

Instant Noodles: Are they Really Good for Health? A Review.

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Review Article

Abstract

Instant noodles are generally used up in Asian nations. Instant noodles seem to have started in Japan in the 1950s and today, are created in more than 80 nations around the world. Accommodation and practicality are critical components adding to its expanding fame. Besides this all ultra-processed foods including instant noodles containing artificial food colors, flavorings and certain preservatives have adverse effects upon children. Children with ADHD are advised to avoid all food that may contain preservatives such as BHA, BHT, TBHQ and sodium benzoate. Safety concerns identified with instant noodle utilization are regularly ascribed to the higher measure of fat and sodium content in the item. Despite the fact that expanding utilization of noodles has prompted deliberate actions to investigate the attainability of utilizing instant noodles as a vehicle for micronutrient fortification. Another step towards bioremediation is to treat noodle waste as a tool. Noodle waste contains significant amounts of starch, lignocellulosic material and oil. Then, using esterification and transesterification reactions, the pretreated oil is converted to biodiesel. The residual starch and lignocellulosic mixtures are hydrolyzed enzymatically to form small sugar units, such as glucose and fructose. The obtained hydrolysate is then fermented to produce bioethanol (conversion rate 96.8%). The hydrolysate can also be used as a nutrient for growing microorganisms for the production of lipids, enzymes and pigments. Additionally, noodle waste can be converted to animal feed. By intervening new health friendly compounds in noodle manufacturing may start a new era of fear free instant noodle consumption. Furthermore, fortification of instant noodles with essential micronutrients like vitamins and minerals, fiber and other flours, which enhance their nutritional attributes, can be targeted to ensure better nutrition to the people.

Keywords: Instant noodles; Fried Noodles; TBHQ; Ramen; Udon.

1. Introduction

Long thin piece of dough made from a combination of eggs, flour and water typically cooked in soup or boiling water, is referred to as noodles. This food stuff is crafted from unleavened dough that is prepared from various types of components [1].

In many Asian states noodles are fed on as one of the staple food stuff. Instant noodles have turn out to be globally recognized food and global intake is getting higher. The strengths of instant noodles like nutrients, flavor, safety, convenience, affordable price and longer shelf-existence have made them famous. Shade, texture, flavor, cooking features, absence or presence of rancid flavor after long term storage and rehydration degrees throughout final provision are the value factors essential for instant noodles [2].

Instant noodles are available in dried and precooked noodle block, with seasoning oil and/or flavoring powder. The seasoning is commonly in a different sachet, in spite of the fact that if there should arise an occurrence of container noodles the flavoring powder is regularly free in the glass. Precooked instant noodle range is seal pressed and those might be warmth up or eaten in a flash from the holder/parcel. While dried noodle pieces are cooked or absorbed boiling water before expending [3].

1.1 History

Asian noodles, originated from China back in 5000 BC. Momofuku Ando developed "Chicken Ramen TM." In 1958, the world's first Instant noodles product manufactured on large scale by Nissin Foods, Japan. In culinary culture, a revolution delivered by means of his accomplishment. He mounted the manufacturing technique of flash frying noodles once they have been made, developing the "instant" noodle. This manner dried the noodles and furnished them a longer shelf life, even surpassing that of frozen noodles. Each noodle block become pre-flavored and sold for 35

Table 1. Nutrition facts of different kinds of noodles.

Types of Instant Noodles	Calories (kcal)	Total Fat (g)	Sodium (mg)	Potassium (mg)	Total Carbs (g)	Dietary Fiber (g)	Sugars (g)	Protein (g)
Ramen	420	20	0	0	60	0	0	10
Rice	160	0	25	0	37	0	0	3
Soba/Buckwheat	226.7	1.3	600	0	46.7	2.7	1.3	6.7
Bean thread	260	0	6	0	65	2	0	0
Udon/wheat flour	250	2	192	0	51	2	1	8
Shirataki	10	0	0	0	0	5	0	0
Egg	334	2	7	0	75	1	0	11

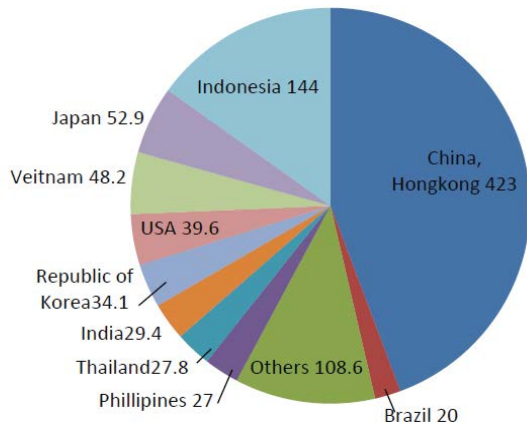


Figure 1. Consumption of instant noodles in different countries [data figures represents 100 million packets; plotted using data from WINA (2011)].

yen. At the beginning, because of its novelty and high price, “Chicken Ramen” becomes taken into consideration a luxury product, as eastern grocery stores typically retailed fresh noodles for one-6th their rates.

