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Study on resistant starch supplementation effect on total cholesterol: Review of literature

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Abstract
The present study is a review study on effect of resistant starch on total cholesterol. From the review it can be concluded that the resistant starch has significant lowering effects of serum total cholesterol. It significantly lowered plasma cholesterol and is more effective in lowering plasma triglycerides. Resistant starch consumption resulted in lower HDL cholesterol.

Keywords: Resistant starch, serum cholesterol, plasma triglycerides and HDL cholesterol

Introduction
With the rising figures in obesity, diabetes, cardiac problems, there is an increased demand for health benefiting compounds and functional foods which reduce the risk of disease and promote better health. One among such compounds is resistant starch. In the last decade, starch resistant to the hydrolytic activity of human digestive tract enzymes has attracted a lot of interest of nutritionists, physiologists and also physicians. The European PLAIR Concerted Action on Resistant Starch (EURESTA) has defined resistant starch (RS) as the sum of starch and products of starch hydrolysis not absorbed in the small intestine of healthy individuals.

Resistant starch supplementation effect on Total Cholesterol
Park *et al*. (2004) [5] this study was examined the effect of resistant starch on hypolipidemic actions, blood glucose, insulin levels and humoral immune responses in healthy overweight subjects. Healthy overweight subjects (over 120% of their ideal body weights) were fed either 24 g/d of resistant corn starch (RS) or regular corn starch (CS) for 21 d with their regular meals. Although this double-blind feeding regiment resulted in no significant changes in their weights or other physical parameters for the relatively acute period of intakes, there were significant lowering effects of serum total cholesterol ($p < 0.05$) in subjects supplemented RS, Compared with the control starch group.
Ha *et al.* 2012 [1] the effects of retrograded rice on body weight gain, gut functions, and hypolipidemic actions in rats were examined in this study. retrograded rice was produced by repetitive heating and cooling cycles, it contained significantly higher amounts of resistant starch (13.9 ± 0.98%) than is found in common rice (9.1 ± 1.02%) ($P < 0.05$). The retrograded rice group had significantly lowered plasma cholesterol ($P < 0.05$). When compared to those in the common rice group. This study resulted that the retrograded rice had higher resistant starch levels compared with those of common rice powder, and it lowered body weight gain and improved lipid profiles and gut function in rats.

Resistant starch supplementation effect on Triglyceride Cholesterol
Lopez *et al.* (1995) the effects of raw potato starch (RPS) and high amylose corn starch (HAS) on cecal digestion, lipid metabolism and mineral utilization (Ca and Mg) were compared in rats adapted to semipurified diets. The diets provided either 710 g wheat starch/100 g diet (control) alone or 510 g wheat starch/100 g diet plus 200 g resistant starch/100 g (RPS or HAS). Compared with rats fed the control diet, significant cecal hypertrophy (240% after 7 d of the fiber consumption) and short-chain fatty acids accumulation (especially propionic and butyric acids) occurred after both resistant starch diets. There were lower concentrations of triglycerides (-53 and -47%, respectively) in the livers of RPS- and HAS-fed rats.
Younes *et al*. 1995 [6] studied the effect of supplementation of RS (25% raw potato starch), of a steroid sequestrant (0.8% cholestyramine), or both were compared on bile acid excretion and lipid metabolism in rats fed semipurified diets. RS diets led to a marked rise in cecal size and the cecal pool of short-chain fatty acids (SCFA), as well as SCFA absorption; cholestyramine did not noticeably affect cecal fermentation. Whereas cholestyramine was particularly

effective at enhancing bile acid excretion, RS was more effective in lowering plasma triglycerides (-29%).

Heijnen's, 1996 study designed in a randomized, single-blind, 3×3 Latin-square study (total of 57 subjects), in which the subjects received 30 g of raw (RS2; Hylon VII, National Starch) or retrograded RS (RS3; Novelose, National Starch) vs. glucose during three weeks. In a study of Behall and Howe (1995), the subjects received approximately 200 g raw high-amylose (vs. low-amylose) corn starch (RS2) per day. They observed a significant decrease in triacylglycerol after the first four weeks of supplementation.

Resistant starch supplementation effect on High density lipoprotein Cholesterol

Nichenametla. *et al*. (2014) [4] examined the effects of a blinded exchange of RS4-enriched flour (30% v/v) with regular/control flour (CF) diet on multiple MetS (Management of metabolic syndrome) comorbidities. In a double blind (participants-investigators), placebo-controlled, cluster cross-over intervention (n = 86, age≥18, 2-12 week interventions, 2-week washout) in the United States, individuals were classified as having MetS (With-MetS) or not (No-MetS). RS4 consumption compared with CF resulted in 12.8% ($p < 0.001$) lower HDL cholesterol in the With-MetS group.

Resistant starch supplementation effect on Low density lipo protein Cholesterol

Park *et al*. (2004) [5] study examined the effect of resistant starch on hypolipidemic actions, blood glucose, insulin levels and humoral immune responses in healthy overweight subjects. Healthy overweight subjects (over 120% of their ideal body weights) were fed either 24 g/d of resistant corn starch (RS) or regular corn starch (CS) for 21 d with their regular meals. Although this double-blind feeding regiment resulted in no significant changes in their weights or other physical parameters for the relatively acute period of intakes, there were significant lowering effects of serum LDL-cholesterol ($p < 0.05$) in subjects supplemented RS, Compared with the control starch group.

Conclusion

RS supplementation improves the blood lipid profile and controls the blood glucose levels in healthy overweight subjects without bowel discomfort. Therefore, RS can be used promising food ingredients for reducing risk factors involved in diabetic and overweight individuals. Resistant starch intake seems to decrease postprandial glycemic and insulinemic responses, lower plasma cholesterol and triglyceride concentrations, improve whole body insulin sensitivity, increase satiety, and reduce fat storage.

References

1. Ha AW, Han GJ, Kim WK. Effect of retrograded rice on weight control, gut function, and lipid concentrations in rats. Nutrition Research. 2012; 56:4-6.
2. Heijnen ML, van Amelsvoort JM, Deurenberg P, Beynen AC. Neither raw nor retrograded resistant starch lowers fasting serum cholesterol concentrations in healthy normolipidemic subjects. Biosci Biotechnology Biochemistry, 2005.
3. Lopez HW, Levrat-Vemy MA, Coudray *C,* Besson c, Krespine V, Messager A, *et al.* Class 2 resistant starches lower plasma and liver lipids and improve mineral retention in rats. Journal of Nutrition. 2001; 131:1283-1289.
4. Nichenametla SN, Weidauer LA, Wey HE, Beare TM, Specker BL, Dey M. Resistant starch type 4-enriched diet lowered blood cholesterols and improved body composition in a double blind controlled cross-over intervention. American journal of clinical nutrition. 2014; 32:62-67.
5. Park OJ, Kang NE, Chang MJ, Kim WK. Resistant starch supplementation influences blood lipid concentrations and glucose control in overweight subjects. Journal of Nutritional Science Vitaminol. 2004; 50(2):93-9.
6. Younes H, Levrat MA, Demige C, Remesy C. Resistant starch is more effective than cholestyramine as a lipid-lowering agent in the rat. Lipids. 1995; 30:847-853.