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Short Communication

Utilizing Tocopherols/Phytosterols Obtained from Pequi (*Caryocar brasiliansis* Camb.) for Complementing Chemotherapy for Breast Cancer treatment/alone -New Herbal Therapy for Improving 5-year Survival- A Short Communication

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The incidence along with mortality of cancer is escalating at a fast pace all over the world with Breast Cancer (BC) representing a commonest cancer which is diagnosed in females as well as biggest etiology for mortality amongst them [1]. The utilization of novel drugs in addition to alternative treatments which work against cancer in view of manipulation of the immune system that get derived from the natural products like fruits is intriguing in view of considerable decrease in inimical actions. Induction of tumor cell demise in particular is necessary with normal cells not getting influenced or these actions are decreased to the minimum. Intriguingly, the utilization of peripheral blood is done which is of interest regarding evaluation of the functional capacity of subgroups of immune cells [2].

The bioactive agent obtained from the Brazilian Cerrado plants along with its anti-oxidant actions are correlated with anti-proliferative effects in case of breast cancer cells [3]. Pequi (*Caryocar brasiliansis* Camb.) represents an oleaginous fruit canonically from the Brazilian Cerrado, constituted of exocarp (outer green bark), mesocarp (inner area of bark) endocarp (orange or yellow pulp) thorn as well as seed layer,that possess the bioactive agents possessing anti-oxidant characteristics like carotenoids, basically **β**-carotene as well as lycopene along with ascorbic acid [4]. Pequi almond oil possesses enrichment of tocopherols along with phytosterols [5]. Nevertheless, the biological characteristics of Pequi oil might vary as per the source of the oil (pulp or almond) [6]. Other than their cardiovascular in addition to robust antioxidant effects tocopherols along with phytosterols might further possess anticancer characteristics that have been illustrated in prior studies [7]. Thus Moraes Brito., *et al*. [8], with the objective of identifying the basic agents present in Pequi pulp in addition to oil (hydrophilic as well as lipophilic) besides validating their modulatory actions on Oxidative stress (OS) of peripheral blood mononuclear cells which got cocultured with MCF7 breast cancer cells. Regarding identification in addition to quantification of the major bioactive agents of Pequi pulp in addition to oil (hydrophilic as well as oil lipophilic) extracts were carried out with utilization of liquid chromatography which is coupled with tandem liquid chromatography mass spectrometry (MS) (LC- MS/MS), whereas the anti-oxidant capability *in vitro* was estimated by utilization of approaches dependent on single electron transport reaction or hydrogen atom transfer, whereas for anti-oxidant along with anti-proliferative effects *ex vivo* enrolment of 20 healthy volunteers was done. Human peripheral blood mononuclear (MN) cells were withdrawn along with cellular viability assay by MTT3 (4,5di methylthiazol-2y, -2,4diphenyl tetrazolium bromide) superoxide anion as well as CuZn superoxide dismutase (CuZn SOD) estimation in MN cells. MCF7 cells along with coculture of MN cells as well as MCF7 cells with or without pequi pulp or oil (hydrophilic as well as lipophilic) was conducted. Their observation was that in the hydrophilic extract, the pequi pulp possessed the maximum phenolic quantities, whereas oil lipophilic extract possessed the maximum quantities of carotenoids. The major phytosterols in pequi oil was β-sitosterol (10.22mg/g) along with major tocopherol was **γ**tocopherol (26.24**μ**g/g sample). The extracts possessing maximum quantities of bioactive agents resulted in stimulation of blood mononuclear

(MN) cells along with enhancement of SOD action. Assessment of the extracts against MCF7 cells along with coculture illustrated that they possessed cytotoxic actions. Thus Moraes Brito., *et al*. [8], concluded that pequi extracts possessed anticarcinogenic actions with pequi pulp possessing greater immunomodulation properties [8] (Figure 1-3).