Instant noodles won enormous recognition in spite of this, especially after being sponsored by Mitsubishi Enterprise. Nissin delivered Nissin cup noodles in 1971, a polystyrene cup has instant noodles, to cook the noodles, boiling water is brought to create a complete instant soup dish, in addition innovation added dried vegetables to the cup [4].

1.2 Consumption world wide

Starting at 2008, right around 93.6 billion servings of instant noodles have been utilized around the world. Amid 2008, 45.2 billion bundles of instant noodles devoured in China, speaking to 51% of the worldwide utilization of instant noodles, while Indonesians spent 13.7 billion bundles, 5.1 billion bundles expended in Japan, Americans utilized 4.3 billion bundles and 3.3 billion bundles devoured in South Koreans. South Koreans devour the most noteworthy per capita measure of instant noodles at 69 servings for each year, which is 4.8 times more prominent than the utilization of Americans and 1.7 times higher than the per capita allow in Japan. Set up on the Korean National Health and Nutrition Examination

Survey (KNHANES) III report, instant noodles were expended at a level of 18.1 g for each day per capita across the country, that made instant noodles the second biggest nourishment sort after steamed rice that adds to the general vitality consumption of Japanese [5].

In the year 2000, according to a Japanese poll “the Japanese considered instant noodles as their best development of the twentieth century. Roughly 96 billion servings of instant noodles are eaten worldwide consistently, estimated in 2010. Indonesia consumes 14 billion packages of instant noodles per year, while China consume 42 billion packages that comprises of 44% of world consumption, like wise Japan, 5.3 billion, USA 4 billion, Vietnam 4.8 billion, Per capita. The greatest amount of instant noodles that is 69 billion per capita per year is consumed by South Koreans [6] (Figure 1) (Table 1).

1.3 Composition

The primary constituents in instant noodles are flour, starch, water, salt and additionally a salt substitute known as kansui, a kind of antacid mineral water containing sodium carbonate and ordinarily potassium carbonate and in addition at times a little measure of phosphoric acid. Particular sorts of noodle can be produced using a blend of wheat flour and other flour, for example, buckwheat. There are differences in the ingredients used depending on the country of origin in terms of the flour content and the salt content.

1.4 Production

Instant noodles are portrayed into two classifications on the premise of strategies used for the ejection of sogginess, i.e., instant dried noodles and instant fried noodles. Instant dried noodles are conveyed in a totally customized era line like the sort used for steamed and sautéed noodles, beside that a constant drying chamber replaces the significant fryer, using hot air as the drying medium. Sautéing the noodles in oil reduces the sogginess substance of noodles to around 2-5%, however in hot air dried noodles, it is around 8-12% (Figure 2).

