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Kinetics of air drying of jackfruit and mango pulp and development of mixed leather

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ABSTRACT

The study was concerned with the kinetics of dehydration of jackfruit and mango pulp and their use for the development of mixed leather. Kinetics study showed that jackfruit pulp dried faster than mango pulp. The chemical composition of fresh jackfruit and mango pulp showed that moisture, ash, protein, fat, vitamin-C, acidity, pH and total soluble solids content were found 74.23%, 0.86%, 1.55%, 0.60%, 5.04 mg $100g^{-1}$, 0.224% (wb), 5.41 and 25.0% for jackfruit pulp, whereas for mango pulp, the contents are 80.1%, 0.45%, 1.2%, 0.70%, 24.2 mg 100 g^{-1}, 0.48% (wb), 3.79 and 18.0%, respectively. During mechanical drying, it was found that the drying rate decreased with the increase in thickness and for fresh jackfruit and mango pulp, values of index 'n' were 0.38 and 0.20 at 60 °C respectively, whereas for steam blanched jackfruit and mango pulp, value of index 'n' were 0.38 and 0.29 at 60 °C respectively and these were lower than 2 as predicted by the Fick's 2nd law of diffusion. The activation energy (*Ea*) was calculated as 3.12 Kcal g.mole, 2.786 Kcal g-$mole^{-1}$, 2.90 Kcal g-$mole^{-1}$ and 2.786 Kcal g-$mole^{-1}$ for the fresh jackfruit, fresh mango, steam blanched jackfruit and steam blanched mango pulps, respectively. The organoleptic taste test showed that sample 401 (Fruit pulp with sugar and KMS) secured highest score.

Keywords: Dehydration, jackfruit pulp, mango pulp, mixed leather, activation energy

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1 Introduction

Now a days jackfruit is widely cultivated fruit throughout the low tropical lands (Ochse et al., 1981). Ripe jackfruit (*Artocarpus heterophyllus*) is mainly consumed as a fruit or in the form of a dessert. In Bangladesh the leading jackfruit cultivated districts are Mymensingh, Dhaka, Rangpur, Sylhet, Khulna, Dinajpur, Rajshahi, Kustia and Tangail. The flesh of the fruit is starchy, fibrous with sweet taste and exotic flavor. Ripe Jackfruit contains high amount of carbohydrates (23.25%), protein (1.72%), fat (0.64%), dietary fiber (1.5%), sugars (19.08%). Apart from this, it also contains calcium (24 mg), phosphorus (21 mg), iron (0.23 mg), riboflavin (0.055 mg), thiamine (0.105 mg), niacin (0.920 mg) and ascorbic acid (13.7 mg) per 100 g of edible jackfruit (USDA, 2008). The bulbs (edible flakes) contain 7.5% sugar and a fair amount of Vitamin-A, Vitamin-C, potassium, protein, starch, calcium and thiamine (Burkill, 1997).

Jackfruit is available generally during the summer months. Main harvesting period in Bangladesh is from May to August. Only a small percentage of the fruits are processed and preserved by small processors as per the traditional methods of food processing and preservation. Jam, jelly, squash, nectar, candies, conserves, beverages etc. can be prepared from jackfruit pulp (Tressler and Joslyn, 1971).

Mango (*Mangifera indica* L.), a fleshy stone fruit belonging to the genus *Mangifera* is one of the most cultivated tropical fruits in the World. It is regarded as the king of tropical fruits and is greatly relished for its succulence, exotic flavor and delicious taste in most countries of the world. Apart from its delicacy, it is rich in nutrients as the fruit is a good source of vitamin A, B and C and minerals. The main constituents of mango are 83% water, 14.98% carbohydrates, 0.82% protein, 0.38% fat, 1.6% dietary fiber, and 13.66% sugars. Apart from this, it also contains calcium (11 mg), phosphorus (14 mg), iron (0.16 mg), riboflavin (0.038 mg), thiamine (0.028 mg), niacin (0.669 mg) and ascorbic acid (36.4 mg) per 100 g of mango (USDA, 2008). Both of these fruits are seasonal in nature and available in large quantities during peak season. But these fruits with high moisture content are perishable items and cannot be kept fresh for longer time following harvesting. Nature of perishability, lack of appropriate transportation and marketing facilities, difficulties of long distance transportation and insufficient preservation and packaging facilities are responsible for spoilage of large quantity of fruits. Food deficiency and post-harvest losses are two major problems in Bangladesh, which is crucial in relation to food. Hence, the utmost duties and responsibilities of the post- harvest crop processors and scientists to find out ways and means to develop appropriate methods for food preservation.

