



E-ISSN: 2278-4136  
P-ISSN: 2349-8234  
JPP 2019; SP5: 26-28

**Anurag A Scott**  
Sam Higginbottom University of  
Agriculture, Technology and  
Sciences, Prayagraj, Uttar  
Pradesh, India

**Susheel Kumar**  
Sir Chotu Ram Institute of  
Engineering and Technology,  
Chaudhary Charan Singh  
University, Meerut, Uttar  
Pradesh, India

**Parshvika Tewari**  
Sam Higginbottom University of  
Agriculture, Technology and  
Sciences, Prayagraj, Uttar  
Pradesh, India

**Aditya Lal**  
Sam Higginbottom University of  
Agriculture, Technology and  
Sciences, Prayagraj, Uttar  
Pradesh, India

**Correspondence**  
**Anurag A Scott**  
Sam Higginbottom University of  
Agriculture, Technology and  
Sciences, Prayagraj, Uttar  
Pradesh, India

**(Special Issue- 5)**  
**International Conference on**  
**“Food Security through Agriculture & Allied Sciences”**  
**(May 27-29, 2019)**

## Reconciliation of green technology with food technology for eco-friendly applications

**Anurag A Scott, Susheel Kumar, Parshvika Tewari and Aditya Lal**

### Abstract

Food is one of the fundamental components of our life on this planet. Generation of food was and will be a fundamental piece of the exercises to keep up a sound and feasible life. The interest of natural sustenance has rapidly enlarged worldwide in the ongoing years for the most part because of customer bits of knowledge of value and wellbeing. Green technology has the conceivable outcomes to satisfy the yield of natural nourishment by the systems which are socially fair, biologically far reaching and ecologically economical. The integration of both these technologies that is food technology and green technology consists of an advancement that is it prevents health damage, and the processing causes no environmental pollution, the integration of both of these technologies have gone to a whole new such as Enzyme assisted food processing, Green packaging. Non thermal processing which are also considered to be more energy efficient and has a better quality attributes than conventional thermally based processes which also serves as an alternative of the thermal processing. The use of supercritical fluid technology in industrial food processing involving dense carbon dioxide at its supercritical liquid state as a solvent as it acquires the properties of a mixture or a pure compound at a particular pressure and temperature, whereas this technique is known to bring characteristic flavor to the oleoresin/oil whereas this technique is not only helpful in food industry but on the other hand is also helpful in perfume industries.

**Keywords:** Green technology, non-thermal processing, super critical fluid technology, oleoresin

### Introduction

Food is a necessary part of life and human presence. Since the get-go, people have needed to eat to endure. In prior occasions when human populace was a lot littler, assets were plenteous and there was less requirement for sustenance handling and capacity. As populaces developed, constraints in nourishment preparing and capacity strategies constrained more people to dedicate significant measures of time day by day to bolstering themselves and their families (i.e., gathering and chasing). Industrialization moved a huge level of the populace toward a bunch of exercises making the requirement for an industrialized nourishment part to encourage an expanding number of urbanized people (Joyce I. Boye, Yves Arcand (2013) [12].

Since the industrial revolution, overall nourishment generation has expanded essentially yet at a slower pace than worldwide populace and with substantially more waste and less effective asset dispersion. Sustenance supply deficiencies have left 3 billion individuals malnourished all-inclusive with iron lack influencing 2 billion individuals and protein/calorie inadequacies influencing about 800 million individuals (Ferguson A 2012) [1]. In the meantime, most land and oceanic assets are abused. What's more, much all the more alarming is the gauge that as of now 30-50 % of sustenance created is squandered (Bloom J, 2010) [2].

Green technology is characterized by the worldwide collective reference book, as "the utilization of at least one of ecological science, green science, ecological checking and electronic gadgets to screen, model and preserve the indigenous habitat and assets, and to control the negative effects of human contribution. In the field of horticulture and agri-nourishment, the expression "green development" is in some cases utilized and has been characterized by the Organization for Economic Co-activity and Development (OECD) as "the quest for financial development and advancement, while averting ecological debasement, biodiversity misfortune and unsustainable common asset use" (OECD, 2011) [3]. This survey abridges key features from the as of late distributed book entitled Green Technologies in Food

Production and Processing (Boye JI, Arcand Y, 2012) [11]. Issues tended to incorporate key drivers of the advancement in the nourishment inventory network, top to bottom portrayal of sustenance creation, and preparing utilizing the existence cycle evaluation (LCA) instrument; ways to deal with improve nourishment generation rehearses; practical sustenance handling approaches; rising explanatory procedures for reasonable innovative work; challenges related with the utilization of agrarian assets to develop biofuels and bio-based items; advances to diminish the age of procedure instigated poisons; social factors that impact customer discernments about a portion of the ebb and flow and risingagri-nourishment advances; and the need and significance of biodiversity in keeping up economical weight control plans of human populaces.