Noodles get a penetrable surface subsequent

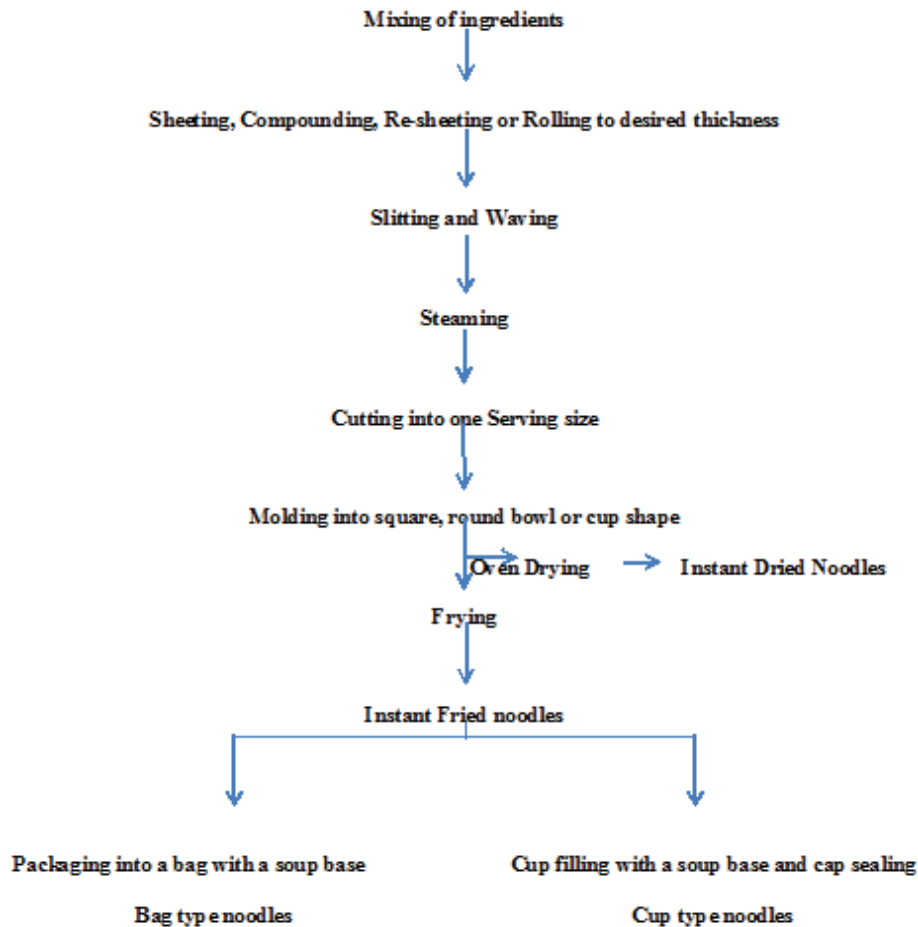


Figure 2. Processing and classification of instant noodles.

to warming amid browning or hot air drying that gelatinizes the starch, which encourages rehydration prepare while cooking the noodles. Hot air drying brings about uneven drying that harmfully influences the nature of the completed noodles, in this manner does not have the unique flavor presented by profound broiling and requires a more drawn out cooking time. Frying is the favored technique for drying and over 80% of instant noodles are fried on account of the resultant noodle item is much better in taste and taking care of. The downside of broiling, in any case, is that fried noodles hold around 15–20% oil (contrasted and a most extreme of 3% fat in hot air-dried noodles), are more exposed against oxidation creating in rancidity, and have medical problems because of higher fat substance. The use of cancer prevention agents, be that as it may, protracts the timeframe of realistic usability of instant fried noodles [2].

1.5 Types and flavors of instant noodles

Ramen, udon, buckwheat and rice noodles are usually called Oriental noodles as well, contrasting American noodles, which are produced using durum wheat flour and indicated to contain egg, Oriental noodles are set up from hard or delicate wheat flours

and for the most part do not have egg. Now and then other grain sources use to made starches or flours from. Oriental noodles can be separated by and large into Chinese and Japanese sorts. Despite the fact that an exact minute rate of the constituents, the utilization of salt accords the key distinction among the two sorts. Where Chinese noodles utilize antacid salts, Japanese noodles utilize customary salt, a typical case of which is Kan-Sui, a blend of sodium carbonate and potassium carbonate. Fragile and low protein flours gotten from delicate wheat are utilized to make Japanese noodles. While Chinese noodles as a rule utilize hard wheat which has strong and high protein flours. The high protein flour makes batter that is more grounded and more flexible when consolidated with the antacid salts, and a noodle that is chewier and more yellow than Japanese noodles. Moreover shortly, Oriental noodles vary as per their arrangement and ingredients. Plant inception of the flour, give the genuine assortment in kinds of noodles, with noodles from wheat flour being the most widely recognized. More sorts utilize wheat flour in mix with starch, mung bean flour or potato starch, or buckwheat flour. One excellent kind of noodle is delivered altogether from mung bean starch. Rice noodles are additionally accessible. The level of

precooking and dampness content convey essential merits in Oriental noodles.

They are offered as wet [bubbled] noodles, crisp [crude] noodles, steamed and boiled instant [ramen] noodles and steamed and dried [alpha] noodles, dried noodles. Oriental noodles come in all sizes and shapes, wide, medium or thin; round or square; short or long; in strips, diced or bars frames. Their shading and surface shifts as per the components utilized. Starch and bean string noodles are optically clear. Noodles containing salt are white and murky. Buckwheat noodles are dark colored. Antacid/alkaline noodles are splendid yellow in shading. For quality white and yellow shading, high review flour processed from white wheat is utilized. Elective and minor elements, for example, gluten, eggs, altered starch or gums, additives, emulsifiers and dried spinach or other coloring agents may influence surface and tinting.