Drying is a very important preservation method because it is the easiest and the most common way to preserve a variety of food products. Jackfruit and mango can be preserved by preparing mixed Jackfruit and mango leather using drying technique and a new value added product would be marketed. Drying could be conducted using a cabinet dryer or a solar dryer. As mango leather is a traditional product prepared from ripe mangoes, hence, mixed leather would be a good item to create new appearance to the consumer's. Cabinet drying has been carried out for making mango leather (Mir and Nath, 1995) resulting into a product with better color and flavor. On the basis of above description, the objectives of the study were (i) to analyze air drying kinetics of jackfruit and mango pulp, (ii) to analyze chemical composition of jackfruit and mango pulp and develop mixed leather from jackfruit and mango pulp, and (iii) to assess the sensory quality of processed mixed leather.

2 Materials and Methods

2.1 Collection of fruits

Ripe jackfruit and mangoes were collected from the local market and all other equipments were supplied from the laboratory stock.

2.2 Mechanical drying of pulp

Cabinet dryer (Model No.:1816-Modern Laboratory Equipment Co., Inc. New York, U.S.A.) was used for the dehydration of jackfruit and mango pulp. The dryer consists of a chamber in which trays of sample could be placed. Air was blown by a fan passed over a heater and trays containing the sample to be dried. The velocity of air was recorded (0.6 m sec^{-1}) by an anemometer. For determining the effect of temperature and thickness on the rate of drying, jackfruit and mango pulp were extracted and samples were taken for determination of moisture content. Fresh and mixed pulps of 3 mm, 5 mm, 7 mm, were placed in numbered trays and drying commenced in the dryer at constant air velocity and specific temperature. Moisture content of samples at each time interval was determined by gravimetric method from initial known moisture content. Again to determine effect of temperature on the rate of drying, samples of pulps of specific thickness were dried at different temperature such as 50 °C , 55 °C and 60 °C and moisture content was determined gravimetrically as before during the course of drying.

2.3 Chemical analysis

Both jackfruit and mango pulp were analyzed for moisture, protein, fat and ash content as per the methods of AOAC (2005) and Ranganna (2003).

2.3.1 Total soluble solids (TSS)

Total soluble solids (TSS) was determined by using an Abbe Refractometer (Model no. 8987 PujiKuki Ltd. Tokyo, Japan).

2.3.2 pH

The pH of the jackfruit and mango pulp was measured by using pH meter at an ambient temperature.

2.3.3 Acidity

Percent titrable acidity was calculated as per following formula:

$$TA = \frac{(T \times N \times V1 \times E)}{(V2 \times W \times 1000)} \times 100 \qquad (1)$$

Where, TA = titrable acidity (%), T = titre, N = normality of NaOH, $V1$ = volume made up, E = equivalent weight of acid, $V2$ = volume of sample taken for estimation, and W = weight of sample (g)

2.3.4 Total carbohydrate

Carbohydrate content of the samples was determined as total carbohydrate by difference that is by subtracting the measured protein, fat, ash and moisture from 100 (Pearson, 1976).

2.3.5 Vitamin-C content

Vitamin-C (ascorbic acid) content was determined by the method reported by Ranganna (2003).

2.4 Development of mixed leather

2.4.1 Extraction of pulp

Ripe jackfruit and mango were used separately for extraction of pulp. Firstly they were peeled thoroughly. Then the pulps were collected by squeezing the flesh of both jackfruit and mango. The pulps were then blended in an electric blender. The pulps were then stored at a temperature of −20 °C for future use. Frozen pulp was thawed at room temperature before being used.

2.4.2 Preparation of mixed leather

Firstly both the jackfruit and mango pulps were cooled into room temperature. Sugar, skim milk, potassium metabisulphite (KMS) were weighed separately and mixed with pulps as per formulations given in Table 1. Frozen pulp was thawed and all the above samples were thoroughly mixed in a blender. The mixture was then placed in tray as sheet. The cabinet dryer was adjusted to the selected temperatures at least 0.5 h before drying. Trays were weighed at 15 min intervals for the first 1 h of drying and every one hour for the next 6 h. As mentioned earlier, gravimetric measurements gave moisture content at each time interval as the initial moisture content was determined by oven drying. The steel trays were smeared with very thin layer of polyethylene paper to prevent mixed leather from sticking to tray surface before drying. The mixed leather was stored in a desiccator at room temperature.

