency of the line design. Pouches racks can be fabricated in one of two ways: Stainless steel or aluminum construction Injection molded plastic construction Allpax injection molded trays - GE resins Both the stainless and plastic racks have advantages and disadvantages. Stainless racks have a long service life. They can be produced in small numbers but do have a high individual cost. Pouches are placed into a tray that must cradle the pouch and protect the integrity of the pouch. It must prevent the weight from other pouches from resting on top of the pouch. The tray, while simple looking, must be well designed. It must be stiff enough for the pouch loader to stack and destack cubes. It must incorporate a design that promotes good thermal distribution and allow for adequate flow. It must be strong enough to allow for the weight load of a whole cube to be supported by the frame members. It must also be free of any type of burrs or defects that could damage the integrity of the pouch. Handling Pouches Allpax Model x high speed loader As stated earlier, most design decisions will flow from the line speed definition and the pouch geometry. As compared to cans, line speeds for pouch lines will generally be slower. The most important aspect in understanding pouch handling is to break any preconceived notion that pouches are similar to cans. Allpax x pouch staging - 4 fillers producing a 2-up pattern One of the misconceptions that many folks have regarding pouches is that the pouch can be used with the same material handling system as cans. Pouches behave much differently than cans and require completely different handling techniques. Cans behave like well-trained soldiers that stay organized and move in unison. On the other hand, pouches behave like felines; they go any way they please and are uncooperative. The pouch loader is designed to stage the pouch into a tray pattern "â€" and this must relate to the manner in which the pouch filler feeds them to the loader. Pouches are staged into a tray pattern, then a pneumatic pick and place head lifts the staged pattern and places it into the tray. A fully loaded tray is stacked, one on top of another, to create a cube. The cube is roughly the shape of a retort basket. Again, due to the nature of cans which nest into overlapping rows and columns. A pouch eats up a lot of room. It must reside in its own compartment. There are three types of process that you could use to perform an overpressure process. The following describes these process types. Overpressure retorts are required when sterilizing glass containers, flexible pouches, and semi-rigid plastic containers. They tend to be more complex and expensive than comparable sized steam retorts. Most include

pumps, motors, drive units, automated valves, and sophisticated controls. The three types of overpressure retorts which are commonly used include: A brief discussion of each follows.

Allpax Model water immersion retort Water immersion retorts generally have the most flexibility when it comes to processing various container types. Water immersion retorts can be effectively run in rotary and non rotary modes. Water spray processes are appropriate for most container types but care must be taken regarding container loading patterns. Water spray processes are typically not done in a rotary mode because of the tendency to have the water migrate to the exterior of the basket as rotational speed increases resulting in poor temperature distribution. A full water process is gentler on both the container and the rotary mechanism of the retort. One alternative for lines that will be used for multiple container types is to consider a Multimode retort. The Allpax Flex line of retorts provides more than one process style in the same retort. This style retort is more complex than a single mode retort, but does provide processing options if more than one container type is to be used. They can be built to order with any combination of process styles. Conventional single mode retorts can be installed in Flex lines that incorporate two or more container handling systems.