1.6 Fortification of instant noodles

Instant noodles can be strengthened either via flavoring, expended alongside the noodles or by sustaining the flour used to make the noodles.

Micronutrients containing vitamin, B2, B1, A, folic acid, niacin, iodine and iron can be included, however the micronutrients and their overages will contrast with every technique. Choosing the appropriate type of fortificant is critical to limit supplement sustenance and additionally supplement connections and any resultant unfavorable impacts. Iron, for example, is a hard mineral to add to nourishments as the most bioavailable sorts have a tendency to invigorate fat oxidation bringing on in the development of unsuitable tactile adjustments in the completed item. In any case, ferrous sulfate in dried frame is the favored sort of iron to strengthen the wheat flour that is utilized inside 1-2 months of creation. Before being utilized as a part of instant noodles generation, ferrous fumarate or electrolytic iron (of molecule size: 98% <math> < 48 \mu\text{m}</math>) are more qualified for wheat flour that is put away for a more drawn out time. Electrolytic iron may be additionally appropriate type of fortificant for instant noodles flavoring to decrease tangible difficulties [7].

1.7 Flour fortification

Wheat flour fortification at the factory has for quite some time been practiced everywhere throughout the world and involves relatively forthright innovation. The procedure of fortification is done through a volumetric feeder that is situated towards the end of the processing procedure which included a micronutrient premix in flour. Single premix gives better control over the amount and dispersion of micronutrients in the flour in this way micronutrients are generally included as blend.

1.8 Flavoring fortification

Fortifying the flavoring brought with the noodles is normally refined in a few sections of the world. In business generation of sustained instant noodle flavoring in South East Asia, fortificant are included alongside the other flavoring constituents to a ribbon blender and blended precisely. The sustained flavoring is around then sprinkled over the noodles [for container style] or bundled into a sachet [for pocket style].

1.9 Hazards related with instant noodles consumption

Tertiary butylhydroquinone, TBHQ

TBHQ is in fact a chemical preservative which is a form of butane. It is used in food products; it greatly extends the shelf life of foods and delays the onset of rancidness. It's not surprising that certain convenience foods and fast foods seem to retain a life time on the shelves now a days. The allowed amount by FDA is up to 0.02% of the total oils in food to be TBHQ. It may not sound like a lot, but why there require being a limit on the amount if it is seemingly a 'harmless preservative.' Beware; everything which originates from butane, no matter how small the dose is could barely be classified as safe.

Expending high dosages (in the vicinity of 1 and 4 g) of TBHQ can bring about sickness, incoherence, fall, tinnitus (ringing in the ears) and retching. There are additionally recommendations that it might prompt hyperactivity in youngsters and in addition asthma, rhinitis and dermatitis. It might likewise additionally irritate ADHD manifestations and cause eagerness [8]. Long haul, high dosages of TBHQ in research facility creatures have demonstrated an inclination for them to create malignant antecedents in their stomachs and in addition cause DNA harm to them [9]. It is likewise proposed that it might be in charge of influencing estrogen levels in ladies.

The blend of disodium EDTA (500 ppm) and TBHQ (200 ppm) in the frying oil quintupled the time span of usability. The inside surface use of TBHQ (200 ppm) delayed time span of usability twice that of an equivalent measure of TBHQ in the frying oil [8].

Sodium

Sodium substance was observed to be in the range of 821 mg for each 100 g much above points of confinement set by the British sustenance wellbeing organization. Knorr Soupy Noodles contained the most noteworthy sodium substance of 1,943 mg for each 100 g, while the least sodium substance was in Maggi Mera Masala at 821 mg for every 100 g [9]. In the present review, the sodium allow in the INC meeting was >6.4 g for each day, which was 3.2 times higher than the prescribed KDRI approval.