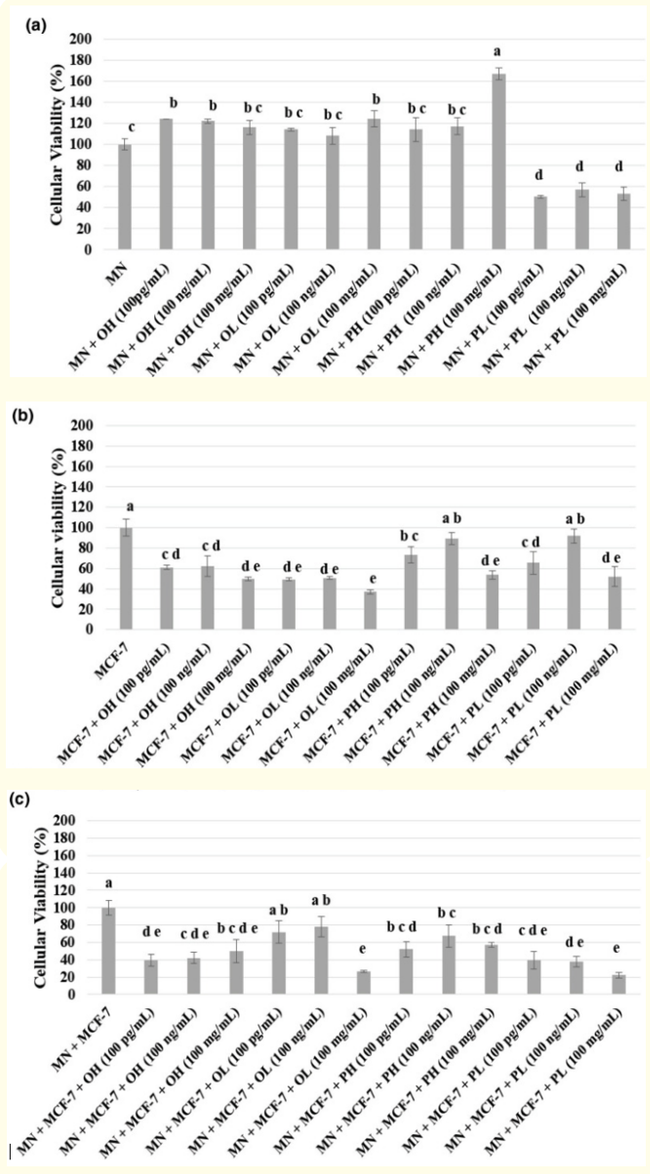

Figure 1: Courtesy ref no-8-Cellular viability in blood mononuclear cells (a), MCF-7 breast cancer cells (b), and coculture of MN cells with MCF-7 breast cancer cells (c) quantified in the presence of the pequi pulp or oil hydrophilic and lipophilic extracts, treated with different concentration, 100 pg/mL, 100 ng/mL, and 100 mg/mL. MN: Blood Mononuclear Cells; PH: Pulp Hydrophilic Extract; PL: Pulp Lipophilic Extract; OH: Oil Hydrophilic Extract; OL: Oil Lipophilic Extract. Results are expressed in average ± standard deviation, n = 4. *Means followed by the same letter do not differ significantly and means followed by different letters differ significantly by the Tukey test ($P < 0.05$).