Allpax Model water immersion retort Full water immersion: This style of retort is the most widely used overpressure retort in the industry. Full water immersion retorts are available as either vertical or horizontal versions. The vertical model has historically been used to process glass containers with lug or screw type lids. In this system, water is introduced into the retort at the beginning of the day and brought to a level which will cover the upper most basket when fully loaded. Once loaded, the temperature and pressure are ramped upward until both temperature and pressure requirements are met. The pressure setpoint is typically higher than the corresponding vapor pressure attributed to the setpoint temperature. Pressure is maintained during cooling and the cooling water is left in the retort to be used for the next batch. This style of retort is generally not used for new lines. Horizontal models can be either self contained with hot well as shown, above or be single vessel retorts which depend on a centralized hot well. In the self contained models, the retort consists of both a lower processing vessel and an upper storage vessel which serves as the hot well. Superheated water is stored in the upper vessel and dropped to the lower vessel at the beginning of the come-up phase. During the cook phase, pressure is maintained in the lower processing vessel by pressure control in the upper storage vessel. A small amount of water is left in the top vessel and the vessel is pressurized by either steam or air. The pressure is transmitted to the lower drum by a connection valve. Following the cook phase, the hot water is returned to the upper drum and stored for the next cycle. Control pressure is usually maintained until the upper drum is filled and then slowly ramped down. A considerable energy savings is realized since the water which is pumped back only requires a small amount of heating prior the next cycle. Full water immersion retorts are typically pressure rated to at least 50psi or higher. This style of retort is available in both rotary and non-rotary models. While pouches can be run in full water immersion retorts, other styles of overpressure retorts are better suited for processing pouches. Most water immersion retorts are rotary models which are not needed for pouches.

Allpax Model water spray retort Water Spray: Like the full water immersion retort, the water spray is an overpressure style of retort. Unlike the full water immersion models, the water spray retort uses only a small quantity of water gallons which is pumped at a high flow rate. Water is dispersed by means of a perforated plate distribution system or by spray nozzles. The water is then pumped through a heat exchanger before returning to the distribution manifold. Models can be built which have an independent storage tank for hot water or no storage tank at all. In the latter model, water is stored in the bottom of the retort. Since the same water is used for both heating and cooling, the use of cooling water sanitizers is eliminated. Depending on the cooling medium available at the installation site, considerable water savings can also be achieved. Steam is injected directly into the vessel by one or more bottom located spargers. Pressure control is accomplished by air and achieved through a completely independent control loop. Because of the corrosive environment created in this process, it is recommended that vessel construction be of stainless. Allpax Model water spray retort Water spray retorts are typically pressure rated to at least 50psi or higher. Both rotational and non-rotational models are available. Spray processing is a good choice for pouches since rotation is typically not needed. Sterilization in this type of retort is accomplished by using a steam and air mixture which is circulated within the retort by means of a turbine type fan. The homogeneous mixture of steam and air is drawn to the rear of the retort by the fan and

then back to the front in a channel between the retort shell and baskets.

Chapter 3 : Retort process modelling for Indian traditional foods

"Retort Pouches - Webinar Data - to " includes the ENTIRE set of quantitative data in the Retort Pouches webinar and study, including market statistics and market forecasts. Click the Brochure and the Table of Contents links to the study for the type of data that is included in the tables from the webinar presentation.