2.5 Sensory evaluation

The consumer acceptability of developed products was evaluated by a taste-testing panel. The 1-9 point hedonic scale was used to determine this acceptability. The panelists were selected from among the teachers and students of the department of Food Technology and Rural industries, Bangladesh Agricultural University, Mymensingh. Samples were served to the trained panelists (10) and were asked to assign appropriate score for characteristic color, flavor, texture and overall acceptability of biscuit. The scale was arranged such that: 9 = like extremely, 8 = like very much, 7 = like moderately, 6 = like slightly, 5 = neither like nor dislike, 4 = dislike slightly, 3 = dislike moderately, 2 = dislike very much, and 1 = dislike extremely.

3 Results and Discussion

3.1 Chemical composition of the pulps

The chemical compositions of jackfruit and mango pulps were analyzed and results are shown in Table 2. It was found that jackfruit pulp contained 74.23% (wb) moisture content which was below-found by Islam (2004), who found moisture content 78% (wb). On the other hand, fresh mango pulp contained 80.1% (wb) moisture content and Rahman (2003) found that the fresh mango pulp contained 81.6% (wb) moisture. The variation in moisture content of jackfruit and mango pulp might be due to varietal effects, stage of maturity, climate, harvesting period etc. The ash content of jackfruit and mango pulps found in the study was 0.86% (wb.) and 0.45% (wb.). These values are very close to Islam (2004) and Rahman (2003) who reported that, the ash content for fresh jackfruit and mango pulps are 0.88% (wb.) and 0.44% (wb). As depicted in Table 2, the protein content of jackfruit and mango pulps found in the study were 1.55% (wb.) and 1.2% (wb.) which was very close to Islam (2004) and Rahman (2003) who reported that the protein content of jackfruit and mango pulp were 1.65% and 1.0%. This study showed that the vitamin-C contents were 5.04 mg $100g^{-1}$ and 24.2 mg $100g^{-1}$ for jackfruit and mango pulps, respectively. Reports by Islam (2004) and Rahman (2003) indicated that the vitamin-C content of jackfruit and mango pulp were 8.0 mg $100g^{-1}$ and 4.3 mg $100g^{-1}$, respectively. The variation in vitamin-C content of jackfruit and mango pulp might be due to, stage of maturity, climate, varietal effects, growing conditions, variation of soil, harvesting period etc. Mango is more acidic than jackfruit. The titrable acidity content for jackfruit and mango pulp were 0.224 and 0.48%, respectively. Islam (2004) and Rahman (2003) reported that titrable acidity content of jackfruit and mango pulp was 0.25% and 0.18%. pH of jackfruit and mango pulps were 5.41 and 3.79, respectively. Percentage of carbohydrate was measured by subtracting the measured protein, fat, ash and moisture content from 100 (Pearson, 1976) which is indicated in Table 2. The TSS content of fresh jackfruit and mango pulps found in the study were 25 and 18%, respectively.

3.2 Mechanical drying of the pulps

The effects of thickness (using 3, 5 and 7 mm) on drying rate at constant temperature (60 °C) of jackfruit and mango pulp in mechanical dryer (Cabinet Dryer, Model No.:1816; Modern Laboratory Equipment Co., Inc. New York, USA) were tested. Another experiment was also performed with three different temperatures (55 °C, 60 °C and 65 °C) in a cabinet dryer at constant thickness (3 mm) to observe the effect of temperature on drying rate.