Instant noodle utilization contributed roughly 30% of the aggregate sodium intake (2,032.2 mg for every day). The salty taste of the soup base is supported by numerous customers. Luckily, Koreans do not lean toward salty and oily tastes [10]. A review was directed to decrease sodium levels in instant noodles; that review revealed that 20% of the sodium content, roughly 350 mg, from not eating the soup base without changing taste and flavor [11]. As of late, the Ministry of Health and Welfare in Korea reported "Dietary Guidelines for Korean Adults", which recommend ten dietary objectives, six dietary rules and 23 real rules, including expending an adjusted vitality consumption and <5 g sodium allow in the eating regimen [12]. The Korea Food and Drug Administration has as of late settled a manual for "the correct nourishment determinations for Korean children" to guarantee sound dietary propensities in later life. The Toyama Birth Cohort Study in Japan as of late detailed that middle school understudies who habitually expend instant noodles [no less than 3 days/week] from the age of 3 demonstrate a higher hazard for a lower personal satisfaction [chances proportion [OR], 1.49; P=0.007] [13]. Youngsters who have an inclination for salty sustenance have a tendency to keep up and fortify this propensity in their later life, so nourishing instruction programs advancing appropriate sodium utilization ought to be led right on time in life [14].

Bisphenol A

The review, distributed in The Journal of Nutrition, was based on information from the Korean National Health and Nutrition Examination Survey from 2007-2009. Utilizing the review information, analysts inspected the weight control plans of a sum of 10,711 grown-ups between the ages of 19-64. The review says a compound called bisphenol A [BPA] is regularly found in Styrofoam compartments used to hold a few brands of instant noodles. Researchers have demonstrated that BPA can meddle with the body's hormones, especially the female sex hormone estrogen, Shin said in an announcement [15].

Monosodium glutamate

Instant noodles and the seasoning soup base likewise contain high measures of monosodium glutamate (MSG). It is a flavor enhancer utilized by instant noodle producers to make their shrimp flavors "shrimpier" and hamburger flavors "beefier". MSG can trigger an unfavorably susceptible response in 1 to 2% of the populace. People who are oversensitive to MSG can get consuming sensations, trunk and facial flushing or torment and cerebral pains from it [16].

Propylene glycol

The component in the instant noodles called

"Propylene Glycol" which has a liquid catalyst property. This ingredient is utilized on the grounds that it keeps the noodles from drying by holding dampness. It enervates the insusceptible arrangement of our body. It is effortlessly consumed by the body and it amasses in the kidneys, heart and liver. It makes variations from the norm and harm those ranges [17].

Polystyrene packaging

1) Polyethylene terephthalate that is mostly used in packaging of drinks and mineral water that is toxic and has damaging effects on the body; 2) polypropylene that is used in packaging of a variety of snacks; 3) high-density polyethylene; 4) polystyrene which is used in foam and non-foam in the manufacture of disposable one-time usage containers such as cups, plates, utensils, etc. These substances are carcinogenic aromatic compounds and according to warnings from experts, in long-term use, have harmful effects on human health [18].

In addition, there are other compounds used in plastic material that may have toxic effects on the body. Bisphenol, an unbreakable, light, as well as transparent material, is used to make polycarbonate plastic (such as athletes' water bottle in the coating of food cans, beverage cans, and also dental filling materials). With washing and frequent use of plastics, Bisphenol A leaks into fluid that can induce asthma and allergies in children. Moreover, it has a likely effect on the cell DNA and creates genetic mutation. Perhaps the increasing prevalence of asthma in the past 30 years could be attributed to certain factors in the environment such as Bisphenol A. The fat droplets on the surface of hot liquids in the plastic disposable cups is in fact polystyrene which is a poison derived from the plastic. Dioxin is another highly toxic chemical substance for human cells that is particularly produced from plastic dishes by the heat of high-fat foods. Phthalates in plastic materials cause hormonal abnormalities, birth defects, reproductive problems, as well as high concentrations of phthalates metabolites in the urine exacerbates the asthma symptoms [19].

Noodles waste recycling

Noodle waste contains significant amounts of starch, lignocellulosic material and oil. Pretreatment involving extraction followed by centrifugation is necessary to separate the oil from the starch and lignocellulosic mixtures. The isolated oil is subjected to a separation process to make it water and solvent free. Then, using esterification and transesterification reactions, the oil is converted to biodiesel by chemical (97.8–98.5% yield) and enzymatic (95.4% yield) methods. The residual starch and lignocellulosic mixtures are hydrolyzed enzymatically to form small sugar

units, such as glucose and fructose. The obtained hydrolysate is then fermented to produce bioethanol (conversion rate 96.8%). The hydrolysate can also be used as a nutrient for growing microorganisms for the production of lipids, enzymes and pigments. Additionally, noodle waste can be converted to animal feed [20].