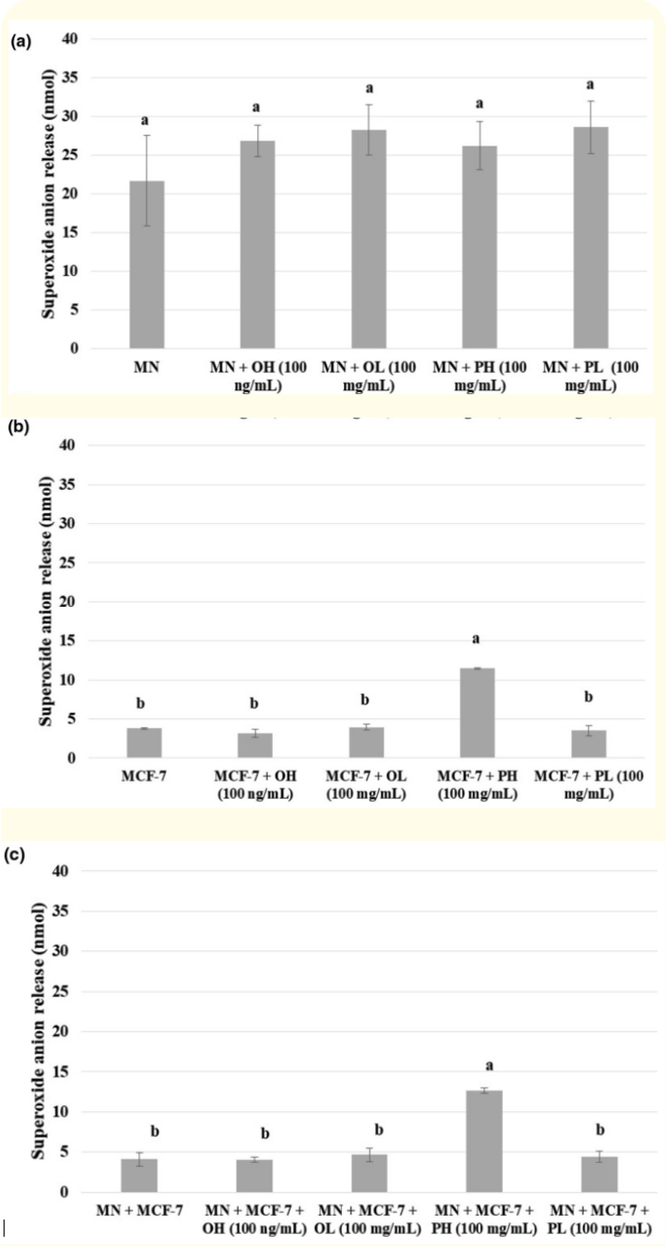

Figure 2: Courtesy ref no-8-Superoxide anion release (O2 ●-) in blood mononuclear cells (a), MCF-7 breast cancer cells (b), and coculture of MN cells with MCF-7 breast cancer cells (c) quantified in the presence of the pequi pulp or oil hydrophilic and lipophilic extracts. MN: Blood Mononuclear Cells; PH: Pulp Hydrophilic Extract; PL: Pulp Lipophilic Extract; OH: Oil Hydrophilic Extract; OL: Oil Lipophilic Extract. Results are expressed in average ± standard deviation, n = 5. *Means followed by the same letter do not differ significantly and means followed by different letters differ significantly by the Tukey test ($P < 0.05$).