Table 1. Formulation of mixed leather

Sample code	Ingredients				
	Jackfruit pulp	Mango pulp	Sugar	Skim milk	KMS
401	15%	85%	4.50%	4.50%	0.05%
402	15%	85%	4.50%	4.50%	0.05%
403	15%	85%	–	4.50%	–
404	15%	85%	–	4.50%	–

KMS = Potassium metabisulphite;
Sample 401 = Fruit pulp with sugar and KMS; Sample 402 = Rehydrated dried pulp with sugar and KMS; Sample 403 = Fruit pulp without sugar and KMS, and Sample 404 = Rehydrated dried pulp without sugar and KMS

Table 2. Chemical composition of fresh jackfruit and mango pulps

Components	Fresh jackfruit pulp		Fresh mango pulp	
	% wb	% db	%wb	% db
Moisture content (%)	74.23	288.04	80.1	402.51
Total solid (%)	25.77	100	19.9	100
Carbohydrate (%)	22.76	88.32	17.5	87.94
Ash (%)	0.86	3.33	0.45	2.26
Protein (%)	1.55	6.02	1.2	6.03
Fat (%)	0.6	2.328	0.7	3.51
Vitamin C (mg $100g^{-1}$)	5.04	19.56	24.2	121.6
Titrable acidity (%)	0.224	0.869	0.48	2.41
pH	5.41	–	3.79	–
Total soluble solids	25	–	18	–

Table 3. Effect of thickness on rate constant at temperature 60 °C for different samples

Thickness	Rate constant (min^{-1})			
	Jackfruit pulp (JP)	Mango pulp (MP)	Steam blanched JP	Steam blanched MP
3 mm	0.009	0.0075	0.009	0.0075
5 mm	0.0076	0.0068	0.0076	0.0067
7 mm	0.0065	0.0063	0.0065	0.0058

Table 4. Effect of temperature on rate constant at a thickness of 3 mm for different samples

Temperature	Rate constant (min^{-1})			
	Jackfruit pulp (JP)	Mango pulp (MP)	Steam blanched JP	Steam blanched MP
55 °C	0.0081	0.0068	0.008	0.0068
60 °C	0.009	0.0075	0.0087	0.0075
65 °C	0.0095	0.0077	0.009	0.0078

Table 5. Mean score for colour, flavor, texture and overall acceptability of developed mixed leather

Sample	Sensory attributes			
	Colour	Flavour	Texture	Overall acceptability
401	7.70a	7.50a	7.90a	7.70a
402	7.30ab	6.20b	6.40bc	6.70bc
403	5.60c	5.60b	6.00c	6.10c
404	6.60b	6.60ab	7.00b	7.10ab

Sample 401 = Fruit pulp with sugar and KMS; Sample 402 = Rehydrated dried pulp with sugar and KMS; Sample 403 = Fruit pulp without sugar and KMS, and Sample 404 = Rehydrated dried pulp without sugar and KMS; Sample having the same letter suffix do not differ at 1% (P<0.01) level of significance.

3.2.1 Influence of thickness on drying behavior

To observe the influence of thickness on drying behavior of jackfruit and mango 3, 5 and 7 mm thick jackfruit and mango pulp were dried at three constant air dry bulb temperatures of 60 °C at a constant air velocity (0.6 m s^{-1}). The results were analyzed as per semi theoretical diffusion equation. The moisture ratio (MR) versus drying time (h) was plotted on a semi-log co-ordinate and regression lines were drawn (Fig. 1) and drying rate constants were obtained which is indicated at Table 3. For three different thickness of each sample, following regression equations were obtained.

For unblanched (Fresh) jackfruit pulp (for 60 °C)

$$MR = 0.883e^{-0.54t} \quad \text{(for 3 mm)} \tag{2}$$

$$MR = 0.919e^{-0.46t} \quad \text{(for 5 mm)} \tag{3}$$

$$MR = 0.958e^{-0.39t} \quad \text{(for 7 mm)} \tag{4}$$

For unblanched (Fresh) mango pulp (for 60 °C)

$$MR = 0.851e^{-0.45t} \quad \text{(for 3 mm)} \tag{5}$$

$$MR = 0.888e^{-0.41t} \quad \text{(for 5 mm)} \tag{6}$$

$$MR = 0.920e^{-0.38t} \quad \text{(for 7 mm)} \tag{7}$$

For steam blanched jackfruit jackfruit pulp (for 60 °C)

$$MR = 0.935e^{-0.52t} \quad \text{(for 3 mm)} \tag{8}$$

$$MR = 0.951e^{-0.44t} \quad \text{(for 5 mm)} \tag{9}$$

$$MR = 0.978e^{-0.39t} \quad \text{(for 7 mm)} \tag{10}$$

For steam blanched mango jackfruit pulp (for 60 °C)