Can it be a Competitive Weapon Lecturer: May 13, Submitted By: Can it be a Competitive Weapon by Nazifa Abd Ghani Abstract The effects on the quality product of shrimp sauce were determined by using two different packaging method. A literature review of general information on Retort pouches, processing, emerging technology in packaging industry as well as the success factors on using Retort technology are presented. A Retort pouch packaging has been found to provide shorter processing time and this lead to the achievement of minimum cost packaging system compared to the conventional cans. Although the costs for acquiring and maintaining Retort technology are higher than a canning system, but the operation process and expenses related to the packaging system are found to be lower and worth depending on them. The results of this study is significant in food packaging industry because the Retort technology revealed its beneficial to companies productivity and product quality with shorter processing time. Shelf life of a food is integrally related to its packaging and the product conditions. The major driving forces for innovation in food packaging technology had increased due to the rise in consumer demands. Retort technology systems use steam or superheated water to cook food in its own package, thus extending shelf life and ensuring food safety. Manufacturers of food products who face a challenge in making their packaging product attractive consumers to should design packages with an innovative look. The revolution in packaging technology has boost up food suppliers mind to be creative in providing a convenient food to the consumer. In fact most of the grocery shops or supermarkets want the food product they buy from the manufacturer to be as convenient as possible. In fact, from the consumer point of view, the less time they spend to prepare a meal, the better. As mentioned before, new advance in technology of packaging has begun to transform the marketing and goods of food products. Retort pouch technology is the solution to meet consumers demand that will help consumers save time and energy. This paper will investigate the significant advantages of acquiring Retort technology in terms of the quality attribution of the produced products in comparison with the conventional canned. As the quality of the food will increase by using Retort technology, so the conventional food packaging material will be substituted. The emerging technology in the food packaging industry resulted from the increasing demand among consumers. Retort is feasible to be a competitive weapon for manufacturers who applied this technology in their factories. As a matter of fact, to adequate this technology among food manufacturers is not a must, but having this technology clearly gives a great impact in improvement of productivity. Retort Technology, shelf life, food processing, Retort pouch technology, consumer 2 1. The evolution of packaging food material refers to the last years. With the development of flexible packaging and barrier layer technology to the marketplace, food suppliers are now becoming presentable with the emergence of innovative packaging options. For instance, pouches made from the combination of specialty firms which allow consumer to purchase rice already cooked and ready to eat, even though previously they need to cook their rice themselves. The current trends have developed two major convenience styles in food services packaging industries which are meals eaten in transit and multi-element meals. The reputation of meal eaten while travelling is obvious given that only 60 per cent of package meals are eaten at home Packaged Facts, whereas 20 per cent of consumers enjoy their meal on their journey to particular a destination. As a result, this situation, affects the value growth of food industry as well as packaged food product. Indeed the manufacturers will therefore require to provide new strategies and innovative thinking in order to fascinate more consumers. The Malaysia International Food Processing and Packaging Exhibition being established with the aimed to handle and assist any exhibition activities purpose to enhance the manufacturers to develop new technologies in order to improve product quality, extensive shelf life and encourage to reduce the usage of preservatives in food processed. The food and packaging industry as well as beverages industry give massive contribution towards the economic growth in Malaysia. In reality, the industry of food processing is dominated by Small and

Medium Enterprises SMEs , whereas the majority of them started business using the concept of family-owned. There are almost 9, of food manufacturers in Malaysia which 95 per cent come from SMEs. In fact, this kind of products have higher possibility to enlarge their target market size. On the other hand, these small-scale entrepreneurs however faced some issues related to the packaging of process food that hinder their progress in order to be competitive in the industry. The significant reasons for this matter occurred from the factor of low level technology, quality problems, lack of Research and Development source of innovation, lack of finance as well as competitive market. In terms of low-level technology, most of the small-scale food enterprises in Malaysia use traditional conventional method because of financial constraints that hesitated them to buy sophisticated machinery as well as lack in technical support. Moreover, the majority of SMEs entrepreneurs cannot maintain the cost for servicing the sophisticated machinery. In fact repairing this technology machine takes time since maybe some of the spare parts need to be imported. Manufactures must be creative in order to develop their business growth , resolved issues intelligently and at the same time, think out of the shelf. In fact, manufacturers of food products faced a challenge in making their packaging product having an innovative look. The revolution in packaging technology has boosted food suppliers mind to be creative in providing a convenient food to the consumer. In fact most of the grocery shops or supermarkets wish the food product they buy from the manufacturer to be as convenient as possible. Retort pouch technology is the solution for substituting conventional canned food in order to meet consumers demand that help consumers to save time, energy and provide better quality. But bear in mind that, buying high technology machine does not necessarily prove that the technology is worth in their business profitability and productivities. In this matter, some comparative study should be done. Therefore, the objective of this paper is to investigate the significant advantages of acquiring Retort technology in terms of the quality attribution of the produced products with comparison of the conventional canned. For the introductory of this report, it begins with the explanation of the current situation of food packaging industry in Malaysia and the major issues affecting the packaging of the processed food. Then, an analysis of the study will be performed after reviewing other researchers previous study in the Literature Review section. Finally, the report will present a conclusion based on the findings. Due to this invention, Louis Paster and his colleagues came up with the introduction of food microbiology in the 19th century and then Samuel C. Prescott and William L. Underwood made an effort to establish the basis theory related to bacteriology which is being applied for the canning system Wilson, The ideas to preserve and package food were similar to the ideas of the other packaging developer such as the emergence of cutting dies specifically introduced for paperboard cartons by Robert Gair as well as the creation of glass bottles by Michael Owens. Fortunately, through rapidly emerging of technology in this industry. Thus, in the early of 20th century, conventional canned, glass bottles and wooden crates were introduced to be used as the packaging material in the market for food and beverage distribution. Military necessity has helped to enhance and rapidly develop packaging technology in the food industry. Retort pouches are popular among countries like Asia and Europe and have developed rapidly in that countries. According to Huston Keith, who is the principal of Keymark Associates in Marietta, GA, there were about million to 1 billion pouches that have been successfully sold in Canada and United States in Retort pouch is substituting the conventional metallic canned to an enormous extent through the capability of the pouch to withstand high temperature and offers convenience result in food handling. Sastry at Ohio State University have conducted a study related to pouch technology. This purpose implies to delay the deterioration, prolong of shelf life and safeguarding of the food packaging quality. Extension of shelf life involves for the destruction of the growth of an enzymatic, microbial and biochemical activities throughout varieties of approaches for example moisture influence, temperature control, and existing of chemicals such as salt, sugar and natural acid Robertson, Through the technology of Retort, it has been proved that, the usage of this technology not only provide a good quality of packaging but can help food manufacturers to produce long lasting products without any preservatives. Concerning to what kind of food product that is suitable to use with Retort technology? Well there are various of different food products that utilize retort pouches in the market such as pet food, seafood based product, meat, rice and soups. Food Companies like Tyson, Masterfoods Inc. Packaged and Retort Pouches Figure 2: Types of tray packs for Thermally Process Food 2. Based on the research, it has been found that sardines