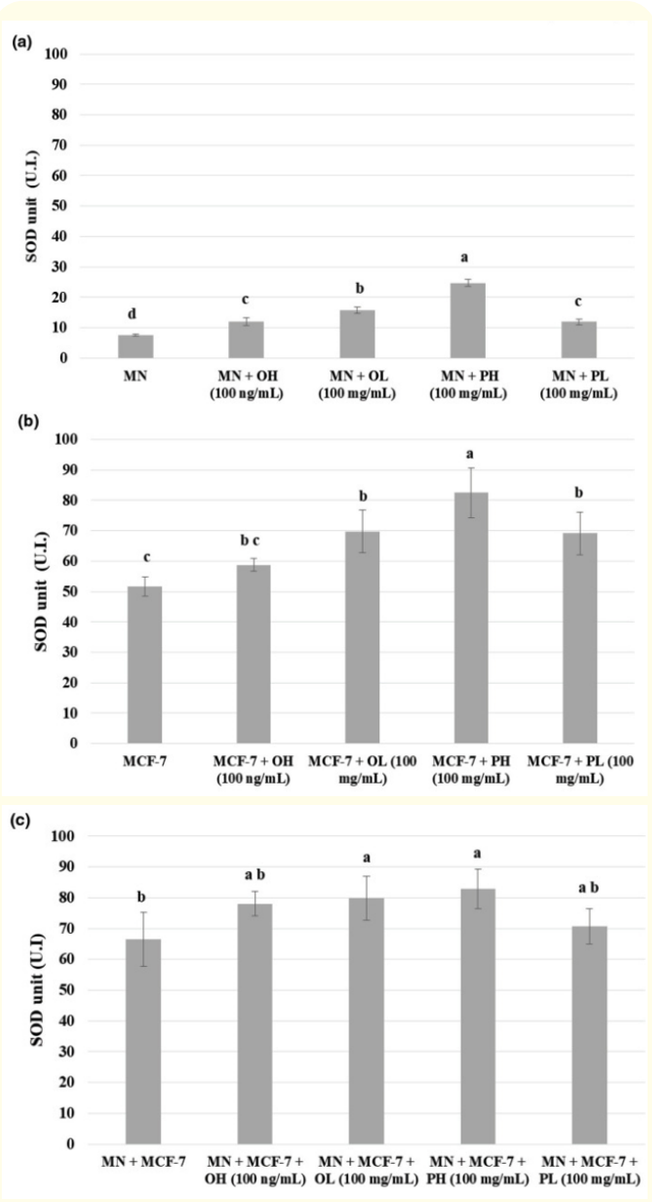

Figure 3: Courtesy ref no-8-Dismutation value of SOD by blood mononuclear cells (a), MCF-7 breast cancer cells (b) and co-culture of MN cells with MCF-7 breast cancer cells (c) quantified in the presence of the pequi pulp or oil hydrophilic and lipophilic extracts of pequi pulp and oil. MN: Blood Mononuclear Cells; PH: Pulp Hydrophilic Extract; PL: Pulp Lipophilic Extract; OH: Oil Hydrophilic Extract; OL: Oil Lipophilic Extract. Results are expressed in average ± standard deviation, n = 3. * Means followed by the same letter do not differ significantly and means followed by different letters differ significantly by the Tukey test ($P < 0.05$).

Conclusions

Earlier we had reviewed the detailed etiopathogenesis, treatment of BC, besides update on management of triple negative breast can cer along with how Dysregulated Cholesterol Metabolism including Oxysterols were implicated in the Pathophysiology of Breast Cancer along with use that pathway for treating it [9-11]. However most chemotherapy agents tend to possess lot of toxicity. Hence there is need for looking for such naturally occurring agents that possess **a**nti proliferative activity as well as anti-oxidant actions, thus immunomodulatory actions and anti-cancer agents. Hence we have presented how pequi pulp that possesses maximum immunomodulation properties of the agents studied along with other parts of Pequi (*Caryocar brasiliansis* Camb.) might work in the form of anticancerous agents or complement existing chemotherapies. Furthermore, Phytosterols obtained from them are known to hamper the side chain Oxysterol modulated activation of LXR in Breast Cancer giving additional mode for targeting BC.

Bibliography

1. Bray F., *et al*. "Global cancer statistics 2018: globocan estimates of incidence and mortality worldwide for 36 cancers in 185 countries". *CA: A Cancer Journal for Clinicians* 68 (2018): 394-424.

2. Cimino Mathews A., *et al*. "Targeting in Breast Cancer". *Oncology* 29.5 (2015): 375-385.

3. OmbredaneAS., *et al*. "Nanoemulsion based system as a promising approach for enhancing the anti tumoral activity of Pequi oil (*Caryocar brasiliansis* Cambess) in Breast Cancer". *Journal of Drug Delivery Science and Technology* 58 (2020): 101819.

4. Traessel GK. "Safety assessment of oil from Pequi (*Caryocar brasiliansis* Camb.): evaluation of potential genotoxic and elastogenic effects". *Journal of Medicinal Food* 20.8 (2017): 804-811.

5. Torres LRO., *et al*. "Physicochemical and anti oxidant properties of the Pequi (*Caryocar brasiliansis* Cambess) almond oil obtained by homemade and cold -pressed processes". *International Food Research Journal* 23.4 (2016): 1541-1551.

6. Faria-Machado A., *et al*. "Discrimination of pulp oil and kernel oil from Pequi (*Caryocar brasiliansis* Camb.) by fatty acid methyl esters fingerprinting, using GC-FIDand multivariate analysis". *Journal of Agricultural and Food Chemistry* 63.45 (2015): 10064-10067.

7. Hutchinson SA., *et al*. "Phytosterols inhibit side chain Oxysterol mediated activation of LXR in Breast Cancer cells". *International Journal of Molecular Sciences* 20 (2019): 3241.

8. Moraes Brito R., *et al*. "Bioactive compounds of Pequipulp and oil modulate anti oxidant and anti-proliferative activity in co-cultured blood mononuclear cells and breast cancer". *Food and Nutrition Research* 66 (2022): 8782.

9. Kulvinder Kochar Kaur., *et al*. "Novel ways of targeting triple negative breast cancer (TNBC) with the latest research-Will it improve prognoses". *Journal of Gynecology* (2019).

10. Kulvinder Kochar Kaur., *et al*. "An update on the screening, diagnosis and management of breast cancer: A review with considerations for future fertility". *International Journal of Medical and all body Health Research* 2.4 (2021): 40-53.

11. Kulvinder Kochar Kaur., *et al*. "Dysregulated Cholesterol Metabolism including Oxysterols in the Pathophysiology of Breast Cancer: Therapeutic Implications -A Narrative review". *Acta Scientific Cancer Biology* 7.1 (2023): 07-14.