$$MR = 0.836e^{-0.45t} \quad \text{(for 3 mm)} \tag{11}$$

$$MR = 0.871e^{-0.40t} \quad \text{(for 5 mm)} \tag{12}$$

$$MR = 0.907e^{-0.35t} \quad \text{(for 7 mm)} \tag{13}$$

Through analyzing from the above equations (2 to 13), Table 3 and Fig. 1, it is observed that thickness had profound influence on drying time and that as thickness of the sample at a constant temperature increased, the drying time to a specific moisture ratio (MR = 0.1) also increased with consequent decrease in drying rate constant. Thus to attain 0.1 moisture ratio (MR = 0.1), 3 mm thick sample required the least time followed by 5 mm and 7 mm thick samples took the highest time. As for example, for jackfruit pulp considering MR = 0.1, 3 mm thick sample required 4.03 h whereas 5 mm and 7 mm thick samples required 4.82 h and 5.79 h, respectively at 60 °C. In case of mango pulp, 3 mm thick sample required the least time (4.75 h) followed by 5 mm (5.83 h) and 7 mm (5.84 h) thick samples at 60 °C. On the other hand, for both the steam blanched jackfruit and mango pulp for MR = 0.1, 3 mm thick sample required the least time (4.29 h and 4.71 h) followed by 5 mm (5.11 h and 5.41 h) and 7 mm (5.84 h and 6.29 h) thick samples, respectively at 60 °C. It is also observed that drying rate constant decreases as the sample thickness increases. From the results it is also seen that jackfruit dried faster than mango for unblanched and blanched sample.

Considering blanched jackfruit and unblanched jackfruit, in all cases, it is found that drying rate constant is higher for unblanched jackfruit than steam blanched jackfruit pulp when sample thickness and temperature remained constant. While for mango, no appreciable difference in rate constant was found when blanched sample was compared to unblanched sample dried under similar conditions. The observed behavior may be attributed to structural and chemical compositions of jackfruit and mango. Different values of rate constant for 3 different thickness such as 3, 5 and 7 mm (Fig. 1, Table 3 and equations 2 to 13) were plotted on a log coordinates (Fig. 2) and regression lines were drawn and the following power-law equations obtained:

$$m = 0.013L^{-0.38} \quad \text{(FJP for 60 °C)} \tag{14}$$

$$m = 0.009L^{-0.20} \quad \text{(FMP for 60 °C)} \tag{15}$$

$$m = 0.013L^{-0.38} \quad \text{(SJP for 60 °C)} \tag{16}$$

$$m = 0.010L^{-0.29} \quad \text{(SMP for 60 °C)} \tag{17}$$

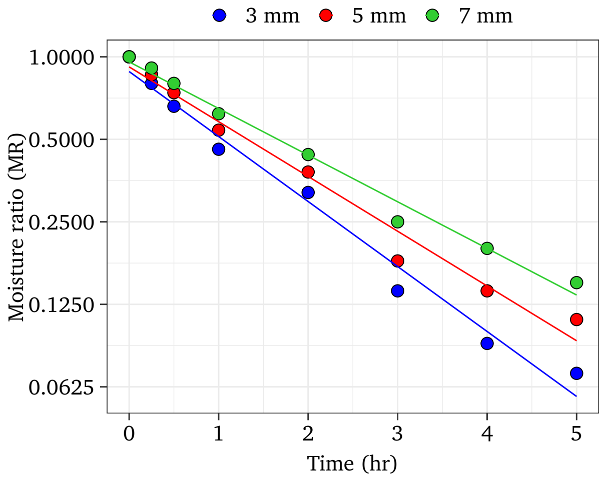

Figure 1. Influence of thickness on drying rate at 60 °C for jackfruit pulp

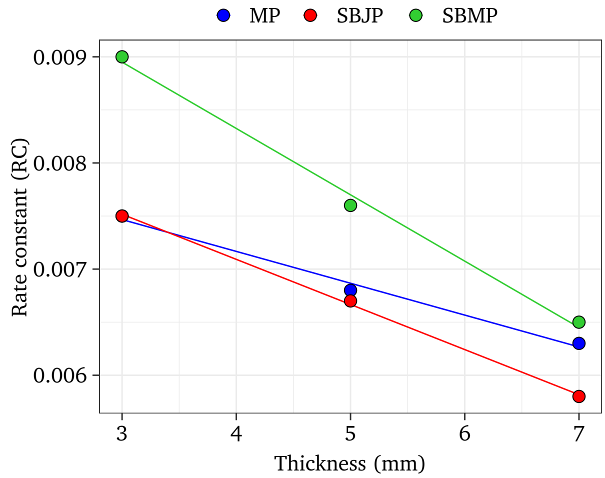

Figure 2. Influence of thickness on drying rate constant at 60 °C for different samples