processed through Retort pouches produced shorter time if compared to conventional can. Besides that, another study that have created attention among manufacturers is the study involving mushrooms which has been processed in retort pouches. The study proved that the mushrooms remained sterilise and fresh without any distortion, leakage or spoilage even after 12 months when keeping it inside the Retort pouches Chandrasekar, Interestingly to know that the products in pouches had better taste, and provided good quality of texture attributes in terms of the chewiness, firmness and hardness. The study also mentioned several advantages of retort pouches compared to conventional cans which has been based on the other research article: The study identified that the retort packaging method provided least costly compared to the conventional canning line. However, the price for acquisition Retort technology as well as its maintenance were notably higher than the conventional one. But bear in mind that the retort pouch packaging system gives a lower freight costs since Retort pouch possess a lighter heaviness and encompasses a smaller volume of the pouch. Indeed the study stated that the purchase price of the pouch is lesser that the conventional can. Up to this point, Retort pouches also help to save on energy through efficient transportation and reduced the storage capacity in manufacturing. In order to know the relevance for the manufacturer to use this technology in terms of costing viewpoint, the manufacturers should focus to the Life cycle cost of the machine itself. According to the Society of Automotive Engineers SAE , life cycle cost LLC is defined as the total amount of cost for having a rights towards the machine, consisting the cost of acquisition, its servicing, functioning, modification and decommission. The purpose of LLC approach is to make an effective decision based on a series of alternatives. Engineers in the manufacturing must be alerted with LLC in order to create efficient economic decision through engineering. Life Cycle Costing Process Source: Barringer, In order to know the effectiveness of buying the technology in terms of costing, the manufacturers need to examine the significant advantages of using the new technology and compared it towards the conventional method. In this case, Retort packaging system can reduce the processing time of the end products. This technology makes the processing time shorter because of the high ratio of surface area towards volume. Energy saving, time saving and increase productivity of the manufacturing are the result from reducing the processing time. These elements lead to an outcome of money saving. In fact LLC is classified into two significant group which are acquisition and sustaining costs. Figure 5 and 6 show the illustration of the cost tree. Acquisition Cost Tree Figure 6: Sustaining Cost Tree Source: Barringer, 8 3. Upon preparation the shrimp are washed with chilled water. At first the shrimp are precooked in solution of 4 percent salt water for 4 minutes and cooled under the room temperature. Ingredient for Shrimp sauce preparation 3. The processing time is measured using the formula taken from Stumbo, This measure is to know the percentage of nutritional loss which determines the textural changes occurred during processing time.

