5. SUMMARY AND CONCLUSION

Efficiency of degumming was evaluated on the basis of p content, FFA, color of degummed oil and residual oil content in gums separated. It was found that the p content in oil, degummed enzymatically was lesser as compared to acid degummed oil. After enzymatic degumming, the residual oil percentage was increased to 69.19 from an initial value of 55.98 while the residual gums were reduced to 30.81 from an initial value of 49.02 when the concentration of enzyme was increased from 40 to 65g/ton. These values were observed better when compared to similar parameters after acidic degumming. The decline in colour and FFA were also more after enzymatic degumming as compared to acidic degumming of oil. The residual chlorophyll content was reduced more when the concentration of phosphoric acid was raised to 3.5 kg/ton after acidic degumming.

Increasing the storage time had an adverse effect on different physico-chemical parameters of all the samples. An increase in free fatty acids, colour, PV and PAV was observed in all samples, whereas the blended oil, consisting of PRBO and SAF (safflower oil) showed least changes after 11 months of storage as compared to the PRBO and blended oil (PRBO+SNF). All the samples were acceptable even after 11 months of storage as changes were within limits. The data observed for all the physico-chemical parameters concluded the superiority of laminate pouches over glass and PET bottles. Laminated pouches and glass bottles are most useful for long term storage as physio-chemical characteristics of all oil samples were not changed or minutely changed, thus making it most appropriate for storage in comparison to PET bottles. The results obtained showed that the amount of unsaturated fatty acids decreased gradually during storage at room temperature in all the packaging materials.
The blended oils consisting different proportions of physically refined rice bran oil with sunflower and safflower oil were analysed for their physicochemical properties. On increasing the proportion of PRBO in blend, significant changes were found in ultrasonic velocity, relative association and acoustic impedance at 2 MHz, iodine value, palmitic acid content, and oryzanol content. SV, RI and SG values were not considered as dependent parameters for quantifying PRBO in blended oil whereas the range of IV for PRBO, SnF and SAF were significantly different therefore IV can be used as an indicator for quantification of PRBO in the blend. The ultrasonic velocity at 2 MHz of blend containing 1% of PRBO and 99% sunflower oil was 728 which decreased to 720 when the proportion of PRBO in blend was increased to 20%, indicating the suitability of the method. The oryzanol content in rice bran oil may be considered as the best indicator to quantify the proportion of rice bran oil. The study revealed that regression equations based on the oryzanol content, palmitic acid composition, ultrasonic velocity, relative association, acoustic impedance, and iodine value can be used further for the quantification of rice bran oil in blended oils. However, study pertaining to the quantification of individual oil by implementing ultrasonic velocities, acoustic impedance and relative association is further required to be explored in depth.

Microwave heating time is associated with the absorptivity and this analysis may be adopted to compare the oxidative analysis of oils under microwave heating. The peroxide values obtained from the correlations during the oven test were found closely correlated with the peroxide values obtained during the microwave oven heating experimentally, indicating the suitability of the oven test to predict the auto-oxidation during the microwave heating. The oryzanol content and p-anisidine values obtained after oven heating when correlated to the microwave heating, data showed the oryzanol content 13,371, 13,267 and 13,188 ppm after 1 day, 4 days and 5 days respectively which were closely correlated with the experimental value.
The study concluded that the moisture content in the product has a dominating effect in more deterioration of oils during deep fat frying process. The higher moisture content in the potato chips sharply brought changes much earlier in the gamma-oryzanol content of rice bran oil. Blended oil showed better stability as compared to pure rice bran oil when used to fry both dried and moistened potato chips. This is evident from the lower values of different physico-parameters i.e. peroxide value, free fatty acid, iodine values, colour, p-anisidine values and gamma-oryzanol values during the repeated deep fat frying cycles. The oil uptake was increased with the repeated deep fat frying cycles for both RBO and blended oils. The oil uptake was significantly higher in the moistened potato chips as compare to the dried potato chips. Trans fatty acids increased with repeated deep fat frying cycles in both the rice bran and blended oils, when used to fry moistened and dried potato chips. Both the oil samples showed greater formation of trans fatty acids when the moistened potato chips were used during frying. However, the blended oil samples were found better as the samples were acceptable even after sixth cycle of deep fat frying, when used to fry dried potato chips.