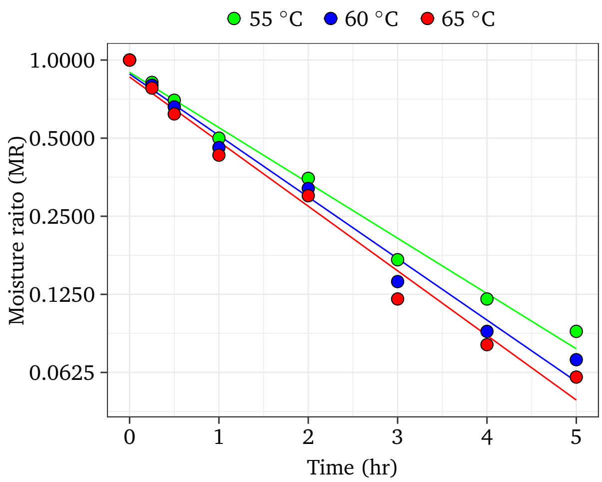

Figure 3. Influence of temperature on drying rate for 3 mm thick jackfruit pulp

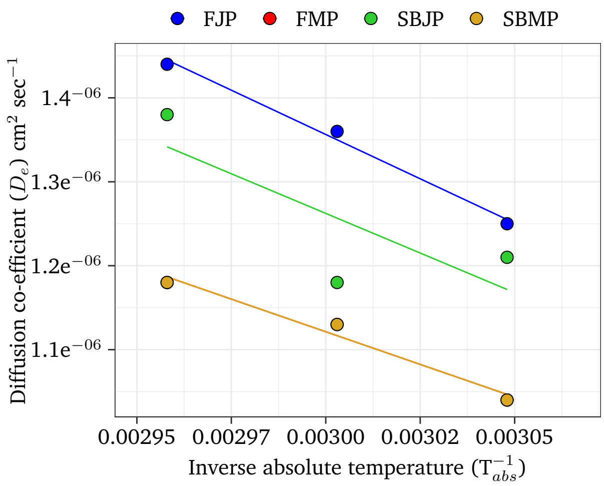

Figure 4. Effect of temperature on diffusion co-efficient of 3 mm thick samples

where, m = drying rate constant (min^{-1}), L = sample thickness (mm); FJP, FMP, SJP, and SMP denote fresh jackfruit pulp, fresh mango pulp, steam blanched jackfruit pulp, and steam blanched mango pulp, respectively. From Fig. 2 and equations 13 to 16, different value of index 'n' of the power law equation was obtained. For jackfruit pulp, value of index 'n' was 0.38 at 60 °C, whereas for mango pulp, value of index 'n' was 0.20 at 60 °C. On the other hand, for steam blanched jackfruit pulp, value of index 'n' was 0.38 at 60 °C, whereas for steam blanched mango pulp, value of index 'n' was 0.29 at 60 °C. In general the 'n' value varies from 0.19 to 0.54 and is lower than 2 as predicted by the Fick's 2nd law of diffusion. This indicates that the external resistance to mass transfer is highly significant under the given conditions. This also indicates that higher airflow rates will give higher drying rates. Iqbal and Islam (2005) determined 'n' value of 0.287 and 0.4105 for cauliflower and cucumber respectively. Sarker et al. observed an 'n' value of 0.459 during the drying of local variety potato (Lalpakri) at 50 °C. Rahman (2009) depicted the value of index 'n' as 0.94, 1.26 and 1.15 for 3, 5, and 7 mm during dehydration of green mango. The above difference of 'n' value was mainly due to airflow rate and thickness and demonstrates the relative importance of external or internal mass transfer resistance. However, product structure and composition and simultaneous heat and mass transfer effects also play important roles in this regard. The different 'n' values observed at different temperatures may be due to heat transfer effects which were assumed negligible for this analysis.