2. Conclusion

To cope up with the daily hectic routine of mankind, it is necessary to take food which can provide the required energy in less time with great taste. Purposive fortification may help instant noodle to carry some nutrition but there is much need to divert attention of people that there are healthier and natural resources of good and fast food other than instant noodles. By switching eating habits from staple to fast and ultra-processed food we are just collecting the new bunch of health and environmental hazards. More scientific studies should be proceed to find out benefits of healthy eating so that people can be convinced to stay healthy with good food.

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References

- [1] Taneya M, Biswas M, Ud-Din MS. (2014). The studies on the preparation of instant noodles from wheat flour supplementing with sweet potato flour. *Journal of the Bangladesh Agricultural University*. **12**: 135-142.
- [2] Gulia N, Dhaka V, Khatkar B. (2014). Instant noodles: Processing, quality and nutritional aspects. *Crit Rev Food Sci Nutr*. **54**: 1386-1399.
- [3] Wang L, Hou GG, Hsu Y-H, Zhou L. (2011). Effect of phosphate salts on the Korean non-fried instant noodle quality. *J Cereal Sci*. **54**: 506-512.
- [4] Zhang N, Ma G. (2016). Noodles, traditionally and today. *J Ethnic Foods*. **3**: 209-212.
- [5] Lee JS, Kim J, Hong KH, et al. (2009). A comparison of food and nutrient intakes between instant noodle consumers and non-consumers among Korean children and adolescents. *Korean J Nutr*. **42**: 723-731.
- [6] Kim D, Lee CK, Seo DY. (2016). Food deserts in Korea? A GIS analysis of food consumption patterns at sub-district level in Seoul using the KNHANES 2008-2012 data. *Nutr Res Pract*. **10**: 530-536.
- [7] Nestel P, Nalubola R. (2002). Technical brief on iron compounds for fortification of staple foods. Washington, DC: International Nutritional Anemia Consultative Group.
- [8] Choy AL, Hughes JG, Small DM. (2010). The effects of microbial transglutaminase, sodium stearoyl lactylate and water on the quality of instant fried noodles. *Food Chem*. **122**: 957-964.
- [9] Choy AL, May BK, Small DM. (2012). The effects of acetylated potato starch and sodium carboxymethyl cellulose on the quality of instant fried noodles. *Food Hydrocoll*. **26**: 2-8.
- [10] Kim SK, Lee AR. (1989). Survey on consumption pattern of ramyon in Seoul area. *Journal of the Korean Society of Food Culture*. **4**: 395-404.
- [11] Chang SO. (2006). The amount of sodium in the processed foods, the use of sodium information on the nutrition label and the acceptance of sodium reduced ramen in the female college students. *Korean J Nutr*. **39**: 585-591.
- [12] Paik HY, Kim CI, Moon HK, et al. (2008). Dietary goals and dietary guidelines for Korean adults. *Korean J Nutr*. **41**: 887-899.
- [13] Wang H, Sekine M, Chen X, et al. (2008). Lifestyle at 3 years of age and quality of life (QOL) in first-year junior high school students in Japan: results of the Toyama Birth Cohort Study. *Qual Life Res*. **17**: 257-265.
- [14] Park J, Lee JS, Jang YA, et al. (2011). A comparison of food and nutrient intake between instant noodle consumers and non-instant noodle consumers in Korean adults. *Nutr Res Pract*. **5**: 443-449.
- [15] Yang M, Kim SY, Lee SM, et al. (2003). Biological monitoring of bisphenol A in a Korean population. *Arch Environ Contam Toxicol*. **44**: 546-551.
- [16] Liu F, He Y. (2008). Classification of brands of instant noodles using Vis/NIR spectroscopy and chemometrics. *Food Res Int*. **41**: 562-567.
- [17] Kim J, Shin M. (2016). Classification of noodles and development of gluten-free rice noodle.
- [18] Robinson L, Miller R. (2015). The impact of bisphenol A and phthalates on allergy, asthma and immune function: A review of latest findings. *Curr Environ Health Rep*. **2**: 379-387.
- [19] Athari S. (2017). Using plastic containers for hot meals may induce potential risk of allergic asthma. *Journal of Food Quality and Hazards Control*. **4**: 1-2.
- [20] Karmee SK. (2017). Noodle waste based biorefinery: An approach to address fuel, waste management and sustainability. *Biofuels*. 1-10.