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## LIST OF ABBREVIATIONS

<b>Abbreviation</b>	<b>Meaning</b>
<b>AOAC</b>	Association of Official Analytical Chemists
<b>BSH</b>	Bile salt hydrolase
<b>cfu</b>	Colony forming unit
<b>DPPH</b>	2, 2-diphenyl-1-picrylhydrazyl radical
<b>FAO</b>	Food and Agriculture Organization
<b>Ig A</b>	Immunoglobulin A
<b>LAB</b>	Lactic acid bacteria
<b>TSS</b>	Total Soluble Solids
<b>RBC</b>	Red blood cells count
<b>HCT</b>	Hematocrit
<b>MCH</b>	Mean cell hemoglobin
<b>HGB</b>	Hemoglobin
<b>MCV</b>	Mean corpuscular volume
<b>MCHC</b>	Mean cell hemoglobin concentration
<b>SOD</b>	Superoxide dismutase
<b>GSH</b>	Glutathine reductase



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**ABSTRACT**

A great global interest in developing processing and consuming functional foods has emerged because of the increasing clinical evidence on the health promoting impacts of these foods. So, some fruit and vegetable juices mixed to obtain functional and nutraceuticals fruit and vegetable nectar blends. Different levels (10, 15 and 20%) of aromatic plant extracts namely, ginger, rosella, peppermint and aloe vera, which are rich sources of phytochemicals, were mixed with selected nectar blends to enhance the bioactive compounds of nectar blends and improve the flavors, antioxidant activity and functional properties. The main physico-chemical properties, bioactive compounds and antioxidant activity of selected fruit and vegetable nectar blends were determined. The most palatable medicinal fruit and vegetable nectar blends (F1G, F2R and V3P) were selected and fermented using three strains of *Lactobacillus* sp. in free and encapsulated cell forms and prepared to obtain the fermented medicinal fruit and vegetable nectar blends. The effect of storage period on some chemical properties, *Lactobacillus* sp. viability (log CFU/ml) and bioactive compounds and antioxidant activity of selected fermented medicinal fruit and vegetable blends were studied. Also, the most palatable medicinal fruit and vegetable nectar blends (F1GCE, F1GAE, F2RCE, F2RAE, V3PAE) used in the previous part of study were gavaged to the rats and compared with its original nectar blends (F1G, F2R and V3P, respectively) as control positive groups to determine the biological effects of receiving probioticated fermented medicinal fruit and vegetable nectar blends on rats. Also, negative control group was gavaged water instead of nectar blends.

The obtained results revealed that, fruit and vegetable nectar blends had antioxidant activity higher than sole fruit nectars. Antioxidant activity of all medicinal extracts. Roselle and peppermint extracts had the highest antioxidant activity. Twelve flavonoid and twenty-six phenolic compounds were separated from medicinal extracts and identified by HPLC. Roselle and peppermint extracts were more effective than aloe vera and ginger extracts. All medicinal extracts increased flavonoid and phenolic compounds contents of fruit nectar blends and improved the bioactive compounds content which had healthy benefits of these blends. Moreover, fermented samples with *Lactobacillus acidophilus* were more palatable more than samples fermented with *Lactobacillus casei* followed by *Lactobacillus plantarum*. Also, nectar blends fermented with encapsulated probiotic cells were more palatable than samples fermented with free form of probiotic cells. Also, nectar blends fermented with encapsulated probiotic bacteria cells had better chemical properties compared with nectar blends fermented with free probiotic bacteria cells. The encapsulated probiotic bacteria which were protected from the acidic environment of the nectar blends did not lose their viability as rapidly as the free probiotic bacteria and  $> 10^6$  CFU/mL were still present after four weeks of storage. Also, receiving of fermented selected medicinal fruit and vegetable blends had enhanced immunomodulatory effect and health parameters.

**Keywords:** Functional foods, Fruit blends, medicinal extracts, antioxidant activity, bioactive compounds. Probiotic, *Lactobacillus*, immunity, IgA.