3.2.2 Influence of temperature on drying behavior

It was observed that drying time was least when the highest temperature (65 °C) was used for the samples of a given thickness (3 mm) followed by 60 °C, while at 55 °C required drying time was the highest for sample of similar thickness (Table 4 and Fig. 3). For example, for 3 mm thick sample of steam blanched jackfruit pulp, drying time to dry to MR = 0.1 was 4.16 h at 65 °C, 4.29 h at 60 °C and 4.67 h at 55 °C. From the drying rate constant for unblanched and blanched jackfruit and mango pulp dried at 55, 60 and 65 °C, diffusion coefficients were calculated. In order to show the temperature dependence of diffusion coefficients as per Arrhenius equation, diffusion coefficients were plotted against inverse absolute temperature on semi-log coordinates (Fig. 4) and regression lines obtained and the following equations developed:

$$D_e = 0.000e^{-1572}{T_{abs}}^{-1} \quad \text{(for 3 mm FJP)} \quad (18)$$

$$D_e = 8E - 05e^{-1403}{T_{abs}}^{-1} \quad \text{(for 3 mm FMP)} \quad (19)$$

$$D_e = 0.000e^{-1461}{T_{abs}}^{-1} \quad \text{(for 3 mm SJP)} \quad (20)$$

$$D_e = 8E - 05e^{-1403}{T_{abs}}^{-1} \quad \text{(for 3 mm SMP)} \quad (21)$$

where, D_e = diffusion co-efficient ($cm^2 s^{-1}$) and T_{abs} = absolute temperature (K).

From the above equations (equations 18, 19, 20 and 21) the activation energy for 3 mm thick samples were calculated and found to be 3.12 Kcal g-mole^{-1}, 2.786 Kcal g-mole^{-1}, 2.90 Kcal g-mole^{-1} and 2.786 Kcal g-mole^{-1} for the jackfruit, mango, steam blanched jackfruit and steam blanched mango pulps, respectively. The activation energy value found for fresh (unblanched) jackfruit pulp is higher than others. The calculated value for 3 mm thickness is lower than that (4.4 Kcal g-mole^{-1}) found for mango by Islam et al. (1997). The differences in activation energy might result from differences in product characteristics as well as process parameters, temperature employed for drying etc. as noted by Islam (1980) and Iqbal and Islam (2005). Villota and Hawkes (1992) stated that variation in activation energy value might be due to changes in temperature, physical state, enzyme activity etc.

3.3 Sensory evaluation of the leather

The mean score for color, flavor, texture and overall acceptability of developed leather are given in Table 5. In case of color, flavor, texture and overall acceptability a two way analysis of variance (ANOVA) showed that there is significant difference (($P<0.01$) in all cases of all samples which indicates that the samples were not equally accepted. Sample 401, secured the highest score (7.70) while sample 403 secured the lowest score (5.60). It is observed that ingredients specially sugar change the color of leather. In sample 403 and 404 as no sugar is added, color of these samples is significantly different from samples 401 and 402 which secured higher scores. In case of flavor, it is seen that sample 401secured the highest score (7.50) while the lowest score was secured by sample 403 (score 5.60). In case of texture, it is seen that the lowest score was secured by sample 403 (score 6.00), whereas the highest score was secured by sample 401 (score 7.90). In case of overall acceptability of leather, sample 401 secured the highest score (7.70) while sample 403 secured the lowest score (6.10).

4 Conclusions

Study of drying kinetics revealed that the rate constant decreased with increasing thickness and increased with increasing temperature. The dependence of drying rate constant on thickness of jackfruit and mango pulp was determined and expressed as power law equation and different value of index 'n' of the power law equation was obtained and these were lower than 2 as predicted by the Fick's 2nd law of diffusion. Three different temperatures (55, 60 and 65 °C) were used to determine the effect of temperature on drying behavior of 3 mm thick unblanched and blanched jackfruit and mango pulps in mechanical dryer and an Arrhenius type relationship was developed from which the activation energy was calculated as 3.12 Kcal g-mole^{-1}, 2.786 Kcal g-mole^{-1}, 2.90 Kcal g-mole^{-1} and 2.786 Kcal g-mole^{-1} for the jackfruit, mango, steam blanched jackfruit and steam blanched mango pulps respectively. For mixed leather, results of taste panel showed that sample 401 secured highest score. Therefore it can be said that good quality mixed mango and jackfruit leather could be developed. Mixing jackfruit with mango will result in lower cost of production. Extended shelf life with higher moisture content will also reduce cost of production with increased marketing and consumption.

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Conflict of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

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