### **Green technology in food processing**

A standout amongst the most encouraging mechanical ways to deal with lessen natural impression in nourishment handling is the utilization of compounds. As natural impetuses, chemicals accelerate response rates and, in this manner, offer reserve funds as far as time, vitality, and cost. Sustenance proteins give focal points regarding particularity, affectability, their relative non-poisonous quality, high action at low focuses, and simplicity of inactivation. Enzymatic methodologies involve milder medications as well as mellow response conditions, in this manner are progressively ecological amicable and would ensure nature better contrasted with customary techniques (Simpson BK, Rui X, XiuJie J, 2012) [5]. Moreover, the unfair idea of catalysts as far as the particularity of particles they follow up on as substrates results in progressively uniform and increasingly reliable items. Notwithstanding ecological advantages, the activity of catalysts in sustenances may result in items with broadened timeframe of realistic usability, improved surfaces, appearance, flavors, usefulness, and yield, empowering an assortment of nourishment items to be created from gathered produce (Simpson BK, Rui X, XiuJie J, 2012) [5]. Instances of proteins that can be utilized in nourishment handling incorporate carbohydrases (e.g., amylases, pectinases, cellulases, galactosidases, and chitinases); lipases (e.g., pancreatic lipase and phospholipases); proteases (e.g., pepsins, trypsins, bromelain, papain, amylases, and cellulases); isomerases (e.g., glucose isomerase); transferases (e.g., transglutaminases); and oxidoreductases (e.g., glucose oxidase and polyphenol oxidase).

Drying, which represents to a huge cost speculation and a noteworthy wellspring of vitality utilization for most organizations, is another significant unit activity that must be viewed as when a greener procedure is focused on. Drying is a basic unit task in the handling of many mass and bundled sustenance items and fixings. It is utilized to give surface, upgrade timeframe of realistic usability, and abatement transportation costs. The ordinary components of a drying activity incorporate wet feed pre-treatment, drying, recovery of dried item, and warmth recuperation from fumes gases. To diminish vitality utilization, end of the drying task from the creation procedure inside and out, or its supplanting with lower-vitality devouring activities, ought to be conceived (Grabowski S, Boye JI (2012) [6]. Besides, at whatever point conceivable, beginning dampness substance of the wet feed to be handled ought to be diminished utilizing less vitality escalated methods, for example, squeezing, film detachment, filtration, centrifugation, coagulation, and sedimentation,

preceding the drying procedure. For instance, osmotic drying out can be considered as a preheat treatment unit activity or a last lack of hydration step (Grabowski S, Marcotte M 2003) [7].

Preheating of wet feed to as high a temperature as conceivable utilizing energy effective methods can likewise decrease by and large vitality use. Also, use of naturally agreeable vitality sources and vitality proficient drying establishments and maximal use or reusing of various waste streams and results are valuable contemplations (Conant RT, Paustian K, 2002) [8]. Besides, to decrease or kill natural contamination, effective establishments which can totally recuperate vitality, particulates, and ozone depleting substances from fumes gases must be considered. To diminish vitality use and natural effects, heat is recuperated from fumes gases and is recycled in the drying activity. Fumes gases after warmth recuperation can be additionally cleaned to expel ozone depleting substances. Regardless of whether for drying or for other unit tasks, the sort of vitality source utilized in nourishment preparing can affect the aggregate sum of vitality expended and the natural impression.

### **Green technology and biomass**

Biomass technology is a composed and financially savvy innovation that can be changed into vitality and high esteem mechanical items. The wellsprings of biomass vitality are trees, harvests and creature squander and consequently serves best for natural arranged agribusiness. Agribusiness deposits and squanders are changed over to electric and warm vitality through procedures like gasification, which are then utilized for capable power age cycles. At the point when biomass builds up a blend of bio processing plant and biogas, it prompts new items and upgrades the quality of natural rural area. By utilizing biomass as trade for petroleum derivatives, emanation of ozone harming substances can be diminished. Along these lines biomass can be the compelling methods for expanding natural horticultural income and moderating expendable assets (Akhtar H, 2012) [9].

### **Green technology for biofuel**

Green Technology of Biofuel, bio-ethanol and bio-diesel, has confronted the potential for future vitality prospects. While making a considerable relationship among agribusiness and biofuel, two parameters are considered i.e.; worries for sustenance security and dangers to condition and biodiversity. Likewise, changing no man's land to farmland with some yield choices can be viewed as positive impacts. In India, 9% current issue of oil necessities can be settled by 0.8 million kilolitres of ethanol which can be produced if all the accessible sugarcane molasses is been used. In this manner, different new innovations are being progressed by the specialists to deliver a propelled type of biofuels from wood biomass, agrarian and backwoods squanders (Arcand Y, Maxime D, Zareifard R, 2012) [10].