Technology Retort Pouch, Frozen Food, Flexible Pouches and Bags, Innovations, Trends & Development, Specification guidelines and The Future of Flexible Packaging Design for a Circular Economy.

If the seal is not robust enough, spoilage and pathogenic bacteria may be able to penetrate, potentially leading to food waste. This potentially equates to , tons of food waste. Better seals could reduce this, and lead to cost savings in the factory. This presentation will review common inspection methods for inspecting pouches and airborne ultrasound technology for pouch seal inspection as an in-depth process control tool. Critical issues with retort pouches continue to be seal quality and pouch integrity. Detecting defects early on in the manufacturing process is critical to increasing output, reducing waste, while assuring product quality and shelf life. Also provides an overview of high voltage leak detection HVLD for liquid filled pouches. This is an excellent opportunity for quality assurance professionals in the packaging industry to hear a presentation about the importance of non-destructive testing and how these technologies can assist companies to meet the challenges of this highly regulated and competitive market. Key learning points will include: Test methods that produce data that is quantifiable and repeatable. Latest developments in non-destructive package inspection technologies for food, pharmaceutical and medical device industries. To view full agenda of this seminar, go to: It is committed to providing industry with the research, technical and advisory services needed to ensure product safety and quality, process efficiency and product and process innovation. Campden BRI are a major training provider to food and drink businesses offering over scheduled courses and events. About Tony Stauffer For over 27 years, Tony Stauffer has focused on developing inspection technologies for the packaging industry that perform with a high degree of precision and reliability, and simplify testing and validation processes in the food, pharmaceutical, medical device and container industries. He has been awarded several U. About PTI Inspection Systems PTI Inspection Systems is the leading manufacturer of non-destructive package inspection technologies for the pharmaceutical, medical device, food and container industries. We offer inspection systems for package integrity testing, seal integrity and leak testing. Our technologies exclude subjectivity from package testing, and use test methods that conform to ASTM standards. PTI Inspection systems provide repeatable, reliable results and can be incorporated into protocols at any point in the manufacturing process as they are non-destructive, non-invasive and require no sample preparation. Like what you are reading? Sign up for our free newsletter I agree to the Terms and Privacy Statement.

Chapter 5 : calendrierdelascience.com | One Stop Solutions for Retort Processing applications

LIBO Packaging Manufacturer is a professional plastic packaging company, Possess advanced automatic machines. With about twenty years printing experiences, our company is devoting to flexible packaging such for food, beverage, meat products, flavoring, snack food daily-use products and chemical products.

Revised Aug 28; Accepted Sep 3. Abstract Indian traditional staple and snack food is typically a heterogeneous recipe that incorporates varieties of vegetables, lentils and other ingredients. Modelling the retorting process of multilayer pouch packed Indian food was achieved using lumped-parameter approach. A unified model is proposed to estimate cold point temperature. A model was developed using combination of vegetable solids and water, which was then validated using four traditional Indian vegetarian products: Pulav steamed rice with vegetables, Sambar south Indian style curry containing mixed vegetables and lentils, Gajar Halawa carrot based sweet product and Upama wheat based snack product. Thus the model will be useful as a tool to reduce number of trials required to optimize retorting of various Indian traditional vegetarian foods. Retort processing, Modelling, Sterilization, Indian traditional foods Introduction Thermal processing is one of the major techniques used for producing packaged shelf-stable food products. Retort processing of foods in semi-rigid, flexible laminates is an advanced form of food preservation by canning. It is a thermal process which imparts increased shelf life with good retention of nutrients and sensory parameters. Although different food processing technologies like high pressure processing, ohmic heating, etc. Changing lifestyle, increased work pressure and nuclear families are leading to exponential increase in the demand of ready to eat processed food in developing countries like India. A consumer would prefer his traditional food on a daily basis, provided a safe, tasty and processed option is available. In spite of old notions and psychological reservations against canned food, Indian market has accepted many retorted and pouch packed products. Traditional Indian vegetarian foods are mostly heterogeneous systems. Typically the recipe incorporates two or more vegetables, lentils, grains and cereals; cooked with spices and condiments. Since fat, spices and protein content of these raw materials is low, one expects the thermal properties to depend only on total solids and water content. Due to cultural diversity, there are over 2, different recipes of staple and snack food. As a result, optimized retorting conditions are developed for a specific product. There is a need to have an unified approach of mathematical modelling so that most of the products could be categorized in terms of total solids plant origin and water content. Several papers have been reported on product and process development of Indian foods, with most work on non-vegetarian foods such as Biryani Rice with red meat or chicken and fish curry etc. Dileep and Sudhakara; Jayakumar et al; Mallick et al. Among vegetarian products, rice and curries have been mainly studied. Abbatemarco and Ramaswamy; Bindu et al. Many of the reports on modelling of vegetarian foods have used Balls model and Stumbo model which has few limitations Sablani and Shayya Further, focus of these papers was more on microbial destruction, lethality and heat transfer aspects as very little has been reported on the same. Others have used classical modelling as a tool Alonso et al. These models were however product specific as they were based on thermal properties of that particular product. This work was therefore undertaken with the objective to develop a semi empirical unified model for prediction of time-temperature profile during retorting of Indian vegetarian products. Temperature of the retort vessel, initial product temperature and solid content were the three independent variables considered. Cold point temperature of the retort pouch was estimated as a dependent parameter. The predictive model developed was validated using four different types of traditional Indian foods viz. A specially designed stainless steel thermo-well was inserted in the pouch so that its tip was in the geometric centre of pouch. It consisted of two rubber O rings, nuts and a space bar having hole in the centre through which a thermocouple could be inserted. These pouches were then thermally processed in a stainless steel still retort processing unit Laxmi Engineering, Chennai, India. Residual air in the retort vessel was steam exhausted and pouches were processed at required temperature and pressure. Model validation was done by using four traditional Indian vegetarian products: Pulav steamed rice with vegetables, Sambar a south Indian style curry, Gajar Halawa carrot based sweet product, Upama wheat based snack product. Ingredient composition used for method validation for different

products were as follows, Pulav: All the products were processed in the retort processing unit as per the procedure described above. Time-temperature profile was modelled using the proposed model and the constants of the same were used to validate the unified model. As a sample, results for Sambar are presented in Fig. Although correction for cum up time Eq.

Chapter 6 : Retort Sterilization in Food Processing | DataTrace

pouches and processed in a steam-air retort with overriding pressure. Time-temperature profile of processing was determined and the same was used for heat penetration characteristics.

Chapter 7 : Flexo technology seminar in Korea | Soma Engineering

Since the late 's, retail food products in retort pouches have experienced substantial growth. Much is known about processing shelf stable food products in rigid, metal cans, but the processing technology for retort pouches is different.

Chapter 8 : Retort Technology | Nazifa Ghani - calendrierdelascience.com

retort flexible packaging, no matter what it is, it tastes better, and the consumer pouch filling. "Retort technology has been developed and perfected for high.

Chapter 9 : Retro Pouches | Retro Bag Printing Technology | Retro Printing Title

Retort Pouch have been in existence for several decades. Since late 's, retail food products in retort pouches have experienced substantial growth in world market! This presentation will.