### **Green technology of crop rotation and multiple cropping**

Multiple cropping is a type of polyculture and can be characterized as delivering multiple yields in a similar land, amid a similar season. It very well may be done in two strategies i.e.; transfer editing, where a succeeding yield is sown alongside the first, before it is collected and twofold trimming, where the principal the present harvest is procured then the progressive yield is planted. Then again the way toward growing at least two disparate or random yields in a

similar land in various seasons is known as Crop turn. The real advantage that is accessible with the assistance of such frameworks is saving the standard of land which is diminished due to the inorganic cultivating. These cultivating rehearses go for non-ruinous condition with improved creation of natural sustenance. In refinement to customary cultivating, this framework contributes a most extreme amicable relationship to the yields as they have soils of higher organic, physical and in a few circumstances concoction quality (Boye JI, Arcand Y, 2012)<sup>[11]</sup>.

### Green technologies utilized in organic foods

Organic food is commonly a plant or creature-based produce in an encircling framework which avoids or limit the usage of concoction composts, development controllers, pesticides and development added substances. Organic food includes those farming sustenance items that are not treated with concoction manures, herbicides, pesticides and other engineered synthetic substances amid its generation, handling and capacity. For the most part shoppers search for the details like recyclable, natural inviting, phosphate free and ozone agreeable when they go for the choice of natural sustenances. The yield and use of natural nourishments have expanded worldwide in the ongoing years fundamentally because of purchaser impression of value and wellbeing. Ecological consideration is likewise a factor towards expanded interest of natural sustenance items. Organic food purchaser is less value delicate and more worry over quality. Well-being concern has affected over buyer viewpoint toward natural sustenance. Customary agribusiness framework may get the opportunities in short increase generation yet neither one of the its is supportable in long terms, nor does it ensure safe nourishment. In exact, creation of customary strategies is rare and are henceforth not a supportable answer for natural nourishment generation (FAO and WHO, 2007) (Boye JI, Arcand Y, 2012)<sup>[11]</sup>. Green Technologies Utilized in Organic Foods Green innovation can possibly achieve the interest of natural sustenance creation by using methods that are biologically stable, socially evenhanded, earth practical and monetarily suitable.

### Conclusion

Green technology is the technology of today and the future, today we see that here is a whole lot of exhaustion of resources on the planet. There are lots of advancements in the world today such as the living wall in London or the vertical farming (a farming with no soil). But on the either hand when it is reconsolidated with food technology, both these technologies can work together and bring lot of advancements in processed foods, fruits and vegetables and much more and can be a noble cause for mankind

A variety of approaches as outlined above can be considered to reduce the impact of agricultural practices while ensuring adequate supplies of food to feed the ever growing world population. To ensure success, regional, national, and international collaborative efforts along the food chain continuum will be increasingly required. Additionally, sustainable food engineering approaches which harness the power of open innovation and which take into consideration social, environmental, economic concerns will be needed (Joyce I. Boye, Yves Arcand (2013)<sup>[12]</sup>.

### Reference

1. Ferguson A. Population matters for a sustainable future. OPT J. 2012; 12(2):4-6.

2. Bloom J. American wasteland: how America throws away nearly half of its food (and what we can do about it). Da Capo Press, Boston, MA, 2010.
3. OECD. A green growth strategy for food and agriculture: Preliminary report. OECD, 2011.
4. Boye JI, Arcand Y. Green technologies in food production and processing. Springer, 2012.
5. Simpson BK, Rui X, XiuJie J. Enzyme-assisted food processing. In: Boye JI, Arcand Y (Eds) Green technologies in food production and processing. Springer, 2012.
6. Grabowski S, Boye JI. Green technologies in food dehydration. In: Boye JI, Arcand Y (Eds) Green technologies in food production and processing. Springer, 2012.
7. Grabowski S, Marcotte M. Pretreatment efficiency in osmotic dehydration of cranberries. In: Chanes JW, Velez-Ruiz JF, Barbosa-Canovas GV (Eds) Transport phenomena in food processing. CRC Press, Boca Raton, 2003.
8. Conant RT, Paustian K. Potential soil carbon sequestration in overgrazed grassland ecosystems. Global Biogeochem Cycles. 2002; 16(4):1143-1152.
9. Akhtar H. Reducing process-induced toxins in foods. In: Boye JI, Arcand Y (Eds) Green technologies in food production and processing. Springer, 2012.
10. Arcand Y, Maxime D, Zareifard R. LCA of processed food. In: Boye JI, Arcand Y (Eds) Green technologies in food production and processing. Springer, 2012.
11. Boye JI, Arcand Y. Green technologies in food production and processing. Springer, 2012.
12. Joyce Boye I, Yves Arcand. Current Trends in Green Technologies in Food Production and Processing. Springer. 2013; 5:1-17.